

1 GULF OF MEXICO FISHERY MANAGEMENT COUNCIL
2
3 MEETING OF THE STANDING SCIENTIFIC AND STATISTICAL COMMITTEE
4
5 JULY 31-AUGUST 1, 2024
6

7 **STANDING SSC VOTING MEMBERS**

8 Jason Adriance.....
9 Luiz Barbieri.....
10 Harry Blanchet.....
11 David Griffith.....
12 Tiffany Hopper.....
13 Jack Isaacs.....
14 John Mareska.....
15 Paul Mickle.....
16 Trevor Moncrief.....
17 Jim Nance.....
18 Will Patterson.....
19 Daniel Petrolia.....
20 Andrew Ropicki.....
21 Steven Saul.....
22 Steven Scyphers.....
23

24 **STAFF**

25 John Froeschke.....Deputy Director
26 Sarah Gardiner.....Fishery Biologist
27 Lisa Hollensead.....Fishery Biologist
28 Jessica Matos.....Administrative and Accounting Technician
29 Carrie Simmons.....Executive Director
30 Verena Wang.....Fishery Biologist
31

32 **OTHER PARTICIPANTS**

33 Shannon Cass-Calay.....SEFSC
34 Tom Frazer.....GMFMC
35 Bridgette Froeschke.....
36 Challen Hyman.....
37 Mara Levy.....NOAA GC
38 Julie Neer.....SEDAR
39 Cassidy Peterson.....SEFSC
40 Katie Siegfried.....SEFSC
41 Nathan Vaughn.....SEFSC
42

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44

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- - -

1 The Meeting of the Gulf of Mexico Fishery Management Council
2 Standing Scientific and Statistical Committees convened at the
3 Gulf Council Office in Tampa, Florida on Wednesday, July 31, 2024,
4 and was called to order by Mr. Ryan Rindone.
5

6 **INTRODUCTIONS**
7 **ADOPTION OF AGENDA**
8

9 **MR. RYAN RINDONE:** All right. I am going to introduce everything
10 this morning, and get the ball rolling, and, after introductions
11 and whatnot, we'll do the election for the chair and vice chair.
12

13 Good morning, my name is Ryan Rindone, and I am the Gulf Council
14 staff lead for the Scientific and Statistical Committee of the
15 Gulf of Mexico Fishery Management Council. We appreciate your
16 attendance and input in this meeting. We would like to welcome
17 the reappointed and new SSC members and thank you all for your
18 participation. Representing the council is Dr. Tom Frazer, over
19 here on my left.
20

21 Council Staff in attendance include our Executive Director Carrie
22 Simmons, our Deputy Director John Froeschke, Fishery Biologist
23 Lisa Hollensead, and then our admin back here, Jessica Matos.
24 Notice of this meeting was provided to the Federal Register, sent
25 via email to subscribers of the council's press release email list,
26 and was posted to the council's website.
27

28 This week's meeting will include the following topics. We'll adopt
29 our agenda, and we'll go through the scope of work piece-by-piece,
30 as we go to each agenda item. We'll do our election for the chair
31 and vice chair, approve our minutes from the last meeting, and
32 we're going to go through an SSC member general orientation with
33 Dr. Simmons and Ms. Kathy Pereira, who is our Travel Coordinator,
34 and I'm going to give you a SEDAR process orientation and
35 engagement.
36

37 The Science Center will provide -- The Southeast Fisheries Science
38 Center will provide presentations on management strategy
39 evaluation and SEDAR assessment process changes and model
40 complexity. Dr. Bridgette Froeschke will give a presentation on
41 our essential fish habitat contract review. Dr. Challen Hyman
42 will give a presentation on the influence of timing and duration
43 of recreational seasonal harvest restrictions on gag effort,
44 harvest, and discards in the Gulf.
45

46 Then the Science Center will give another presentation on ABC
47 Control Rule modifications. Dr. Nathan Vaughn, who I thought I
48 saw, will give a presentation on a RESTORE project that focuses on

1 updating how we do our projections. Then Dr. Will Patterson will
2 give a presentation on regional and sector-specific Gulf of Mexico
3 age, growth, and age-length key estimation derived from otolith-
4 based ageing for gray triggerfish. Then council staff will review
5 our research and monitoring priorities for the next four years.
6 At the each of day, today and tomorrow, we'll receive public
7 comment, and, at the end of the day tomorrow, we'll conclude with
8 any Other Business items.

9
10 This webinar is open to the public and is being streamed live and
11 recorded. A summary of the meeting and verbatim minutes will be
12 produced and made available to the public via the council's
13 website.

14
15 For the purpose of voice identification, and to ensure you are
16 able to mute and unmute your line, please identify yourself by
17 stating your full name when your name is called for attendance.
18 Once you have identified yourself, please re-mute your line. If
19 you're on the webinar, we'll be using the raise-hand function for
20 the SSC chair to help recognize you to speak. Jess will type
21 names up on a little memo pad, that you will see on the screen.
22 The chair will be keeping track of hands in the meeting room as
23 well, to add to the list. We'll start on my left, Dr. Frazer,
24 with you.

25
26 **DR. TOM FRAZER:** Tom Frazer, Gulf Council.

27
28 **DR. JIM NANCE:** Jim Nance, SSC.

29
30 **DR. ANDREW ROPICKI:** Andrew Ropicki, SSC.

31
32 **DR. PAUL MICKLE:** Paul Mickle, SSC.

33
34 **MR. JOHN MARESKA:** John Mareska.

35
36 **DR. DAN PETROLIA:** Dan Petrolia.

37
38 **DR. CASSIDY PETERSON:** Cassidy Peterson, Southeast Fisheries
39 Science Center.

40
41 **DR. STEVEN SCYPHERS:** Steven Scyphers.

42
43 **MR. JASON ADRIANCE:** Jason Adriance.

44
45 **DR. STEVEN SAUL:** Steven Saul.

46
47 **DR. NATHAN VAUGHN:** Nathan Vaughn.

48

1 **DR. WILL PATTERSON:** Will Patterson.
2
3 **DR. JACK ISAACS:** Jack Isaacs.
4
5 **DR. DAVID GRIFFITH:** David Griffith, SSC.
6
7 **MR. RALPH TOWNSEND:** Ralph Townsend.
8
9 **DR. TIFFANY HOPPER:** Tiffany Hopper.
10
11 **MR. TREVOR MONCRIEF:** Trevor Moncrief.
12
13 **DR. LUIZ BARBIERI:** Luiz Barbieri.
14
15 **MR. RINDONE:** In the back, any of our presenters, and so Bridgette
16 and Challen. Just introduce yourself. This helps when we're doing
17 the verbatim minutes, so they know whose voice is whose.
18
19 **DR. CHALLEN HYMAN:** I'm Challen Hyman, and I'm a post-doctorate
20 researcher at USF.
21
22 **DR. BRIDGETTE FROESCHKE:** Bridgette Froeschke. I'm an associate
23 professor the University of Tampa.
24
25 **MR. RINDONE:** Then, Carrie, you wanted to make a couple of
26 introductions? We've got a few people online too, and so we'll do
27 those first, Carrie, and then we'll do your introductions. Jess,
28 go ahead.
29
30 **MS. JESSICA MATOS:** Harry Blanchet.
31
32 **MR. HARRY BLANCHET:** Harry Blanchet.
33
34 **MS. MATOS:** Katie.
35
36 **DR. KATIE SIEGFRIED:** Katie Siegfried, Southeast Fisheries Science
37 Center.
38
39 **MR. RINDONE:** Dr. Simmons, go ahead.
40
41 **EXECUTIVE DIRECTOR SIMMONS:** Okay. Thank you. Good morning,
42 everyone. I just want to introduce two new staff members. One
43 was actually here, Dr. Verena Wang, during the May SSC meeting,
44 but that was virtual, and so we didn't get to see each other, and
45 so, Verena, raise your hand.
46
47 She has done some work at the University of North Carolina in
48 Wilmington, and she focused on examining fish stock structure and

1 connectivity in the South Atlantic. She has also done research at
2 the University of Southern Mississippi and East Carolina
3 University, understanding the effects of climate and environmental
4 factors that impact the distributions of fishes, and she's going
5 to be leading the effort on our climate resilience and ecosystem
6 work that the council is undergoing.

7
8 I think, if you have volunteered for the Ecosystem Technical
9 Committee, you have probably received some emails from Verena, and
10 so, again, welcome, and hopefully you'll get a chance to talk to
11 here.

12
13 Then, also, our newest member is Sarah Gardiner, and she has just
14 driven, I think, over a hundred hours from Alaska, and she's been
15 working for the North Pacific Fishery Management Council, for about
16 two years now, two-plus years, and she served as the lead on the
17 Bering Sea, Aleutian Islands, and Alaska Scallop Fishery
18 Management Plans, and she has worked on EFH, and as well as helped
19 with the harvest specifications for that council. She earned her
20 master's degree from UNC Wilmington, and she studied the
21 ontogenetic shifts in the nervous system of sockeye salmon, and
22 so, again, welcome home, back to the south, Sarah.

23
24 **MR. RINDONE:** All right. Thank you very much, and welcome to
25 everybody. First, what we'll do is adopt the agenda, and so the
26 agenda was in the meeting materials on the website. Does anyone
27 have any modifications for the agenda? Seeing none, can I get a
28 motion to adopt it?

29
30 **DR. NANCE:** Adopt the agenda.

31
32 **ELECTION OF SSC CHAIR AND VICE CHAIR**

33
34 **DR. BARBIERI:** Dr. Nance, and a second by Luiz. Any objection?
35 All right. The agenda is the best anyone has ever seen. Like I
36 said, we'll go through the scope of work piece-by-piece, as we
37 move down the line, and so the next thing that we'll do is Election
38 of the SSC Chair and Vice Chair.

39
40 Just a little bit about the positions. Both the SSC chairs' main
41 responsibilities are to help with the facilitation of the running
42 of the meeting, keeping track of keeping us on track, and keeping
43 track of who needs to be called on next for discussion, and then
44 the SSC chair is also responsible for either themselves or
45 delegating out someone to present the proceedings of the SSC
46 meeting to the council, at the following council meeting, and
47 working on the presentation to the council and those sorts of
48 things.

1
2 The vice chair works along with the SSC chair, in all of these
3 capacities, and serves as the chair in the SSC chair's absence,
4 and both receive my assistance for all of these things, and so
5 what we'll do is we'll open the floor for nominations, and then
6 you guys can send me an email with who you are voting for, as
7 individuals, and, that way, everything can remain confidential,
8 for the purposes of voting, and I will tally-up the votes for both
9 the chair and the vice chair. With that, I will open the floor
10 for nominations for chair. Dr. Barbieri.

11
12 **DR. BARBIERI:** Thank you, Ryan. I would like to nominate Mike
13 Allen for the SSC chair. I know that Mike, you know, wasn't able
14 to be here today, and he had a previously-scheduled appointment
15 that couldn't be postponed, but I did talk to him about this, and
16 we had a conversation about it, and he expressed interest in
17 serving as chair, and so I would like to make that nomination.

18
19 **MR. RINDONE:** Okay, and I did receive an email from him confirming
20 all of that, and so that was for chair. Are there any other
21 nominations for chair? Is there a motion to close nominations, if
22 there's no other nominations? Jess, any hands online or anything?
23 Okay. So a motion to close nominations?

24
25 **MR. MONCRIEF:** Motion to close.
26
27 **MR. RINDONE:** All right. Does anyone object? Not all at once.
28 All right. Well, with only one name, then, by acclamation, Mike
29 Allen is the chair. I will then open nominations for vice chair.
30 I have Trevor and then Will.

31
32 **MR. MONCRIEF:** I think Mr. Allen might serve with someone with
33 some experience in it, and so I would nominate Jim Nance, if he
34 was up for it.

35
36 **MR. RINDONE:** Okay. Dr. Nance, do you accept?

37
38 **DR. NANCE:** I do. Thank you, Trevor.

39
40 **MR. RINDONE:** Okay. Will.

41
42 **DR. PATTERSON:** I agree with Trevor's sentiment, and I nominate
43 Luiz Barbieri as vice chair.

44
45 **MR. RINDONE:** Okay. Dr. Barbieri, do you agree to be nominated as
46 well?

47
48 **DR. BARBIERI:** I do accept the nomination. Thank you, Will.

1
2 **MR. RINDONE:** All right. So any other nominations for vice chair?
3 All right. Seeing none, is there a motion to close nominations?
4 Thanks, Jack.

5
6 **MR. MONCRIEF:** Second.

7
8 **MR. RINDONE:** No objections? Great. We're cruising. Okay. SSC
9 members, I will ask you to send me an email with one name, either
10 Jim Nance or Luiz Barbieri, as your vote for vice chair, and we
11 will give this a few minutes for these to come in. That's
12 ryan.rindone@gulfcouncil.org, if you haven't already been
13 assaulted against your will by a barrage of emails from me in the
14 past.

15
16 I think that is everybody, and so, Dr. Nance, congratulations.
17 You are the vice chair. You may come back over and sit over
18 yonder, if you like. In a process that I know is completely
19 foreign to you, we'll proceed with the agenda, and, since Dr. Allen
20 is absent, Dr. Nance, if you will take us through, starting with
21 Review and Approval of the Minutes from the May 2024 Meeting.

22
23 **REVIEW AND APPROVAL OF MINUTES FROM THE MAY 2024 MEETING**

24
25 **VICE CHAIRMAN NANCE:** Okay. Thank you. Let's see, and so I guess
26 review of minutes, and is that what we're on?

27
28 **MR. RINDONE:** Yes, sir, review of the minutes.

29
30 **VICE CHAIRMAN NANCE:** Review and Approval of the Minutes from the
31 May 2024 SSC Meeting, do I have any additions or corrections for
32 those minutes? Any opposition to approving those minutes? Seeing
33 none, those minutes are approved. We'll now have a presentation
34 -- Is Dr. Simmons giving this one?

35
36 **MR. RINDONE:** Yes. Dr. Simmons will give the one on general member
37 orientation, and just a note that, at lunch today, we have a
38 harassment training that's mandatory for all -- Or anti-harassment
39 training. Anti-harassment training, and it's mandatory for all
40 SSC members and AP members, council members, et cetera, that you
41 guys will be asked to complete during lunch today, and so we'll
42 extend lunch just a little bit today, to try to accommodate that.

43
44 I think there's a video that has to be watched, and it's a short
45 thing, but it's still required, and so we'll do that at lunch
46 today, and get that out of the way then, and so, Dr. Simmons, you
47 are prepared? All right.

48

1
2 What is your role as a council member? You're expected to review
3 materials, attend in-person meetings, and participate in
4 discussions to make recommendations to the council. Now, we
5 understand that you have day jobs, or most of you do, and some
6 people are retired, but this takes work, right, and we recognize
7 that, and so we thought it was important to highlight that.

8
9 Just a reminder that council members are not necessarily
10 scientists, and so we rely on your expertise to provide guidance
11 on the science behind fisheries management.

12
13 How does the SSC function? In the Gulf, the SSC will be chaired
14 by one of your members, and you just elected your chair and vice
15 chair, and council staff, several council staff typically, will
16 serve as support. Ryan is our lead staff, Ryan Rindone, and so
17 we'll develop the agenda, and we'll share that with the chair and
18 vice chair. They provide feedback, and we coordinate with the
19 Science Center and the Regional Office, and then we finalize the
20 agenda, hammer everybody to get the materials in on the briefing
21 book, and then post those and tell you when they're available.

22
23 Often, the chair presents the meeting outcomes to the council, but
24 that doesn't have to be necessarily the case. If you're a subject
25 expert on a particular item that's on the agenda, we welcome that
26 SSC member to be at that particular meeting and provide insight on
27 the SSC's deliberations, as a body.

28
29 Currently, and I think we talked a little bit about, in May, the
30 restructuring of the SSC, and so the Reef Fish, previously, was
31 separate, the Socioeconomic, and then the Ecosystem. That's been
32 collapsed into one body, the Standing SSC, and then you have one
33 or more special SSCs that the council has populated, and so that's
34 the Special Mackerel, with three members of that, and they're going
35 to populate the Special Shrimp in August, and then, right now,
36 we've decided to wait until we have items that are directly related
37 to coral, red drum, and spiny lobster.

38
39 Again, staff will provide a scope of work for each agenda item and
40 help answer questions, with the assistance of our council member
41 representative, in this case Dr. Tom Frazer, attending the meeting.

42
43 Again, you advise the council on scientific and technical aspects
44 of the Gulf fisheries, and so these are just some examples. I
45 know that many of you are aware of these. We occasionally bring
46 different parts of our fishery management plans, perhaps new
47 methodologies, to the SSC occasionally, and typically it's the
48 analysis behind that, and so this just shows you a demonstration

1 of the advisory panel and SSC recommendations go to the council,
2 the council committees deliberate on that, they direct staff what
3 to do, and they make final decisions after public comment and then
4 Full Council.

5
6 This is a lot of words, and I apologize for that, but hopefully
7 you can use it as a reference, and it's a good reminder for folks,
8 even if you've already been on the SSC, about our process and
9 voting processes. So you do provide advice as to the effectiveness
10 of the measures in achieving the objectives of an FMP or amendment,
11 and, again, that's not as common of recent, but it is something
12 that you may be asked to comment on, and it's really the adequacy
13 of the scientific information and supporting analyses in the stock
14 assessments.

15
16 We typically operate by Roberts Rules in the Gulf, and I know the
17 South Atlantic, and other councils, operate by consensus, but we
18 don't typically operate that way in the Gulf, and we try to use
19 Roberts Rules, although sometimes we use it pretty loosely, and
20 so, if you're not familiar, there's a link there, that you can
21 take a look at Roberts Rules, and then typically our chair and
22 vice chair keep us on task with that, as well as the staff lead.

23
24 I think, a couple of years ago, we drafted, and you guys reviewed,
25 the regional framework for best scientific information available.
26 There was a national policy, and then a regional policy, and that
27 just provides the link there to that information, for your review.

28
29 Then we also developed a best voting practices, and this is also
30 available on the council's website, under SSC materials, for SSC
31 members, and there's a link that talks about voting practices, for
32 your reference, and you did take a look at this, and review this,
33 before we posted it, and finalized it, and so this, again, is here
34 for your information and reference, and there is that link for
35 your voting practices.

36
37 I think I've gone over this a little bit, but just to explain the
38 process to folks that are not as involved. Once you provide this
39 information to the council, the chair, or another representative,
40 and the committee will deliberate on that, and sometimes they will
41 send it back to the SSC, if things aren't clear. We haven't had
42 that happen in a long time, and I think our process is much better,
43 as explaining upfront what the council is asking the SSC to do.

44
45 Again, the Full Council will decide what to do with those actions,
46 after they hear the SSC's recommendation, and then public comment,
47 and then they direct us what to do next.

48

1 Again, we typically meet five times a year, right now, a couple of
2 weeks before our council meetings, and that's the way that we have
3 it set up, and we'll try to get those dates, and coordinate with
4 you as soon as possible, now that we have our new membership, and
5 so council staff will contact you to do that, and we at least, at
6 a minimum, need a quorum, for us to convene you and to deliberate
7 and make recommendations.

8
9 You will also have ample opportunities to get involved in other
10 things, such as stock assessments, and we typically will be asking
11 for volunteers, based on the timing of those stock assessments and
12 the needs of those stock assessments.

13
14 This is a bit new here, even for returning council members, that
15 we're asking to try to have a better communication and
16 administrative process, as far as participation, and so we're
17 asking that, if you know that you can't participate in an SSC
18 meeting in-person, that you notify us at least fourteen days in
19 advance, and then, if you have an extenuating circumstance, that
20 you notify me. Now, the reason for that is we have some monetary
21 potential, with the hotels, if we can't fill those rooms and meet
22 our attrition rate, and then we could lose money on that, and then
23 just meeting logistics and understanding who is going to be
24 present, and so just having better communication on what we're
25 doing there. We're just asking that you do that in the future.

26
27 We probably are going to have one to two meetings per year that
28 are going to be virtual. The council has been level-funded for
29 some time now, and your May meeting was completely virtual, and
30 that's a possibility, perhaps when we don't have a big, full
31 agenda. You might be asked to be convened virtually, for one day
32 or half-a-day, and then all of this information is in the council
33 SOPPs for your reference.

34
35 For SEDAR meetings, we're also asking that you notify us at least
36 thirty days in advance, if you can't participate in-person, so
37 that we can try to find a replacement, and also because we have to
38 work with other staff at SEDAR, and it takes us some additional
39 time to perhaps find a replacement, and we're asking for more days,
40 and, you know, some of this is done two to three years out.

41
42 People's schedule changes, and so just please communicate, and
43 notify us, if you know there's going to be an issue with your
44 schedule. If you have an extenuating circumstance, please contact
45 me, and we'll always work with you, as necessary. Then I will let
46 Kathy take over and cover this section, unless there is questions
47 on what I've presented.

48

1 **VICE CHAIRMAN NANCE:** Is there any questions? Jess, or Bernie,
2 this monitor is not working. We like to keep those in the dark on
3 this side.

4
5 **MS. KATHY PEREIRA:** SSC members, welcome. I'm Kathy Pereira, and
6 I do the meetings and travel here for the Gulf Council. Most of
7 you all have received all my emails, and I know Tiffany and Ralph
8 are new members, and so welcome, and, if you have any questions,
9 please contact me.

10
11 So how do we book our travel? Once the dates are selected by Ryan,
12 we'll go, and I will book the rooms at the hotel next door, at the
13 Fairfield Inn. They will give us a government per diem that we
14 have, and most of the time it's available, if the city is available
15 during those dates, and then we'll go ahead and send out that
16 information with the reservation link for you to make your
17 reservations. The hotel rooms will be put on our master account,
18 just so you know.

19
20 You will be receiving an email with instructions on how to make
21 your hotel reservations and with AmTrav, and that's our new
22 platform for airlines.

23
24 Meeting authorizations will show you what's allowable for
25 reimbursements, and we'll have the government rate there and the
26 per diem for your food. If you're staying at this hotel, your
27 room will be billed to our master account, if, if you stay
28 somewhere else, then we'll just give you whatever the government
29 per diem is. We'll reimburse you for that, and you'll have to pay
30 for your own room.

31
32 Flights should be booked fourteen days in advance from your
33 departure. If it's any time after that, the airfares are going to
34 be really expensive. Please book for full participation. That's
35 very important. I know, a lot of times, there may be flights that
36 will get you out of here, you know, a half-an-hour early, but then
37 you have to be there an hour-and-a-half to two hours in advance,
38 and so it will have you departing the meeting a little bit too
39 early.

40
41 **MR. RINDONE:** You will be shamed for this.

42
43 **MS. PEREIRA:** Yes. Yes, you will. You can book your flights
44 through AmTrav, which those flights are billed directly to our
45 master account, but, if you want to book on your own, you can do
46 that, but just remember the flights are your personal flights until
47 you actually conduct the travel for the Gulf Council.

48

1 Reimbursements, when you receive your meeting authorizations, you
2 will receive a claim form. We ask that you please submit your
3 claims within sixty days after the meeting. Receipts for hotel
4 and airfares are required, if you're not staying or using our
5 AmTrav. Receipts for meals are not required, and you just claim
6 your per diem.

7
8 If your travel deviates, we'll do a cost comparison, and just let
9 me know if there's any changes, so we can do that, so you'll know
10 ahead of time what we're going to be able to reimburse you for, or
11 not, and rental cars are not usually approved, but you can submit
12 me a request, and I can seek approval from Carrie, to see if it's
13 beneficial for the Gulf Council to have you use a car. You can
14 submit your claim via email, fax, or regular snail mail.

15
16 This is a stipend, and you will receive two with your travel stuff,
17 an SSC stipend form, and you will fill that out, and you can submit
18 that in as well. If it's a full day, you'll claim the full amount.
19 If it's a half-day, then you'll go ahead and do that. Most of you
20 guys, I'm pretty sure, have already submitted your SOFI forms.
21 Also, in the back credenza, there is travel expense forms there.
22 If you have any questions on them, I am in the office today and
23 tomorrow, and I can help you fill them out or answer any questions
24 that you may have. That's all for me.

25
26 **VICE CHAIRMAN NANCE:** Any questions for Kathy?

27
28 **MS. PEREIRA:** Very good. I'll be in the office over there, if you
29 all need anything.

30
31 **VICE CHAIRMAN NANCE:** Harry, please.

32
33 **MR. BLANCHET:** Thank you, Mr. Vice Chair. This is regarding the
34 scheduling of the meetings. We have a couple of new members, and,
35 in the past, we've coordinated with Ryan. If you have some
36 recurring meetings, and like the Louisiana Wildlife and Fisheries
37 Commission is typically the first Thursday of the month, like
38 tomorrow, and that can help with going -- With developing a
39 schedule, and you might have people like Jason, who may not be
40 able to be available on that date. If anybody has those kinds of
41 recurring meetings, and that's just a suggestion, that they might
42 give that to Ryan. Thank you.

43
44 **VICE CHAIRMAN NANCE:** Thank you, Harry.

45
46 **MR. RINDONE:** Yes. By all means, please do. If you have something
47 that's just always blocked off on your calendar, we'll try to work
48 around that, just also with the understanding that there are lots

1 of things that are blocked off, on lots of calendars, and so we
2 will genuinely do our absolute best to get the highest number of
3 people here.

4
5 **VICE CHAIRMAN NANCE:** Because it does fill up fast, for sure.
6 Okay. I think, Ryan, I think you're up next, if I'm not mistaken.

7
8 **SSC MEMBER SEDAR PROCESS ORIENTATION AND ENGAGEMENT**
9

10 **MR. RINDONE:** I am. This is a cannibalized version of a
11 presentation that I have given a few times to the Marine
12 Recreational Education Program, and so it's got some animations in
13 there, I think, at least if they work, but, anyway, this is about
14 SEDAR, the Southeast Data, Assessment, and Review stock assessment
15 program, which is the framework that we use in the southeastern
16 United States for a good chunk of our stock assessment needs.

17
18 SEDAR covers stock assessments for species that range basically
19 from Brownsville, Texas all the way up to Maine, and it has many
20 masters, who we call cooperators, such as the Gulf States Marine
21 Fisheries Commission, Atlantic States Marine Fisheries Commission,
22 the Gulf, Caribbean, and South Atlantic Councils, and then our
23 federal cooperators are the Southeast Fisheries Science Center,
24 the Southeast Regional Office, and, for Atlantic Highly Migratory
25 Species, the NMFS office there, and that's primarily for sharks.

26
27 SEDAR is a collaborative approach to conducting peer-reviewed,
28 regional, quantitative stock assessments, and the purpose of SEDAR
29 is to broaden participation in these assessments, by academics, by
30 members of the public, provide an independent peer review of the
31 work that is done, and provide improved planning and increased
32 transparency, and the additional opportunities for participation
33 certainly help facilitate that.

34
35 It was never designed to handle all regional assessment needs, and
36 we are currently on SEDAR 98 for Gulf red snapper, and, if you had
37 asked me thirteen years ago, when I started doing this, if -- You
38 know, when we would be on SEDAR 98, I probably would have thought
39 it would have been a little bit further out from now, but it's
40 amazing how they can stack up.

41
42 Again, on the program goals, trying to improve species priority
43 setting and workload management, and there's, obviously, a lot of
44 managed species to take a look at across the regions, across all
45 the cooperators that use SEDAR, and the transparency is very
46 important to the public, and it's important to the scientific
47 process and the reproducibility of the science that is generated
48 through SEDAR.

1
2 It's trying to improve data and assessment quality, which is a
3 very large statement in general, but there are multiple ways in
4 which we try to achieve that, that we'll get to. Provide thorough
5 documentation of methods and data, again lending to transparency
6 and reproducibility, the independent peer review, and that
7 participation element.

8
9 All of the SEDAR workshops and webinars are open to the public,
10 and all the documents are available on the SEDAR website, and so
11 all the data that go in, the different methodologies that are
12 considered and used, all of the supporting analyses, and everything
13 is made public. All the assessment input data and control files
14 for things like Stock Synthesis, those are all made public, and
15 there are some limitations occasionally on the data within the
16 legal limits of confidentiality requirements, but some of that
17 might be being modified by the government here before too long,
18 and so we'll see how that evolves.

19
20 There's multiple opportunities for public comment, both through
21 the SEDAR process, here at the SSC meetings, and through the
22 council process, directly at council meetings and through the
23 council's advisory panels, which are also presented with
24 assessment results.

25
26 SEDAR is comprised of lots and lots of people, and it's really a
27 shame that my GIF is not working, because it's hilarious. We have
28 federal, state, and university scientists that are engaged in
29 research, monitoring, ageing, supporting research with each other
30 and independent work, and they work on evaluating and compiling
31 all the data that go into the assessment process.

32
33 We have federal and state analysts that run the assessments, and
34 supporting models, and work on things like age and length
35 compositions and indices of relative abundance, and the fishermen,
36 who share their data, and they interpret and evaluate the results
37 and trends, and can often be very insightful to explaining things
38 that scientists might miss.

39
40 We also have council members and staff, who serve as observers and
41 provide some oversight to the process, in terms of its
42 applicability to management, and also generate the regulatory
43 history and help inform things like management bias and how that
44 might affect the data that we're looking at.

45
46 Just kind of a visual depiction of the sorts of people in the Gulf
47 that are involved in SEDAR, or Gulf and the South Atlantic, and so
48 you can see it's quite the storied crowd, and so -- Except for

1 Carolina. Go Wolf Pack.

2
3 SEDAR is overseen by the SEDAR Steering Committee, and this is
4 comprised of the council chairs and executive directors, the
5 commission executive directors, Andy Strelcheck, who is the
6 current Southeast Regional Office Regional Administrator, the
7 Science and Research Director for the Southeast Fisheries Science
8 Center, who is Dr. Clay Porch, the HMS Director, who is Karyl
9 Brewster-Geisz, and our own Dr. Barbieri for FWC.

10
11 The steering committee approves the policies and balances
12 assessment priorities and scheduling, budgets, all the fiscal and
13 human resources, and just provides general oversight for the
14 program as a whole.

15
16 SEDAR is administered through the South Atlantic Fishery
17 Management Council, on behalf of all the cooperators, and the staff
18 there are housed there at the South Atlantic Council, which
19 includes Dr. Julie Neer, who is the program manager, and their new
20 SEDAR coordinator, whose name escapes me, who I was just told on
21 Monday, and so I apologize in advance for not writing that down.

22
23 The point being though that you may be appointed by the Gulf
24 Council, but someone from the South Atlantic Council, namely Dr.
25 Neer, will be the one who contacts you about SEDAR stock assessment
26 things, and grant funding for all of this comes through the
27 Department of Commerce, via NOAA Fisheries. All right, and so
28 Jess being up in the ceiling to fix the TV monitors was not on my
29 Bingo card today. Thank you, Jess.

30
31 So we have different assessment types, if you will, or
32 classifications, that we use to consider the scope of work that
33 we're essentially going to be doing for these different stock
34 assessments, and so the one on the screen now is the benchmark,
35 which is kind of the everything can be on the table, but the scope
36 generally can vary.

37
38 It could be that there are changes to the modeling environment
39 that are being considered, or new data that are being considered,
40 that require kind of a methodological rethink of how we deal with
41 all the data in general for that species, any number of things,
42 and it's always followed by an independent peer review with the
43 Center for Independent Experts, and an SSC representative on that
44 independent peer review, and it uses a workshop approach. These
45 workshops can be in-person and/or virtual, and, ultimately, it
46 provides catch advice, through the SSC's review at the end.

47
48 The other one is the operational assessment, which can also

1 consider new data, but through a prior-accepted model, and we use
2 topical working groups to evaluate any new data, new methods, new
3 whatever it is that's being considered as part of this scope of
4 assessment.

5
6 All the existing data that were used the last time are updated,
7 and there can be some limited changes to the prior model that can
8 also be done through topical working groups, but these changes
9 shouldn't be like a complete change in modeling environment. It
10 should be changes within.

11
12 Changes proposed, obviously, can affect time requirements, and,
13 you know, the operational assessment could take, you know, just a
14 matter of months, but, if a whole bunch of things get tacked onto
15 the list, and there's multiple topical working groups, or workshops
16 or whatnot that are ultimately required, then that stretches out
17 how long the assessment process will carry, and the SSC provides
18 the sole peer review for these assessments, and then recommends
19 management advice to the council following.

20
21 The pick-two problem, right, and, when we're thinking about our
22 stock assessments, SEDAR can be transparent, thorough, and/or
23 timely, and you can't really transparent and timely, you know, and
24 be very open about everything, and do it quickly, and also do it
25 thoroughly, and you guys can imagine, you know, the rest of the
26 combinations.

27
28 The most transparent and thorough approach is the multi-workshop
29 benchmark process. The most transparent, but timely, is the
30 operational with topical working groups, and still thorough, but
31 timely, just without as much transparency, is the operational
32 without any topical working groups, and, the last one here,
33 essentially that's when -- I will pick on cobia as an example,
34 and, you know, if we were to do a cobia assessment right now, like
35 there's no any revolutionary science that has happened since the
36 last cobia stock assessment, and so, presumptively, we would use
37 the same data that were used the last time, generally the same
38 methods, and there might be a couple of small things that would be
39 updated, but that would all be done in-house by the Science Center,
40 who is the analytical body for that species.

41
42 You know, the council would request it, and they would do it, and
43 the next people to see it would be you guys, to review it here at
44 the SSC. Sorry, Jim.

45
46 **VICE CHAIRMAN NANCE:** Just a quick question, and, from our last
47 discussion, we kind of were doing away with the SEDAR nomenclature
48 of benchmarks and operational and those types of things, but

1 anyway.

2

3 **MR. RINDONE:** Yes, and we'll get to that a little bit more when we
4 have Dr. Siegfried's and Dr. Peterson's presentation about the
5 process changes that are being proposed, and so, right now, this
6 is still what is on the books, but doing away with the nomenclature
7 is something that's being talked about, because, generally
8 speaking, and like they will get to, you know, we ask for what we
9 need to get the work done, and, really, you know, what the name of
10 it is is not so consequential to that.

11

12 **VICE CHAIRMAN NANCE:** Yes, and it just matters about the complexity
13 of the model, and not necessarily its name.

14

15 **MR. RINDONE:** Well, the complexity of the work, ultimately, that
16 is required. You know, if we're looking at multiple topical
17 working groups, or in-person workshops, that kind of -- Are we
18 changing some fundamental things from the last peer-reviewed
19 model, and, if we are, then that probably necessitates a peer
20 review.

21

22 The process goes through three general steps, a data stage, while
23 the data are compiled and analyzed, and the data that are going to
24 be included are considered, and, ultimately, it's determined that,
25 you know, that's what we're going to use, and the assessment stage,
26 where all the data are plugged into the model, and lots of
27 statistical fiddling about occurs, and then the review stage, where
28 we evaluate essentially the work that was done at the first two
29 stages and the ultimate product that is generated.

30

31 SEDAR focuses on the science. Discussion about management is
32 largely constrained to ways in which previous management bias could
33 be affecting the data that are being observed in the model, but,
34 ultimately, the answer is about -- It's focused on the science.
35 You know, the answer is the answer. Panels develop their
36 recommendations by consensus, and tasking is developed for each
37 stage, via what we call terms of reference, which is kind of like
38 the recipe for the assessment.

39

40 At the data stage, in the data workshop -- You know, if we're not
41 having an actual data workshop, and it might just be a webinar or
42 two to talk about the data that are to be included. The data are
43 compiled, reviewed, and evaluated, and participants can include
44 everybody, you know, anyone that you can imagine, state and
45 university researchers, federal researchers, analysts, SSC
46 members, fishermen, and it's a significant effort to compile all
47 of this information in advance, and one of the Science Center
48 analysts has a great slide about the graveyard of missed deadlines,

1 and that is sometimes an issue that we run up against when it comes
2 to this, and so, if you're ever participating in a data workshop,
3 you know, please be mindful of those data deadlines, because we do
4 have to have everything in place before we can proceed.

5
6 SSC volunteers for this stage should be familiar with the species
7 life history, just generally speaking, fishery dynamics, and, you
8 know, how the fish are being pursued within the Gulf, and the types
9 of data that are being made available.

10
11 For when we have workgroups, SSC members should be participating
12 in these workgroups based on your expertise, and you might be able
13 to participate in more than one, and so floating around, and being
14 contributory to multiple, is certainly encouraged, but, if there's
15 one in particular that, you know, you're a particularly heavy
16 hitter at, you know, please try to provide some focus there.

17
18 You will ultimately help determine the data that are put forward
19 to the assessment process and review all of the available
20 information and offer guidance, and, when we come back to the SSC
21 meetings, you know, we might have opportunities for you to talk
22 about what went on at a particular data workshop, just to keep the
23 rest of the SSC kind of abreast, because not everybody is going to
24 be able to go.

25
26 Again, these workgroups work by consensus, and so solution building
27 and compromising will sometimes be necessary, and, you know, we
28 don't always have the data we wish we had, and sometimes we have
29 what we have, and, in certain circumstances, we might not even
30 have that.

31
32 Just an example for consensus building, and I picked on Carrie a
33 little bit here, with her favorite fish, and Dr. Capriscus thinks
34 a survey shouldn't be included, because the sample sizes are too
35 low, and the signal is noisy and uninformative, but Dr. Dumerili
36 thinks that the survey should be included, because of the general
37 lack of other data available, and excluding this survey leaves
38 even less to inform trends in abundance, and, ultimately, the
39 panel, via consensus, might agree to recommend combining that
40 survey with another survey to resolve both the sample size issue
41 and the data paucity issues. You know, maybe that works, but maybe
42 that doesn't, but, just in this example, it works great, and
43 everyone was happy at the end of it.

44
45 For the assessment process, this is where the model is formally
46 developed, and the data are plugged in, and different problems are
47 evaluated, and all of the participants are involved in this, and
48 are going to be asked for their input along the way, and it's

1 important that you give it, because silence is compliance. You
2 know, these usually work via webinars, and so, if you see
3 something, you've got to say something. Otherwise, they will just
4 keep proceeding along, and the assessment analysts will kind of be
5 left to have to make and shoulder those decisions, you know,
6 without that advice.

7
8 SSC volunteers for this stage should have familiarity with how
9 contemporary stock assessment models work, so that they can provide
10 some quality advice to the analysts along the way, and also not to
11 ignore other participants, like the fishermen, and there are
12 certainly still times, during this part of the process, where the
13 fishermen's input can be pretty valuable, because, if the model is
14 estimating that something is happening in a certain way, and
15 fishermen are saying, well, that's just not what we ever see on
16 the water -- Sometimes those things can spur additional thought,
17 and additional problem solving can be done to try to make the
18 models a little bit more representative of reality between the
19 observed and estimated data.

20
21 It's important to participate, like I said, in these webinars, if
22 you volunteer for this part of the process, as much as possible.
23 The direction, model direction, may change once data begin
24 informing the model estimates, and materials are not often
25 available until about a week before these assessment webinars, and
26 so you kind of have to be on your toes and ready to look at this
27 stuff with, you know, less than the customary two weeks' worth of
28 notice on materials being presented, or being made available to
29 you.

30
31 You should be prepared to provide constructive guidance throughout
32 this process, and, you know, you're not entirely limited to just
33 providing that input during the webinars. You know, if you think
34 of something after the fact, by all means reach out to the analysts
35 and let them know. More information is better.

36
37 At the end of it all, we review it, and, if there have been
38 substantial model modifications, and new data being considered,
39 things like that, that ultimately determine that it requires a
40 peer review, that will be part of the review process, like an
41 independent peer review, including SSC members and members of the
42 Center for Independent Experts.

43
44 Otherwise, you guys are the peer-review body, and so either FWC or
45 the Science Center will present the assessment to you all as a
46 body, and you will be the ones that ultimately determine whether
47 you think that it's met the terms of reference and whether you
48 think that the analytical product as a whole is consistent with

1 the best scientific information available.

2

3 These reviews are open to the public, and SSC members for this
4 stage should have familiarity, again, with how contemporary stock
5 assessment models work, and preferably they also have some
6 familiarity with the species, so they can look at both the
7 information that went into the model and how the model handled it.

8

9 It's important to be critical of how the data are used here, and
10 you need to be able to critique assessment methods and decisions
11 and examine things like weightings, time blocking, handling of
12 biases and assumptions, and evaluate the appropriateness of the
13 methods to the data available.

14

15 You know, like we discussed a little bit earlier, sometimes the
16 data aren't great, and sometimes, you know, it might be that you're
17 trying to fly the space shuttle to go to the grocery store, and
18 maybe that's not quite the approach that was necessary, and so,
19 for that particular comment, like that sort of thing is important
20 at the assessment stage, too. You know, if you're participating
21 at the assessment stage, and you have the opportunity to kind of
22 head off something that you see is a growing issue, you know, or
23 something that you think the SSC might take issue with, like that's
24 the time. You know, as soon as you have input to offer, please
25 offer it.

26

27 It's important to be impartial to the data and methods that are
28 used here, and, for the review workshop, we try to avoid having
29 anyone participate in that that was also a panelist for the data
30 workshop or the assessment workshop, or assessment process, just
31 to try and keep any potential biases at bay, but sometimes we run
32 into just general people availability problems.

33

34 If you did participate in the data or assessment phase, and you
35 want to serve as the chair for the review workshop, you can do
36 that, and Dr. Barbieri can tell you all about having done that
37 several times.

38

39 What's ultimately generated? We have our stock assessment report,
40 which is the final product that characterizes everything from the
41 process, including the results, and targeted audiences for the
42 stock assessment report are primarily people like the SSC, peer
43 reviewers, et cetera, and it's a pretty technical document, and we
44 also have working papers, and other reference papers, that go into
45 further detail about model inputs, data provided, methods, et
46 cetera, background information used in decision-making, control
47 files, things like that, and all of that, like I mentioned before,
48 is kept on the SEDAR website.

1
2 After we get out of the stock assessment, the SSC's next action is
3 to review the assessment, and you guys may make additional requests
4 of analysts, like additional sensitivity runs, once you've had an
5 opportunity to look at things, and also parameterizing the
6 projections.

7
8 With the sensitivities though, it would be great if you're
9 participating in the process, and you're thinking about what the
10 SSC might ask questions about, and it's great to propose those not
11 after the product is completed, and it's being reviewed for the
12 last -- You know, for the last bit by the SSC, and so if you can
13 think of something, like I think this might be a different way to
14 look at this, and let's add this to our list, and let's have a
15 conversation about it, and the time is during the assessment, and
16 not after, but, occasionally, it does become necessary to do one
17 after the fact as well.

18
19 You guys are also tasked with recommending consistency with the
20 best scientific information available, again considerate of the
21 data that are available, the methods that are available to analyze
22 those data, and, you know, it's all within the context of what we
23 have, and you are also tasked with recommending the suitability of
24 the analytical product for informing management advice, like catch
25 limits, like our overfishing limit and acceptable biological catch
26 limits.

27
28 NMFS will ultimately consider the stock assessment peer review and
29 SSC recommendations in its official determination of whether the
30 analytical product is consistent with BSIA, and it will ultimately
31 use it for determining stock status, and so whether the stock is
32 overfished and/or undergoing overfishing, and then, after that,
33 the council receives all of this, and it makes necessary actions
34 to do things like increase or decrease catch limits, modify harvest
35 through bag limits, trip limits, seasons, et cetera. That's it?
36 Okay. I had some great animations in there that we didn't get to
37 see.

38
39 **VICE CHAIRMAN NANCE:** We'll have to see them during lunch.

40
41 **MR. RINDONE:** So that was a lot. We really want to try to have
42 you guys engage in this process. There are many of you who have
43 a lot of experience engaging in this process, and some of you that
44 have a little bit less, and so, if you're a part of that latter
45 crowd, and you have an interest, by all means ask around the table.
46 There is a wealth of experience with SEDAR assessments here,
47 especially upfront here, and these two gentlemen have been in a
48 lot of them, and, of course, you can always ask me anything, any

1 questions about SEDAR. Dr. Mickle.

2
3 **DR. MICKLE:** Just an overview, or maybe a good starting question,
4 would be the steering committee -- Does it roll over much? What's
5 the history of the steering committee? Has there been much new
6 blood in it, things like that, just to give a historical
7 perspective of who -- You mentioned a few of the members, I think,
8 but how long they've been on, and do they roll off, things like
9 that.

10
11 **MR. RINDONE:** There is pretty strong continuity for the steering
12 committee, because the people that are on the steering committee
13 are all kind of like the tops of their respective totem poles, and
14 so the rollover there is really limited to the degree to which
15 those executive-level positions change hands, and so, you know, I
16 would imagine that Dr. Porch will be on there until his retirement,
17 and Dr. Simmons until hers, you know, many, many, many years from
18 now.

19
20 Council chairs will roll over, because council chairmanships can
21 turn over every year. For some of the councils, every now and
22 then, the council will reappoint a chair for a second consecutive
23 term, and so that's probably where most of the rollover actually
24 occurs, but, for like the council staff, the federal staff, the
25 commission staff, they're pretty consistent over time. I had a
26 hand over here.

27
28 **DR. GRIFFITH:** Thanks, Ryan. You know, I've been on this shrimp
29 one, just recently, and I was told that this was one of the first
30 times that social scientists had been involved in the SEDAR
31 process. First of all, is that true, and, if so, are you going to
32 continue to have social scientists in the SEDAR process?

33
34 **VICE CHAIRMAN NANCE:** They've always had the opportunity to be on.
35 Economists, or social scientists, very few have taken the
36 opportunity, and so you've never been discouraged from being on,
37 but, in the past, usually they haven't taken that opportunity. I
38 will say, whenever these things come up, and we ask for volunteers
39 to be on a SEDAR, please take that opportunity.

40
41 The only thing we ask is to make sure you're available. It's
42 people that sign-up and then never show up -- We don't want that
43 to happen, but, just because you're not a stock assessment person,
44 I think you have great input into the process, and I think you can
45 bring valuable information to what's happening.

46
47 **MR. RINDONE:** We have had varied participation in the past, but,
48 generally speaking, it's always been biological and ecological

1 science heavy. There have been discussions, routinely, for as
2 long as I've been here, about trying to involve more social
3 science, more economic science, into the process, and so it's
4 another one of those that, if you see an opportunity to present
5 something that you think might help provide some direction, where
6 it's currently lacking, present it at the data workshop.

7
8 You know, if you have that sort of information to share, and Dr.
9 Scyphers helped out with the yellowtail assessment, and, Dr.
10 Griffith, you with shrimp, but it's few and far between, and
11 certainly the opportunities do exist though to improve upon that.
12 Any other questions? Anything from Harry? I don't want to forget
13 Harry out there in virtual land. All right. Dr. Nance, it might
14 not be the worst time for our break.

15
16 **VICE CHAIRMAN NANCE:** A break, because the next ones are going to
17 be two presentations that overlap each other, and so we're going
18 to go ahead and take a fifteen-minute break, and so we'll come
19 back at ten to the hour, and we'll reconvene, and Dr. Peterson is
20 here, from the Southeast Fisheries Science Center, and so she'll
21 be giving both presentations, or Dr. Siegfried is going to do one?

22
23 **MR. RINDONE:** Dr. Peterson first, and then Dr. Siegfried.

24
25 **VICE CHAIRMAN NANCE:** Okay. Perfect. We'll go ahead and break
26 for fifteen minutes, and we'll come back at ten to, and then we'll
27 have Dr. Peterson. Thank you.

28
29 (Whereupon, a brief recess was taken.)

30
31 **VICE CHAIRMAN NANCE:** We'll back to the table, and, Dr. Peterson,
32 we're happy you're here, and I guess you came from Beaufort, and
33 so we'll go ahead and have you start your presentation.

34 35 **MANAGEMENT STRATEGY EVALUATION**

36
37 **DR. CASSIDY PETERSON:** I will wait until it gets pulled up, but,
38 for those who don't know me, I'm Cassidy, and I'm the management
39 strategy evaluation person at the Southeast Fisheries Science
40 Center, and I really appreciate having some time to be able to
41 talk to you today about management strategy evaluation, and so I'm
42 going to give sort of a primer.

43
44 I will talk a little bit about management strategy evaluation
45 generally, and then I will talk about how we want to use it in the
46 Gulf, and so I'll start by introducing sort of the management
47 procedure approach to fisheries management, and sometimes
48 management procedures are also called harvest strategies, or

1 management strategies, but it's basically a fisheries thermostat.
2
3 If we think about what happens when you set your thermostat in
4 your house, you sort of define your system, which is the inside of
5 your house. You set the thermostat, and that's sort of your
6 desired state of your -- You set the thermostat to the temperature,
7 and that's sort of your desired state of your system, and then,
8 every few minutes, the thermostat will collect data about the
9 current state of your system.

10
11 It will take the temperature of the air, and it will compare the
12 current temperature to the desired temperature, figure out if it
13 needs to up or down-regulate the air conditioning units in your
14 house, and then it will trigger an action to get the air in your
15 house, or the temperature in your house, back to the desired state,
16 and the action that's triggered, whether it triggers on the heating
17 or the air conditioning, is dependent on the current temperature
18 in your house, and the management procedure approach is exactly
19 the same thing.

20
21 We have our stock fishery ecosystem environmental drivers, and
22 that's sort of our system that we're thinking about managing. The
23 desired state is usually something like maintaining the stock
24 biomass at the biomass that would produce maximum sustainable
25 yield, or SSB MSY, and then scientists go ahead and collect data
26 about the current state of the stock, analyze those data to
27 determine stock status, and, oftentimes, this looks like a stock
28 assessment, and then those biological reference points are fed
29 into a catch control rule.

30
31 This is the adaptive management component, where it will adjust
32 management recommendations based on the perceived state of the
33 stock, and then those management recommendations are implemented
34 back into the stock and fishery.

35
36 Everything highlighted in green is part of what we call a
37 management procedure, and it's essentially a fisheries management
38 recipe, all the way from how we collect the data to how those
39 management recommendations are implemented back into the stock,
40 and there is two types of management procedures, and we can think
41 of them in two different categories. One is model-based management
42 procedures, and these are what we would traditionally think about
43 when that sort of determined stock status bubble is a stock
44 assessment, and so, in a model-based management procedure, a
45 population dynamics model is underlying the management procedure.

46
47 There's another category of management procedures, which are
48 empirical management procedures, or indicator-based management

1 procedures, and these are really useful in data-limited scenarios,
2 or scenarios where a full stock assessment isn't useful, or not
3 viable, and this is the case where we basically take an indicator
4 of stock abundance, like an index of relative abundance, and we
5 adjust management advice based on the behavior of that indicator.

6
7 Management strategy evaluation is basically a simulation of this
8 entire process, and this framework is what we use to develop and
9 stress test potential management procedures, and you can see that
10 this is a closed loop. It's a feedback loop, and that's what
11 distinguishes MSE from other types of simulation analyses, and so
12 it's exactly the same process, where we have a simulation of our
13 system, our stock fishery ecosystem, and that's called our
14 operating model, and then we apply the management procedure
15 repetitively through time, and we project the operating model into
16 the future, to measure how the management procedure performs.

17
18 MSE is really useful to evaluate management procedure performance
19 relative to the ability to achieve pre-specified management
20 objectives, and so we take performance metrics from the operating
21 model to measure how well the management procedure should perform.
22 It's really useful to evaluate tradeoffs inherent in managing a
23 natural resource, and there's biologic restraints around
24 maximizing all of the management objectives, so we can understand
25 the tradeoffs in natural resource management, and it's important
26 to make sure that our management procedures are robust to
27 uncertainty.

28
29 What defines a good management procedure? I mentioned before that
30 this is dependent on the management objectives of the fishery, and
31 so I have two sort of examples here, and we can think about the
32 way that we would manage a highly-industrialized commercial
33 fishing fleet, like Pacific hake, that has factory vessels, and
34 the way that we would manage that fishery is very different than
35 the way that we would manage sort of a small recreational trophy
36 fishery, and that's because the management objectives are
37 different.

38
39 What we're looking to get out of the fishery is very different,
40 and so management objectives both include what we're calling sort
41 of must-meet objectives, and these are following Magnuson-Stevens
42 guidelines, and so we can't overfish, and we need to rebuild
43 overfished stocks, et cetera, and this is a key area where it's
44 important to have integration with the SSC, because it's up to the
45 SSC to really characterize the risk tolerance around meeting those
46 must-meet objectives, and it also includes sort of would-like
47 objectives.

1 Once we meet all of the Magnuson-Stevens-defined objectives, there
2 is also, you know, additional objectives that we want to meet, and
3 these are defined by stakeholders. An example of that is, you
4 know, do we want to maximize the number of fish that we catch, or
5 do we want to maximize the size, and the quality, of the fish that
6 we catch, and these are competing management objectives. We can't
7 simultaneously maximize both at the same time, and so MSE is a
8 useful way to sort of characterize what those tradeoffs look like.

9
10 We also have to take management objectives from what are called
11 conceptual management objectives, like we want to maximize catch,
12 and convert them into operational management objectives, and
13 that's putting hard numbers on that, and so an operational
14 expression of a conceptual management objective would look
15 something like we want to make sure that catch does not fall below
16 X number of metric pounds every year for the next ten years, with
17 at least a 60 percent probability.

18
19 Once we've operationalized those management objectives, we develop
20 performance metrics, and these are the quantitative and measurable
21 statistics that we can take measure from the operating model to
22 measure how the management procedure is performing.

23
24 How do we make sure a management procedure is robust? So, when we
25 think about what we're doing when we're building a simulation, or
26 we're building an operating model, is we're doing our best to
27 simulate exactly the true dynamics of the stock and fishery, but,
28 of course, we don't know everything, and we can't exactly
29 parameterize everything as it is in the real world, and so,
30 ultimately, the operating model is, at some level, an abstraction
31 from reality, and it requires making assumptions.

32
33 Some of the assumptions that we might make are things like defining
34 a relationship between spawners and recruits, making an estimate
35 of what natural mortality looks like, because maybe we don't know
36 exactly what that is, and it's hard to estimate, and so we make
37 those assumptions to build the operating model, which is our best
38 hypothesis of the state of the stock.

39
40 We project the operating model forward, we apply the management
41 procedure, and measure management procedure performance. Now, if
42 we just did this with the one operating model, all we would be
43 able to say is that, if the real world is exactly how we've
44 simulated it, then this management procedure will or will not work,
45 but we know that we make assumptions when we build an operating
46 model, and so we need to characterize that uncertainty, and the
47 way that we handle that is we build multiple operating models.

48

1 If we're not sure what the true productivity is, or the true
2 maximum mortality, we can build multiple operating models, with a
3 low, medium, and high-level steepness, low, medium, and high-level
4 natural mortality, for example, and we test the management
5 procedure against all of those operating models, and, that way, we
6 can say, even though we know that we don't know the true level of
7 natural mortality, we've defined a management procedure that will
8 work, and it will be able to manage through this uncertainty, and
9 we can apply these axes of uncertainty more broadly, thinking about
10 future uncertainties as well, and so what are future climate
11 implications, things like that.

12
13 Of course, we're not just testing a single management procedure,
14 and we're usually testing multiple management procedures, to see
15 which one is going to maximize our management objectives.

16
17 Our operating model is sort of our one best hypothesis of the stock
18 fishery ecosystem environmental dynamics. It's our one alternate
19 reality, or our one parallel universe, and we build multiple
20 operating models. That's our operating model grid, and this is
21 the suite of all of the operating models that we use to test the
22 management procedures, and it should encompass what we don't know
23 about the stock and ecosystem, and we can further subdivide the
24 operating model grid into the reference grid. These are the most
25 important uncertainties that we want to make sure that we're
26 tweaking and parametrizing our management procedure to. Then we
27 have sort of ancillary uncertainties, or sort of sensitivity runs,
28 that can be built into a robustness grid.

29
30 Then what happens after a management procedure is implemented? We
31 intentionally build-in guardrails, to make sure that we don't just
32 jump off a cliff into a brand-new management regime. Some of these
33 safeguards are listed here, and the first is exceptional
34 circumstances provisions, and so, basically, these specify
35 situations where a management procedure can be overridden, and
36 it's basically any time the true dynamics of the stock, and the
37 fishery, fall outside of what was simulation tested in the
38 management strategy evaluation, our management procedure is no
39 longer stress-tested to those conditions, and so those are grounds
40 for exceptional circumstances.

41
42 This plot here is an example of exceptional circumstances for
43 Atlantic bluefin tuna. This is the eastern index of relative
44 abundance that's used in the management procedure. These purple-
45 shaded distributions are representative of the simulated indices
46 that were simulated tested in the management strategy evaluation.
47 The lines on the top and bottom are the 95th percentiles, and so
48 the dark-black lines are the true observed index values in 2021

1 and 2022.

2
3 We're saying that, anytime the true index value falls outside of
4 the distribution that was simulation tested of that 95 percent
5 interval, those are grounds for triggering exceptional
6 circumstances, because there was less stress-testing of how the
7 management procedures will perform in those scenarios, and the
8 magnitude of the response to exceptional circumstances breach is
9 in proportion to the magnitude of the breach. We test for
10 exceptional circumstances every single year, to make sure that the
11 management procedure is on the right track.

12
13 Another thing that we do is we continue to conduct stock
14 assessments, and so this is not abandoning stock assessments in
15 favor of a different approach. Some management procedures have
16 stock assessments included in them, and so there will still be a
17 stock assessment each management cycle, but empirical management
18 procedures, like what was accepted for Atlantic bluefin tuna, is
19 an empirical management procedure, and there is no stock
20 assessment, and so a schedule for continuing to conduct stock
21 assessments, as health or status checks, is set when the management
22 procedure is implemented, and the assessments are generally - They
23 can occur less frequently, because we're still providing regular
24 and updated management advice.

25
26 Lastly, we set a schedule for management procedure review and
27 revision, and so usually this is on the order of every seven or so
28 years, and, basically, it's an opportunity to revisit the
29 management procedure, incorporate new data that we've collected
30 since the last time the management procedure was reviewed, retune
31 it, to make sure that it's still maximizing management objectives,
32 and, if substantial new data have been observed, then we can build
33 that into a full management strategy evaluation revision.

34
35 This chart shows sort of the three major components of conducting
36 a management strategy evaluation, building the operating models,
37 the management objectives, and the management procedures, and, on
38 the top, we see the major bodies that are usually involved in the
39 process, the stakeholders, modeling team, SSC, and the council,
40 and it sort of has the roles of each of these players on each of
41 these processes, and so stakeholders are really involved,
42 throughout the process, to advise.

43
44 It's important that the stakeholders advise on what the operating
45 model looks like, how it's developed, what are the uncertainties,
46 and it's important that stakeholders advise on what the management
47 objectives are, and they're the ones that are supposed to be mostly
48 defining those management objectives, or the would-like management

1 objectives, and they advise on the management procedures, what
2 types of management levers they want to see, things like that.

3
4 The modeling team is really there to just listen, to be a sponge
5 and soak in all the feedback from stakeholders and managers, and
6 quantify it in the model, and so they're the ones who are
7 constructing the operating models, based on input from the
8 stakeholders and managers, and the same with quantifying
9 management objectives and building, testing, and refining the
10 management procedures.

11
12 The SSC is tasked with reviewing the operating models, to make
13 sure that they're in line with the best scientific information
14 available, and it's important that the SSC advises on the
15 biological must-pays, making sure that the risk tolerance is
16 correct and making sure that we're meeting Magnuson-Stevens-
17 defined management objectives, and they're also tasked with
18 advising on what the management procedures look like. It will
19 ultimately be up to the council to adopt the management objectives,
20 and adopt and implement the management procedures.

21
22 Management strategy evaluation can be very complex, but it does
23 occur on a spectrum, and so this is sort of outlining what that
24 spectrum looks like, from the most sort of resource-intensive
25 category is a full stakeholder MSE, and this is where stakeholders
26 are involved from the very beginning, and they are iteratively
27 engaged throughout the entire MSE process, and this is most
28 important to incorporate stakeholders into a full stakeholder MSE,
29 where the MSE is intended to directly result in management action,
30 and especially where the management objectives are not fully
31 developed.

32
33 There's an intermediate level of stakeholder engagement, and this
34 is going to be, obviously, moderate resource requirements, and, in
35 this case, you know, stakeholders can be engaged through a survey,
36 or through the council comment procedure, or through a technical
37 working group, but they're not fully engaged throughout the entire
38 process, like in a full stakeholder MSE, and then there's this
39 category of desk MSE, and so this is where stakeholders are not
40 involved, and this is most commonly applied when the MSE is
41 designed to ask general research questions, and maybe in a case
42 where we're uncertain about data quality, or data biases, and,
43 lastly, it's important to identify categories where an MSE is not
44 appropriate.

45
46 Again, MSEs are fairly complex, and there are several research
47 questions where simpler approaches are going to still be able to
48 answer the research question, and so it's important to categorize

1 these, because we don't want to waste resources, and we especially
2 don't want to waste stakeholder time, and involvement, if the same
3 result can be achieved with a simpler approach.

4
5 According to best practices, this is the MSE process, and we start
6 by identifying fishery-specific stakeholder-defined management
7 objectives. Two, we identify relevant uncertainties over which
8 the management procedure should be robust. Three, we develop
9 operating models, and so our best guess akin to what a stock
10 assessment would look like is sort of our base operating model,
11 and then we define the operating model reference grid based on the
12 uncertainties that we identified in Number 2, and we condition
13 those operating models to available data. This is an important
14 step, because it makes sure that the data that's simulated and
15 projected in the operating model is consistent with the data
16 quality that we have in real life.

17
18 Number 4 is we identify management procedures that are responsive,
19 and Number 5 is we run the simulation exercise and summarize and
20 present the results.

21
22 Because the MSE is such a thorough simulation of the entire fishery
23 management process, we can ask a lot of really interesting and
24 really useful research questions using this framework, and, with
25 an MSE, we're specifically interested on the management
26 implications of these different questions, and so we can think of
27 what's the management impact of future climate-induced non-
28 stationarity, and we can build-in ecosystem considerations, and we
29 can build-in economics, fishery behavior, and we can think about,
30 you know, optimizing our sampling design.

31
32 We can justify the value of an additional data collection protocol,
33 or a data collection framework for new data, and we can justify
34 the improvement that it would have on our ability to manage the
35 stock. We can think about estimating model complexity, or stock
36 assessment model complexity, what type of biological reference
37 points we're using, and we can parameterize the control rule that
38 we use to specify management advice, among many, many others, but
39 this is just a flavor.

40
41 There's some additional ancillary benefits that come with an MSE,
42 and it forces us to identify management objectives of the system
43 in really quantitative ways. It fosters increased communication
44 and transparency between stakeholders, managers, and scientists,
45 and it helps us to sort of outline the stock-specific tradeoffs
46 that are inherent in managing a natural resource. It helps us to
47 highlight future research priorities, and we can think -- If we
48 have multiple axes of uncertainty that are built into our operating

1 model grid, some of those axes of uncertainty are going to have a
2 bigger impact on management success than others.

3
4 We can say, you know, we looked at different levels of natural
5 mortality, but that didn't really impact our ability to manage the
6 stock, and so maybe an understanding of what the true -- Maybe
7 it's not as important to understand the true natural mortality,
8 because it doesn't have significant management implications, and
9 we can manage really well, regardless of what the true natural
10 mortality is, and so maybe it's more important to focus our
11 research efforts on axes of uncertainty that have a bigger impact
12 on management, maybe for example the reaction to climate change.

13
14 It helps us to clearly eliminate management approaches that don't
15 work, and we're not just taking a shorter view of the resource,
16 and we can look long, and mid-term, into the future, to really
17 understand the long-term benefits, or costs, of different
18 management actions, and, overall, it improves our understanding of
19 the management system.

20
21 Some key take-home messages, and so, unlike a stock assessment, in
22 an MSE, we're not predicting the most likely future state of the
23 stock. Instead, we're designing, and testing, a management
24 procedure that will be robust, and we'll be able to mention
25 successfully, by meeting management objectives, even though there
26 are a lot of things about the stock that we don't know.

27
28 On its own, MSE is a research tool, but, when we do MSEs with
29 managers, then it can become a management tool, and so we're really
30 looking to sort of collaborate with managers and the SSC, as we
31 start building our MSE portfolio in the Gulf, because we want this
32 research to be, obviously, impactful and useful.

33
34 A management procedure is a management recipe, and it's designed
35 to be accepted as a recipe, and so we can think of it, and we're
36 not accepting a sequence of total allowable catches, or a sequence
37 of management recommendations, and we accept the recipe, and then
38 whatever the recipe produces is supposed to be already accepted,
39 because we accepted the recipe, and that's how management
40 procedures are designed.

41
42 Lastly, we build-in safeguards, when we implement a management
43 procedure, so we're not just shifting to a new management regime.
44 We can make sure that we're still keeping track on the health and
45 safety of the stock, and so I think this is the last slide, before
46 we move into MSEs for the Gulf, and so maybe I will pause and see
47 if there's any questions.

48

1 **VICE CHAIRMAN NANCE:** Okay. Thank you. I have one question. It
2 seems like data input is a problem, to keep our assessments moving
3 along, and I see that as also a problem for this, in the fact that,
4 if you've got an MSE that you're working on, you still need data
5 input, to see how you're doing, and so, if that doesn't come
6 quickly, then this sits idle until you have that, and is that
7 accurate?

8
9 **DR. PETERSON:** Yes, and, I mean, it's a simulation exercise, and
10 so there are assumptions that we can make in a management strategy
11 evaluation that we might not be able to do in a stock assessment,
12 and so I think it is a little bit more flexible, and, when we
13 embark on an MSE process, we create -- Tom Carruthers has sort of
14 dubbed them data guillotines, and, basically, we say any data that
15 we don't have collected by this point, we're not going to use, and
16 so, from now on, we're using the data that we have in-hand. That's
17 part of what MSE reviews and revisions are. We can incorporate
18 all the new data that we've gotten since the last data guillotine.

19
20 **VICE CHAIRMAN NANCE:** Thank you. Luiz, please.

21
22 **DR. BARBIERI:** Thank you, Mr. Chairman, and thank you for this
23 great overview presentation, Cassidy. It's really, really
24 helpful. If we could go back to Slide 11, and I'm thinking about
25 this, and this is going to be difficult, Cassidy, right, to what
26 was generalized, right, because there are so many things that could
27 be changing between the colors, or the boxes, here, but can you
28 give us at least like your gut feeling about the timelines involved
29 and the cost associated with each one of these boxes, just because
30 this is something that, you know, if we're adding this, right, to
31 our quiver of arrows, so to speak, it would be good to see which
32 one of those we can actually afford and get completed within the
33 expected timelines.

34
35 **DR. PETERSON:** That's a great question. I wish I had a more
36 concrete answer. It really, really depends on the framework that
37 we've already laid, in order to easily take what we have and build
38 it into an MSE, and that's something what we're working on, but,
39 from ground-zero, if we don't have any groundwork laid, a full
40 stakeholder MSE can take, I mean, upwards of multiple years.

41
42 The notorious ICCAT bluefin tuna, I mean, it took a decade. A
43 more realistic estimate for something in the Southeast might be
44 three-ish years, if we're starting from ground-zero, and we'll
45 probably have to think about hiring a contractor, if we want it to
46 be done a little bit quicker, and, you know, that can take \$100,000
47 a year, as a rough estimate. If we want to fund stakeholder
48 interaction, and go to different places and hold stakeholder

1 workshops, you know, that might be another \$15,000, or \$20,000,
2 depending on how intensive those workshops are, and so that's an
3 outline for sort of a full stakeholder MSE.

4
5 A desk MSE is a little bit shorter, if we're using a package that
6 already exists, and we can just take our stocks, feed them into a
7 package, and we're not quite there yet for the Gulf, but that would
8 be on the scale of maybe one year, and, eventually, once we lay
9 the groundwork, hopefully that can be shortened to six months or
10 so, as a rough estimate.

11
12 **DR. BARBIERI:** Wonderful. Thank you, Cassidy.

13
14 **VICE CHAIRMAN NANCE:** Ralph, please.

15
16 **MR. TOWNSEND:** Can you go to Slide 13, I think it is? It seems,
17 to me, that a word that you never used in this presentation is
18 "enforcement and administration", and you started off with
19 management approaches, and a management approach would be to pick
20 a management strategy that's enforceable.

21
22 **DR. PETERSON:** Absolutely.

23
24 **MR. TOWNSEND:** That obviously involved lengths, and the estimation
25 model tells you what your goals are, and the control rule, how the
26 control was forced, how much is spent on it, the socioeconomic
27 response, and it's fine to say, well, we could do it, and my
28 question is, as a practical matter, are these tools used to assess
29 how management affects enforcement, enforcement costs, and
30 behavior, because that is -- From my perspective, for American
31 management systems, enforcement has been ignored, in large part,
32 and it is the core of the failure of a huge part of systems, and
33 so my question is, as a practical matter, are there models where
34 enforcement is built-in, so that the council, for example, gets
35 the feedback? It's all well and good that you don't want cameras,
36 because of what it's going to cost you on the other end, and do
37 you understand the nature of my question here?

38
39 **DR. PETERSON:** Yes, I think so. That is something that gets
40 incorporated in the implementation model, and so this little slice
41 of this pie here. Some of that can be modeled, but, ultimately,
42 that will need to be informed, and that's a key reason why it's so
43 important to have stakeholders involved in the process, because
44 stakeholders might say, from the very beginning, we're not willing
45 to have cameras on our boats, and so maybe we think about other
46 management levers that we can adjust in developing our management
47 procedure.

1 That's something that we can build-in, sort of once we have that
2 understanding, and those are easy sort of sub-models to add onto
3 an existing MSE, but they do need to be informed, and
4 parameterized, and usually that is done, I would guess, outside of
5 the MSE.

6
7 **MR. TOWNSEND:** Well, I guess that's sort of my question. I mean,
8 you're talking about -- Your statement that we decide we're not
9 going to do cameras, and we take that off the table, and so we
10 never use the MSE to tell the council that, you know, taking
11 cameras off the table costs you this much on the other end.

12
13 It seems, to me, that an MSE that says we're not going to look at
14 certain options, and particularly this administrative enforcement
15 thing, which goes through estimation, or I think it goes through
16 estimation, because you need to estimate how the enforcement will
17 affect it, and, of course, there's also the piece, in
18 implementation, of how much is the Coast Guard going to spend
19 enforcing these kinds of rules, and how much are we -- Also
20 interactions where there are state-federal fisheries, where the
21 states are enforcing it, and so it seems, to me, in terms of
22 thinking about management, this enforcement administrative issue
23 is huge, and largely overlooked, and my question is are we doing
24 the same thing in our MSE?

25
26 **DR. PETERSON:** That's -- I mean, it's a great point, very well
27 taken, and it is something that we could do. I mean, we could
28 hear, from the stakeholders, that they don't want cameras, but we
29 could include that as a potential management procedure.

30
31 I mean, oftentimes we're dealing with -- In a management strategy
32 evaluation, we're dealing with, you know, tens, or more, management
33 procedures, and so we would ultimately, if we wanted to keep it
34 in, have the ability to say this is how much management success
35 will improve with cameras, versus without them, and, if you
36 incorporate an economic sub-model, you would be able to also think
37 about those costs associated with it, and that's a key reason why
38 this is such an interdisciplinary exercise, right? It's not just
39 fisheries scientists. It's important to have social scientists,
40 economists, managers, subject matter experts, species experts, all
41 involved in this entire process.

42
43 **VICE CHAIRMAN NANCE:** Thank you. Tom, please.

44
45 **DR. FRAZER:** Ralph, I think those are great questions, right, and,
46 I mean, one of the things that we struggle with, at the council
47 level, is we get a lot of biological information, right, and I
48 think there's a lot of talent, right, that kind of underpins that.

1 I think there's a need, obviously, to incorporate more
2 socioeconomic information.

3
4 The struggle is how to get it, right, and, when I look at a model,
5 or this approach, one of the things that I see is that you can --
6 If you incorporate the economic, you know, parts of this, then you
7 can start to evaluate what type of economic information you might
8 need to collect, right, and so, to me, that's kind of the first
9 part of all of this.

10
11 The second part of this is, if you go to this approach, and
12 particularly go to -- Instead of like more of an empirical modeling
13 approach, then I think what happens is you're starting to deal
14 with indices, right, and it's harder to characterize the
15 uncertainty around what your data are telling you, and so
16 developing that kind of risk assessment, right, and articulating
17 how you would interpret that, is something that is going to be
18 important moving forward. I don't think we do a good job of that,
19 interfacing between the SSC and the council.

20
21 **VICE CHAIRMAN NANCE:** Thank you, Tom. Cassidy.

22
23 **DR. PETERSON:** Now I will go to the --

24
25 **VICE CHAIRMAN NANCE:** Let me ask if there's any other -- For this
26 presentation, any other questions, or input, from the SSC? Paul,
27 please.

28
29 **DR. MICKLE:** Thank you. I enjoyed the first part. You mentioned
30 that natural mortality is not -- Well, not the effort for the
31 estimation of MSEs, but you mentioned climate change, and can you
32 give an example of how that would -- Are you leaning on literature,
33 or is there actually climate change data implementation of indices,
34 or -- I'm so locked in the model process, but just give an example
35 of that.

36
37 **DR. PETERSON:** Sure, yes, and, for clarity, natural mortality was
38 just an example, based on some previous MSE exercises, and it's
39 not to say that an understanding of natural mortality isn't going
40 to be most important in other case studies, but it's something
41 that we can look at.

42
43 For thinking about how we want to incorporate climate, that's
44 something that I will talk about, because it is a priority that
45 we're thinking about, and there are different ways that you could
46 build in the effects of climate change. There's sort of a
47 mechanistic way, where you identify the environmental driver, and
48 the mechanistic response to the fish population, or the fish

1 individual, and then you scale that up to a stock-wide process,
2 and you try and model that, linked to the environmental driver
3 projections and to the future. That's way to do it.

4
5 That's a very challenging approach, because you need to have those
6 data projections, and you need to have that relationship, and that
7 relationship can't be spurious, or changing over time, and there's
8 another approach, which is an empirical approach, where you
9 basically induce plausible changes that can be attributed to
10 climate change, and so we can say we know that climate change will
11 likely impact productivity of the stock, and so you can say I'm
12 going to model a future scenario in which productivity increases
13 and productivity decreases.

14
15 You can, I mean, obviously refer to experts, to parametrize what
16 those look like, but you can test the robustness of your management
17 procedures, based on those potential climate-induced responses,
18 and so the latter is more so how we're thinking, in the Gulf, and
19 in the Southeast, with the data limitations and complexities that
20 we have.

21
22 **VICE CHAIRMAN NANCE:** Okay. Thank you. With no other questions,
23 let's go ahead and go -- Sorry. Tom.

24
25 **DR. FRAZER:** Sorry. Thanks, Jim. I was thinking about this a
26 little bit too, and, I mean, later on in the presentation, you
27 have a couple of examples, and, I mean -- But they're all single-
28 species approaches, right, and so has there been any discussion,
29 within kind of the MSE group, about multispecies MSEs?

30
31 **DR. PETERSON:** Absolutely, yes, and multispecies operating models
32 are going to be the easiest way to start thinking towards
33 multispecies within MSEs. It's more challenging to have
34 multispecies, or ecosystem models, as the estimation model, or the
35 stock assessment model, and that's just logistically a little bit
36 less implementable, but, yes, I mean, we can take existing
37 Atlantis, or EwE, models for the Gulf and think about single
38 species management approaches, and we can think about multispecies
39 management approaches, and see how that affects the entire
40 ecosystem, and that's something that we're moving towards,
41 certainly.

42
43 **VICE CHAIRMAN NANCE:** Perfect. Harry has a question, please.

44
45 **MR. BLANCHET:** Thank you. On Slide 15, you're talking about a
46 management procedure as a recipe, and, to me, this requires a
47 certain level of trust between the managers and the developers of
48 that recipe. I mean, I can recall similar discussions, and not

1 nearly as technical as this, when some of the first stock
2 assessments came across, and, yes, I've been around that long, and
3 it gained acceptance of a whole new process, by not just the
4 council, but also the users and the observers of the fishery, the
5 NGOs and the other governmental groups as well. It's going to
6 take some education, and some trust-building, and how do you plan
7 on getting there? Thank you.

8
9 **DR. PETERSON:** Very good question. It's -- That's part of the
10 reason that I spent a long time talking about sort of the
11 safeguards that we build into place, to make sure that we're
12 continually reviewing the management procedure, and the resulting
13 management recommendations, but I will say that it's -- Management
14 procedures aren't always adopted as a recipe.

15
16 Sometimes they're put in place, and like an example is for Pacific
17 halibut. The management procedure is put in place, but then the
18 resulting management recommendations are still accepted every
19 year, and that's maybe an intermediate place, where we can start
20 building trust towards implementing management procedures, but we
21 do need to remember that they're not -- They might not perform as
22 designed, or as intended, or as simulation tested, if they're not
23 accepted and implemented as a recipe.

24
25 In ICCAT, for example, and in other areas, and management
26 procedures are very common in south Africa, New Zealand, and
27 Australia, and they are implemented as the management recipe, and
28 part of the reason that management procedures, or adaptive
29 management in general, might fail is if it's not treated as the
30 recipe, but, I mean, there are some intermediate steps, where we
31 can, you know, accept the resulting management recommendations,
32 but with the caveat that the management procedures likely won't
33 perform as designed. Does that answer your question?

34
35 **MR. BLANCHET:** Yes, and I can see how this can work one way if you
36 have -- Like your beautiful picture of an industrial fishing boat,
37 and, if you've got that type of a fishery operating, but where
38 we're dealing with how do you -- To me, one of the big things that
39 you could look at with this is multispecies discards from the
40 recreational fishery, and those kinds of issues are going to --
41 They're going to be a lot more driven by behavior than by
42 economics, and so I see it kind of as a different set of things
43 that we have to deal with in the Southeast than we might have to
44 deal with in some of those other fisheries. Thank you

45
46 **DR. PETERSON:** Absolutely, and you're exactly right, and that's
47 why it's so important to make sure that we have a good
48 understanding of the management objectives, because we really

1 design the management procedures to meet those objectives, and so,
2 I mean, we're obviously not in the factor ship, industrialized
3 commercial fishing industry down here, and so our management
4 objectives would look different, and so our management procedures
5 would be designed differently, to meet a different set of
6 management objectives, and so it is important for us to have a
7 full understanding of what that is, and I did make a note of the
8 multispecies discards, and I think that's a great idea.

9
10 **VICE CHAIRMAN NANCE:** Thank you, Harry. Okay, Cassidy, let's go
11 ahead and go on to the next part of the presentation.

12
13 **DR. PETERSON:** Sounds good. Okay, and so this is where we're
14 thinking about MSEs for the Gulf, and we have sort of an idea of
15 -- Near-term, we're really focused on capacity building, and we're
16 doing that through our application of what we're calling our FES,
17 or our MRIP-FES, pilot study MSE, and I'll talk more about that
18 later.

19
20 We're thinking in terms of on the scale of months, for near-term.
21 Capacity building is something that's going to extend into the
22 mid-term, and maybe long-term, and, for mid-term, we're thinking,
23 you know, on the measure of years. For long-term, on the scale of
24 multiple years.

25
26 Some future directions that we're interested in looking at are
27 validating and tuning case-specific interim assessment approaches,
28 exploring the performance of simpler empirical and simple model-
29 based management procedures, measuring the effects of stock
30 assessment frequency and complexity on our resulting management
31 stock assessment variability and risk tolerance, characterizing
32 uncertainty buffers around our stock assessment results, and using
33 that to parameterize catch control rules, and again ensuring that
34 management procedures are climate-ready, and, by that, we mean
35 robust to future climate-induced non-stationarity.

36
37 Our most important focus right now is capacity building. We're
38 trying to get to the place where we have the groundwork laid and
39 where we can do a management strategy evaluation in a few months.
40 That's the goal that we're trying to get to, and we're not there
41 yet, but we're using Stock Synthesis Management Strategy
42 Evaluation, which is a software package that was codeveloped by
43 the Southeast Fisheries Science Center and the Northwest Fisheries
44 Science Center. Nathan is one of the codevelopers, and so feel
45 free to direct questions towards him.

46
47 This is a really great opportunity for us. In the Gulf, obviously,
48 we use Stock Synthesis for our Gulf assessments, and the idea is

1 that we can take a peer-reviewed stock assessment and input it
2 into SS-MSE, and that is now the operating model for a management
3 strategy evaluation, and we can use this package as the basis of
4 our MSE.

5
6 We need to acknowledge that the structure of our fisheries, and
7 our stocks in the Gulf, is very complex, and so our Stock Synthesis
8 stock assessments have all of that structure built in, and that's
9 a little bit beyond the capacity of SS-MSE. It is a brand-new
10 package, and so, to-date, we've been doing a lot to expand SS-MSE
11 to allow for the complexity that we have in our Gulf assessments,
12 and some examples are listed here.

13
14 We've built in the capacity to treat discards, and we're ensuring
15 that all of our specific data types are resampled appropriately,
16 building in the capacity to look at bycatch or red tide fleets,
17 building in multiple area, time-varying parameters, and this is a
18 great opportunity to sort of beta test SS-MSE, and fix some
19 outstanding bugs, and that's something that we've been working on
20 for the past eight months.

21
22 The reason that we've been able to do all of this capacity
23 development is because we have been focusing on what we're calling
24 the FES MSE, and the Gulf Council request is listed here.
25 Essentially, given the MRIP pilot study results and timeline, and
26 to better understand how variability in recreational landings and
27 discards for Spanish mackerel might ultimately affect the health
28 of the stock, the council requests the Science Center conduct a
29 desk MSE to examine the impacts of recreational landings data on
30 management, and so this is something that we have already started,
31 and we are working on this, and hopefully this can be sort of a
32 joint effort, with the SSC and the council, so that we ensure that
33 these results are useful.

34
35 I will pause here and ask if there's any feedback on this Gulf
36 Council request, and there will be time later too, but just if
37 there's any immediate reactions, and I would be happy to hear some
38 now.

39
40 **VICE CHAIRMAN NANCE:** Okay. Any comments from the SSC? We did
41 have a presentation, at the last meeting, on the MSE and this, and
42 so we had a little discussion. Was there anything else that we
43 wanted to add to that at this time? Will, please.

44
45 **DR. PATTERSON:** You know, unpacking this a little bit, you know,
46 past the bolded text, when you're talking about uncertainties,
47 right, and so, in this particular data input, there is imprecision
48 in the landings estimates, but, with FES, there's also, and just

1 MRIP in general, you know, there's concerns about bias, and so
2 that's a whole different realm of evaluation than just what happens
3 when you're really uncertain, and do you have to add in greater
4 buffers, according to the legislation, but bias is a much more
5 difficult to think to deal with, and so I'm curious. In your early
6 explorations, like how much focus has been on those two different
7 components?

8
9 **DR. PETERSON:** That's a great question. I will keep going, because
10 I will get into it over the next couple of slides, but we are
11 considering bias, and so maybe I will keep going.

12
13 We're focused on Spanish mackerel. This is a good case study, and
14 we just did the assessment, and there's no allocation issues that
15 we need to worry about, and, as a small pelagic fish, the data,
16 reflective of the population dynamics, are highly variable, and so
17 our purpose here is to understand the management implication of
18 true versus measured recreational landings and discards when
19 they're on two separate scales, and so this is getting at the bias
20 that Will highlighted.

21
22 Our goals are sort of twofold, which is, first, what is the impact
23 that unknown magnitude of recreational removals has on management
24 performance for Gulf of Mexico Spanish mackerel, and, two, are
25 there any alternate management approaches that may be able to
26 perform better when that absolute magnitude of removals is biased.

27
28 One alternate management procedure that has been proposed by John
29 Walter, which we're calling this percent change approach, is
30 illustrated in this graph, and this is just made-up data, but,
31 basically, we're looking at the blue line, which is spawning stock
32 biomass ratio, or spawning stock biomass relative to SSB at MSY,
33 and we want that to be equal to one, and so this percent change
34 approach specifies that we run a stock assessment, and then we
35 adjust last year's total allowable catch based on this year's SSB
36 ratio.

37
38 The idea is that, if the SSB ratio is greater than one, then our
39 SSB is greater than we want it to be, because we want it to be
40 equal to SSB MSY, and so we can increase total allowable catch
41 this year, or next year, to help bring the spawning stock biomass
42 back down to an SSB ratio of equal to one, and this blue line is
43 SSB ratio. We can see that, if SSB ratio is equal to one, the
44 total allowable catch recommendation for next year stays the same,
45 but, when it's greater than one, the TAC recommendation for next
46 year increases, vice versa, if it was below one.

47
48 We have -- To-date, we've been working to expand the complexity

1 that we can incorporate in SS-MSE. We've been trying to convert
2 multiple Gulf assessments into SS-MSE operating models. We have
3 many running, but we still need to work out some kinks, and we
4 have developed a proof-of-concept, which involves building out the
5 ability to have the landings from the operating model and the
6 estimating model on two different scales to simulate that bias,
7 and we've developed John's percent change management procedure
8 approach, and run it on a very simple case study.

9
10 We're going to start with a very simple -- A simple two-by-two
11 operating model management procedure process, which I will explain
12 on the next slide, and we're going to hope to expand a little bit
13 from there, and, of course, this is helping us to expand capacity
14 and beta test. Go ahead.

15
16 **DR. PATTERSON:** So, in this simple model, how do you handle if the
17 uncertainty in the percent change is greater than the percent
18 change?

19
20 **DR. PETERSON:** If the uncertainty -- Like the uncertainty around
21 the --

22
23 **DR. PATTERSON:** So just a straight ratio, and you don't have any
24 variance estimates on your spawning stock biomass. Whatever the
25 metric is that you're measuring to get your ratio, that's just
26 assumed to be deterministic, and you don't have any variance
27 incorporated?

28
29 **DR. PETERSON:** That's a good question. Right now, the way that
30 it's coded is that it is -- We're not incorporating uncertainty.
31 That's something that we can easily build-in, but we're building-
32 in a constant, so that we can make it so that it's not a one-to-
33 one ratio, and so a 10 percent increase in SSB ratio doesn't
34 necessarily equate to a 10 percent increase in next year's catch
35 recommendation, and so it can be tuned to account for that
36 uncertainty, but I think there would be room to build-in an
37 estimate of that uncertainty into the control rule algorithm. I
38 think that's a good idea, but, as it's coded right now, we haven't
39 built that in, but it would be inherently built-in by the way that
40 we tune to that constant, if that makes sense. We've built in --
41 Go ahead.

42
43 **VICE CHAIRMAN NANCE:** Yes, and I have a question. If you go back
44 to the slide before this one, because, with variance in there, you
45 could have -- The line looks like it's above, but the variance
46 could be below also, and it could be way above and below, and so
47 how would you manage with that large variance around that point?

48

1 **DR. PETERSON:** Yes, and so one option is that we could measure
2 that uncertainty, and build that into the control rule, and so, if
3 the uncertainty is large enough, then we create a buffer around
4 the SSB ratio, and we don't induce a change in next year's total
5 allowable catch, unless that change is greater than, and we haven't
6 done that yet, but we can, and I'm going to --

7
8 **VICE CHAIRMAN NANCE:** I think that would be a good point, because
9 it's -- This is very simple, and it looks like there is no variance
10 at all, and so you see, if it's at this point, it goes -- But I
11 think it would be good to have that variance around it, so that
12 you can manage with that unknown.

13
14 **DR. PETERSON:** Absolutely, yes, and so the way that it's coded
15 right now is that there is -- The change in SSB ratio is reduced
16 a little bit when you estimate the TAC, and so, like I mentioned
17 before, like a 10 percent -- Like if the SSB ratio was 1.1, that
18 would be -- That would suggest, on a one-to-one ratio, a 10 percent
19 increase in total allowable catch, but we have a constant built-
20 in, so that it's not a 10 percent, and it's less than that, and we
21 would tune that, based on the MSE, and so that's why I'm saying
22 that, inherently, that constant approach might inherently account
23 for that uncertainty, but it would be more direct to take estimates
24 of uncertainty around the SSB ratio estimate and use that to scale
25 what the change in TAC next year would be, and so we can build
26 that in as another management procedure to test.

27
28 **DR. PATTERSON:** I would just -- You know, I would think of that
29 more as a precaution, so you're not changing too fast, based on
30 uncertain information, than truly incorporating uncertainty.

31
32 **DR. PETERSON:** Yes. I guess I'm thinking, because it would be
33 tuned to the level of uncertainty we would expect for this case
34 study, that it could be similar, but I agree that it is more a
35 precautionary thing.

36
37 This simple design that we've identified right now is two operating
38 models. The base case operating models were both the operating
39 model and the estimating model measure recreational removals, in
40 MRIP units, and then our second case study is where the observed
41 removals are still in MRIP units, but the true removals are
42 actually lower, and so these are our two case studies, and so it
43 can reflect uncertainty in variability, and also the impact of
44 bias, and we're going to look at two management procedures right
45 now, and I have a note to look at a different parameterization of
46 Number 2, and so maybe we'll have three.

47
48 The first is sort of the conventional approach, where we project

1 with the FSPR ratio for Spanish mackerel and estimated total
2 allowable catch, and then the next is this percent change approach,
3 and we can look at multiple configurations of that, but this is an
4 area where I would like a little bit of input, and discussion, if
5 folk are up for it.

6
7 Basically, we're interested in do you have anything that you want
8 to add to this request right now? What project deliverables are
9 most important, and most informative, and what do you want to see?
10 Are there any other operating models, or management procedures,
11 that we want to be considering here at this stage?

12
13 **VICE CHAIRMAN NANCE:** Any input from the SSC? Luiz and then
14 Trevor.

15
16 **DR. BARBIERI:** Thank you, Mr. Chair. The short answer is no,
17 Cassidy, because, going through this presentation now in more
18 detail than we had seen this before I think matters, right, because
19 we see a little bit more of the guts, that we hadn't seen before,
20 and, you know, the last presentation was very conceptual in nature,
21 and, to tell you the truth, I didn't quite understand, and that's
22 not your fault, but, I mean, I just couldn't grasp, from that
23 presentation, really what direction this was going.

24
25 Here, you're going into a bit more detail, and so I wonder, right,
26 and others may have additional recommendations, or suggestions, to
27 make today, but I think that, you know, something that we can think
28 a little more, and perhaps, at our next meeting, you know, discuss
29 and if you could at least be online, and we could have some feedback
30 for you that is a bit more detailed than I think what I would be
31 prepared to present today.

32
33 **DR. PETERSON:** Yes, of course. Of course.

34
35 **VICE CHAIRMAN NANCE:** Trevor, please.

36
37 **MR. MONCRIEF:** I've been kind of back and forth and trying to deal
38 with another thing going on, but, on the inputs of recreational
39 landings, and we've had discussions, throughout the past, when it
40 comes to, you know, how to reconcile magnitude differences, how
41 to, you know, think through the uncertainty and everything else,
42 and we've talked about essentially running averages for the
43 recreational catch over time, to smooth basically the time series,
44 and has that been a consideration of you all's at all, because I
45 know it's definitely on our thought process, when it comes to how
46 to think about this stuff back in time, and to adjust for the
47 uncertainty that we'll never be able to truly, you know, fix or
48 reconcile.

1
2 **DR. PETERSON:** That's a great question. I might defer to Katie,
3 to see if that's something that she's thinking about, but Katie is
4 thinking about other sensitivity runs that we can do that are not
5 the full feedback loop MSE. Harkening back to that MSE
6 complexity, there are some research questions that we can answer
7 with simpler approaches, and so that might be one of the ones that
8 we can look at the impacts on the stock assessment, instead of the
9 impacts on management, but I can definitely talk more with Katie,
10 and the rest of the team who is working on this, and we can think
11 about that as well. Absolutely.

12
13 **VICE CHAIRMAN NANCE:** Will, please.

14
15 **DR. PATTERSON:** Thank you, Mr. Chair. Similar to that, this MSE
16 is focused strictly on FES recreational landings, but, as part of
17 that like simpler approach, and not going through the full feedback
18 loop, could you also examine other substantial sources of
19 uncertainty, just so you can put this sort of in context, or
20 perspective, relative to those, like ageing error, or M, discard
21 mortality, and, I mean, maybe those -- Not all those are that
22 germane to Spanish, but, some of the other stocks that you're going
23 to look at, they will be. Just to kind of scale what you're
24 looking at.

25
26 **DR. PETERSON:** Yes, and absolutely those are things that we can
27 incorporate. I've made a note, and anything that's most important
28 to Spanish mackerel -- You can always follow-up with me offline,
29 or at the next meeting, and we can absolutely incorporate those
30 things, and so, if that's something that you're looking for in
31 this analysis, we can do that.

32
33 **VICE CHAIRMAN NANCE:** Ralph, please.

34
35 **MR. TOWNSEND:** So, if you have a biased estimate of recreational
36 catch, how you would feed that into the estimation of the stock
37 size, and I understand how that works, but, on the other end, if
38 you have a biased estimate, the council is getting a different
39 outcome than it thinks it's getting, right, that the benefit to
40 fishermen is higher or lower.

41
42 They're catching more fish, or fewer fish, and, ultimately, the
43 goal is to deliver fish to fishermen, and so I guess the question
44 is, when you take account, or when you're estimating the impact of
45 bias, or uncertainty, but bias in particular, for recreational
46 removals in the process of setting a control rule, do you also
47 take that consideration in when you're evaluating the outcome of
48 the system, that is how many fish are actually being caught by the

1 management system?

2

3 **DR. PETERSON:** Yes. Yes, and so the -- We're assuming that we're
4 measuring on two different scales, right, and so the true removals
5 are going to be on a different scale than the measured removals,
6 and so when, you know, we measure those removals, we have to do
7 that translation. When we specify what the removals should be for
8 the next year, that's going to be in the measured units as well,
9 and we translate those back into the real units, when implementing
10 that advice, and does that make sense?

11

12 **MR. TOWNSEND:** I'm not talking about developing the advice.

13

14 **DR. PETERSON:** Okay.

15

16 **MR. TOWNSEND:** I'm talking about the goals of the management system
17 are to deliver fish to the recreational harvesters over the long
18 run, and the number that you're delivering is not what the catch
19 rule -- Is not what the catch rule says it's being delivered. It's
20 different.

21

22 **DR. PETERSON:** Right.

23

24 **MR. TOWNSEND:** There may be more, and there may be less, and so my
25 question is, when we're figuring out -- Does the management system
26 then say, oh, the actual catch is different from what we said in
27 this step, where we set the catch rule, and that's what we need to
28 measure over the long run, and that is we need to be measuring
29 what we think are the benefits to the fishermen, in terms of the
30 benefits they get from catching these fish, and they're catching
31 more or less fish than we're giving them, than is official in the
32 data.

33

34 **DR. PETERSON:** I don't know if I totally -- I'm sorry, and I don't
35 know if I totally follow your question, but we will be able to
36 look at long-term benefits, and long-term performance, metrics
37 from this, and I don't know if that's -- I don't think that's what
38 you're asking though.

39

40 **MR. TOWNSEND:** Well, I guess the question is, if you assume, and
41 let's simplify it to if you assume the recreational catch is
42 underestimated by 20 percent, when you get to looking at the
43 outcomes, do you take -- Do you say actually catches are 20 percent
44 higher, in every year, than what we set as the rule? Do you
45 understand what I'm saying? In other words, the process generates
46 more or less fish than the model says it does, and that is our
47 goal, is not -- Our ultimate goal is to provide some level of
48 landings for the harvesters, and are we evaluating that based on

1 different assumptions about how correct, or incorrect, our
2 measurements are?

3
4 **DR. PETERSON:** So the management objectives, or the performance
5 metrics, that we measure are going to be from the true operating
6 model, but we can also look at them as how they would be measured
7 from the biased perception in the estimating model. We can look
8 at both, but, ultimately, what we're interested in is the state of
9 the stock and fishery, the truth, and so we mostly measure it from
10 the unbiased truth.

11
12 **MR. TOWNSEND:** But it's not just the stock size. It's the catch,
13 the recreational fishermen catch, that is also reported.

14
15 **DR. PETERSON:** Yes, and we can measure that in the truth, and we
16 can measure that in the bias, and we can measure it in both scales.
17 Absolutely. Yes.

18
19 **VICE CHAIRMAN NANCE:** Trevor, to that point?

20
21 **MR. MONCREIF:** Ralph, I think you're stepping into what has been
22 essentially a decade-long culmination of the work that's ongoing
23 now on the recreational side, and so the things you're asking
24 about, that's -- Those are all basically all active scenarios and
25 things that are having to be discussed at all levels of management.

26
27 **VICE CHAIRMAN NANCE:** Thank you. Jason.

28
29 **MR. ADRIANCE:** I think I took a simpler point out of that, is that
30 the TAC that the council then gets, adjusted for what's in here,
31 or are they fishing to a false TAC, in essence, that you're then
32 feeding back in later.

33
34 **DR. PETERSON:** Yes.

35
36 **VICE CHAIRMAN NANCE:** Thank you. Tom, please.

37
38 **DR. FRAZER:** That's good discussion, and so I want to follow-up on
39 a couple of things that Will said, right, and so, again, moving
40 forward, there's a fair amount of uncertainty here, and I'm not
41 sure how you're going to capture that, but I'm also assuming that
42 -- You refer to some type of a biological control rule.

43
44 We don't have any established for MSEs, right, and so who would be
45 responsible for kind of drafting out those control rules, right,
46 and then you're probably going to have to incorporate -- Because
47 you have fewer data that you're relying on, and so you're going to
48 have to incorporate more uncertainty, and perhaps have larger

1 buffers, and how is the SSC going to articulate to the council,
2 you know, that uncertainty means, right, and what are the
3 biological and socioeconomic risks associated with, you know, a
4 particular buffer. Those are things that I will be looking for
5 from this group, right, and I think that we're not quite there
6 yet, but hopefully.

7
8 **DR. PETERSON:** That's a good point, and it is part of our longer-
9 term goals for using MSE in the Gulf, and so we will have a whole
10 slide dedicated to just that question.

11
12 **VICE CHAIRMAN NANCE:** Okay. Luiz, please.

13
14 **DR. BARBIERI:** Just a quick comment, just to add to this
15 discussion, right, and I think that, you know, when we think about
16 our sense of direction here for the regional process, right, I
17 mean, this is something to think about as well, is, you know, how
18 to handle the fact that MSEs can become a Pandora's Box, so to
19 speak, right, where we end up asking so many questions, that may
20 or may not be achievable, or realistic, that it becomes difficult
21 for us to put all those things in a box, right, that can be
22 operationally viable.

23
24 I think that, as we learn this implementation process, and, you
25 know, for our regional thought process on how to handle all of
26 this, it's to try to identify, like some of your slides before,
27 right, what questions really we want to ask, and what's the range
28 of uncertainties, right, and, I mean, in this case, because we
29 haven't seen like terms of reference, so to speak, right, and so
30 the questions are not well-defined in front of us, and, the moment
31 that you show us, right, the possible scenarios that can be
32 considered, everybody gets greedy, and because it's very
33 interesting, right, but I'm just thinking, and perhaps that's a
34 discussion point for the next presentation, is, as we try to
35 integrate this into our toolbox, right, of procedures to be used,
36 that we're going to have to satisfy ourselves in being a little
37 more bound by something, so we don't end up in this situation where
38 you never get to the end.

39
40 **DR. PETERSON:** Absolutely, yes, and that's a great point, and
41 that's why we're starting with a relatively simple scenario that's
42 going to directly answer our research question, and that's why
43 we're starting small, because it can, very quickly, and very
44 easily, spiral.

45
46 **VICE CHAIRMAN NANCE:** Katie, please.

47
48 **DR. KATIE SIEGFRIED:** Thanks, Mr. Vice Chair. I appreciate the

1 opportunity to talk now, because I think that Cassidy could
2 potentially try to incorporate all of these different things, like
3 Luiz just mentioned, but that's part of why we incorporated that
4 short-term versus long-term slide, and I have some interest in
5 building this capacity in my group, to answer all kinds of other
6 questions that don't actually have to do with FES, and so I share
7 your enthusiasm in trying to answer multiple questions with this
8 tool.

9

10 However, I did want to just state that this particular MSE, this
11 FES MSE, when we started it, even before the council requested
12 this Spanish-mackerel-specific one, it was really meant to answer
13 a temporary question, we hope, and we're hoping that, you know,
14 the bias, the nature of the data question, will be answered as
15 soon as the other studies are completed, although there will be
16 lots of changes happening in the Gulf, whether it be state surveys
17 or the MRIP-FES survey.

18

19 This is meant to answer the question of whether that ratio
20 approach, or the percent change approach, that both Clay and John
21 have mentioned at multiple council meetings, could be a way forward
22 in the interim, before we have a final answer for FES.

23

24 We're also, as Cassidy alluded to, trying to work out some
25 sensitivities with the model, the red-snapper-specific model, to
26 start, to take a look at the specific question of say what happens
27 with calibrations of the recreational landings and discards state-
28 by-state, and what is the effect on both the stock, but then, also,
29 downstream, what is the outcome for the ABC and the state-to-state
30 allocation.

31

32 What we hope to be able to provide, prior to the data workshop for
33 SEDAR 98, is those sensitivities, some sort of answer of how --
34 You know, how the assessment units translate into state-to-state
35 allocations, and a percent approach, but this FES is special, in
36 that it can answer the question knowing the truth, right, and so
37 the sensitivities use the stock assessment, which has all of the
38 flawed current data in it, but it doesn't -- We don't know the
39 truth, and so this really will help us understand what happens
40 with the management advice with the potential bias in our data,
41 and so this just the first set of questions that we want to answer,
42 but this definitely has to be paired with all kinds of other
43 approaches, in order to answer even a quarter of what you all have
44 brought up so far. Thanks.

45

46 **VICE CHAIRMAN NANCE:** Thank you, Katie, and I think the key is,
47 last time, we had a very general discussion. This one is a lot
48 more specific, and, as you see, there's a lot of other questions

1 that we have, and so I think, as we move forward with this, and,
2 as Katie pointed out, this is specific for Spanish mackerel and
3 the impacts of recreational landings on management, and that's
4 what this is trying to look at, and so, as you delve into that,
5 and we see presentations on that, we may have other input into it.
6 Let's go ahead and move forward on the rest of it. I think,
7 unfortunately -- Well, not unfortunately, these questions at the
8 bottom opened up where we would like to see everything go, as
9 opposed to just dealing with this one specific thing.

10

11 **DR. PETERSON:** That's all good and useful conversation for me,
12 specifically, and so we mentioned some longer-term goals that we
13 have, and I want to quickly give a flavor on what those timelines
14 look like and what's involved in getting to the point where we can
15 ask those questions.

16

17 These are longer-term, and not necessarily because we envision
18 that they're going to take that long to conduct, but that we don't
19 have the capacity right now to ask all of these different questions
20 simultaneously, and we only have our technical team, and we can
21 only focus on sort of one question at a time, and so, eventually,
22 we're going to get to the place where we can do more, but just a
23 flavor of what we're looking to do.

24

25 We're really, really interested in building, and stress testing,
26 interim approaches and simpler management procedures. In order to
27 get to that place, we need to build in that capacity to do interim
28 assessments and empirical management procedures, simpler model-
29 based management procedures, and none of that capacity exists right
30 now in the tool, and so we do need to go ahead and build that.
31 That will take several months.

32

33 We need to think about target stocks, make sure they're compatible
34 with SS-MSE, and that might also take a little while, if they're
35 not already compatible, and, of course, we need the time to run
36 all of these simulation exercises, and tuning interim and empirical
37 management procedures is another very time-consuming process.

38

39 Another goal is measuring the impacts of stock assessment
40 frequency, throughput, and complexity. That is something that --
41 You know, again, we need to identify target stocks, make sure
42 they're compatible, and then think about how, you know, time-
43 consuming it is to build one stock assessment model, and we'll
44 need to build multiple assessment models, with different levels of
45 complexity, in order to run this case study.

46

47 You will see that I have noted that both of these goals are
48 crossovers with Nathan's RESTORE project, and so you'll see Nathan

1 talk tomorrow, and a lot of this will look familiar. There's a
2 lot of parallels, and I just want to highlight that we are working
3 collaboratively, and synergistically, so that, hopefully,
4 together, both of these projects will be greater than their sum,
5 but Nathan is really focused on identifying practical solutions
6 and approaches to addressing assessment and management complexity
7 and characterizing sources of modeling uncertainty, to better
8 approximate reality.

9
10 This is going to be really useful, and it's going to help us to
11 parameterize our simulations and characterize our MSEs in the Gulf,
12 and we also have the opportunity, building this capacity, to test
13 and tune example solutions that Nathan comes up, with using
14 management strategy evaluation.

15
16 This is coming back to the catch control rules, and so another
17 goal is to characterize uncertainty buffers and use that in the
18 development of catch control rules, or harvest control rules, and
19 those are predefined decision rules that specify what management
20 actions will take place in response to the perceived states of the
21 stock.

22
23 As defined in the Magnuson-Stevens National Standard Guidelines,
24 we take our maximum sustainable yield estimate, or proxy, and that
25 becomes the overfishing limit. The overfishing limit is then
26 reduced or equal to acceptable biological catch, to account for
27 scientific and management uncertainty, and that can then,
28 optionally, be further reduced into the annual catch limit, to
29 account for implementation uncertainty, and the diagram on the
30 right is sort of an illustration of that process.

31
32 Basically, we acknowledge that, when we estimate maximum
33 sustainable yield, or proxy, that there is some level of
34 uncertainty around that, and this distribution is intended to
35 demonstrate that uncertainty. We translate our MSY into an
36 overfishing limit, and that is a catch that we're going to think
37 about implementing.

38
39 To account for this uncertainty, if we go ahead and we fish at
40 exactly maximum sustainable yield in the next year, because of
41 this uncertainty around this estimate, that still gives us a 50
42 percent chance that we will overfish in the next year, and so the
43 way that we account for that is we precautionarily reduce it based
44 on the amount of uncertainty around that estimate, and that's why
45 we get our ABC, and so the harvest control rule, or the catch
46 control rule, is the way that we do that, and so we're really
47 interested in understanding, and characterizing, what this
48 uncertainty looks like for Gulf stocks, so that we can

1 appropriately design these catch control rules.

2
3 To do that, we need to make sure that we're configuring our
4 operating models appropriately, so that we can observe, in our
5 simulations, the same level of uncertainty that we see in real
6 life. It's really easy to make a simulation perform much better
7 on the computer than they occur in real life, and so that's going
8 to be something that we need to contend with, and then, of course,
9 we'll have to ensure that our stocks are compatible with SS-MSE.

10
11 Our last goal that we're highlighting here is climate-ready
12 management procedures. This is a crossover with the Climate,
13 Ecosystem, and Fisheries Initiative, which is part of the Inflation
14 Reduction Act funding.

15
16 Here is where we can build climate impacts into our management
17 strategy evaluations, and I mentioned that there is sort of a
18 mechanistic approach to that, where we identify the driver and the
19 response, and we model that in a management strategy evaluation,
20 or in our operating models, or we can think about plausible
21 responses to climate, things like shifting distributions and
22 changes in productivity, and model those more generally, to make
23 sure that our management procedures are robust.

24
25 That involves a lot of development, and a lot of building of
26 scientific knowledge. If we're going to do the mechanistic
27 approach, with the empirical approach, it's something that we can
28 implement much quicker, and we're seeing MSEs are really important
29 in this CEFI initiative, because they're sort of the actionable
30 and transformative link. They're the way that we can apply all of
31 the great climate research that's going into this effort, and so
32 we think MSEs are a really important component of this.

33
34 Basically, this is this diagram again, and we can build the impacts
35 of climate into every single component of this simulation
36 framework, and model the management response, and so we can think
37 about climate changes to the stock and fishery, and we can think
38 about climate changes to the way that we're collecting data. We
39 can link them to assessment models, incorporate them in our control
40 rules, or think about how implementation might be impacted by
41 climate.

42
43 We touched on some of this already, but I would be happy to take
44 more feedback on what these priorities look like, whether they're
45 things that you're interested in, and if we should be thinking
46 about additional priorities for MSE in the Gulf.

47
48 **VICE CHAIRMAN NANCE:** Thank you for that presentation, and, if you

1 have any other feedback and stuff, I think get with Cassidy. I'm
2 going to move on to the next presentation, but I really appreciate
3 you being here, and I thought, for me especially, this was a great
4 presentation, to bring me up-to-speed on MSEs and being able to
5 use those in the future. We'll now go ahead and move to our next
6 presentation, and I think, Dr. Siegfried, you're going to give
7 this one, if I'm not mistaken.

8
9 **DR. SIEGFRIED:** Yes, I am.

10
11 **VICE CHAIRMAN NANCE:** Okay. Good, and this is on SEDAR Assessment
12 Process Changes and Model Complexity, and we'll go ahead and have
13 the scope of work for that, please, Ryan.

14
15 **SEDAR ASSESSMENT PROCESS CHANGES AND MODEL COMPLEXITY**

16
17 **MR. RINDONE:** So Dr. Siegfried is going to review proposed changes
18 to the SEDAR process, and the Science Center's organizational plan
19 for addressing and implementing these proposed changes. She'll
20 also briefly talk some about the SEDAR Steering Committee's
21 comments, which aren't directly included in the presentation,
22 because the SEDAR Steering Committee met two days ago, but she
23 will briefly touch on some of those conversations that we had a
24 couple of days ago, and I can help out with some of that too, and,
25 as we noted in that presentation that I gave earlier this morning,
26 the SEDAR Steering Committee is the one that is responsible for
27 the overall process and management of the SEDAR program and just
28 how these organizational changes are being discussed.

29
30 She'll also -- Dr. Siegfried will also discuss possible levels of
31 model complexity that might be considered for various managed
32 species relative to the data available for each, which she is going
33 to describe, and you guys should review this information and ask
34 questions of the Science Center and council staff. It's yours,
35 Katie.

36
37 **VICE CHAIRMAN NANCE:** Thank you very much, Ryan. Katie, please.

38
39 **DR. SIEGFRIED:** Thank you. I appreciate that. I'm very sorry
40 that I can't be there with you all in-person. I'm disappointed
41 not to be there for the new SSC, the new SSC's first meeting, and
42 I'm having some family medical issues that is keeping me close to
43 home, but hopefully you all can hear me okay, and please let me
44 know if I need to change headsets or anything.

45
46 As Ryan stated, we're trying to give you an update on all of the
47 assessment process changes that are underway. I did present at
48 the last meeting about this, and I plan to until we get to our new

1 2026 calendar, and then, through discussions with council staff
2 and the SSC, it became apparent that we needed to continue
3 discussions about what data are available for which species, and
4 this could be in an effort to streamline the assessment process
5 for those species or potentially investigate a simpler model for
6 species. Then what are our next steps, before I present more
7 information towards either of those process changes or
8 simplification?

9

10 One of the things that we discussed last time is how do we move
11 forward scheduling when we're trying to meet the needs, or the
12 objectives, of the council, meet our staffing and funding
13 limitations at the center, but also provide timely management
14 advice, and we have come through with this thing that we're
15 calling, at this point, an 8-2 approach, which I will show you
16 more details about that, both in description and then a visual for
17 you.

18

19 The idea, at least with our last discussion with the council staff,
20 is to conduct full stock assessments of up to twelve species every
21 eight years. Now, they did give us a list of key species, at the
22 last council meeting, and that was only five species long.
23 However, there is definitely interest in updating other species,
24 and not just those five, and those were the top-priority species.

25

26 The next thing is to update management advice for up to twelve
27 species every other year, using simpler approaches, and so the
28 full stock assessment takes a lot of time, a lot of effort on the
29 part of all of the people cooperating in that process, and then
30 all of the money that it takes to get everybody in the room, and
31 so there is a benefit to updating management advice with a simpler
32 approach in the interim.

33

34 The options for that are an interim analysis, as most of you have
35 seen multiple times, and something else that we're looking to is
36 management procedures, which Cassidy will be investigating some of
37 those for the FES MSE that you all saw, and there's also the
38 potential for update assessments, which is basically the most
39 streamlined assessment, and that doesn't require any participatory
40 workshops. That can take far less time than a full stock
41 assessment. There is the option to update our projections or do
42 a simple review of available data after a conventional data pull.

43

44 We also have efforts from the center to provide things like indices
45 on public-facing websites that can be viewed annually, if not more
46 often, and the center will also work with the councils to determine
47 which one is most appropriate for those interim approaches, but
48 this calendar will allow for us to conduct update assessments, if

1 that is warranted, and it just depends on the species what the
2 management needs are and the data availability.

3
4 This proposed calendar, or really approach to setting a calendar,
5 intentionally holds some analyst time for a number of things. We
6 have interest, from the SSC and the center, to conduct procedural
7 workshops, through SEDAR, on high-priority research topics.
8 There's been a number of issues raised, such as episodic mortality,
9 concerns in how to incorporate things like climate change, looking
10 at recreational data, and so it wouldn't be a species-specific
11 workshop, but it would be more of a high-priority research topic
12 type of workshop.

13
14 We could work on data-limited stock complexes, and so there's a
15 number of species that either haven't been assessed, or have been
16 assessed infrequently, that could be lumped together and assessed
17 at the same time, and we could attempt to assess a new stock in
18 some of the time that is not dedicated to those twelve species on
19 this calendar, or we could have that analyst time for further
20 development of those desk MSEs and MSE-tested MPs that Cassidy
21 just reviewed for you.

22
23 Some of the advantages of this calendar is that increases the
24 throughput of management advice from about three species a year to
25 four or five, depending on the year, and we can continue to assess
26 most of our stocks that are currently assessed, using the age-
27 structured assessments, and update management advice for those
28 stocks every other year, with this proposed calendar, and we do
29 want to say that we still would investigate ways to simplify those
30 models, so as to not to overtask our data providers unnecessarily,
31 and then -- We'll never overtask them, but to task them
32 unnecessarily, and then we avoid exceeding the capacity of our
33 data providers and retain sufficient worktime to advance important
34 research and development initiatives.

35
36 This could be through the SEDAR procedural workshops, or it could
37 be through our internal efforts, such as we've got an age data
38 workshop coming up in August that we have significant time
39 allocated to, and then, also, other types of things, like the FES
40 MSE work, and then this approach is advantageous, because it's
41 developed in cooperation with Gulf Council staff.

42
43 One of the things that we noted, when we're trying to use that
44 SEDAR Steering Committee, is that there may not be a one-size-
45 fits-all approach to all councils and all cooperators, and this
46 approach seems to work really well for the council, based on our
47 conversations with council staff up to this point.

1 Here is the potential calendar. Besides being pretty, there's a
2 whole bunch of information here for you, and so let me walk you
3 through the top table first. We have it by analyst, and this is
4 not because we're trying to show you what the workload is, and
5 this is not indicative of each analyst's total workload, and this
6 is just their operational workload on that one specific, or two
7 specific, stocks.

8
9 Across the X-axis, so to speak, is the year, but, by analyst, we
10 anticipate each of them to be able to do up to two stocks, depending
11 on if we have stocks that need multiple analysts, and then to, in
12 the interim, you know, in the spaces, provide the interim catch
13 advice.

14
15 You can see all of the twelve stocks represented, and the interval
16 that they will be assessed, and so this is showing, if all things
17 are perfect, if all things work well, and full stock assessments
18 are requested for all twelve species, this is approximately how
19 the calendar could be filled out. Now, this is based on the second
20 set of -- Sort of the second matrix there, which shows you that
21 timeline broken down into the data pieces, which is the red "D",
22 the assessment pieces, which is the yellow "A", and then when the
23 management advice is ready, which is the green "M". Then the "IA"
24 is whatever interim approach is utilized in the blue boxes there.

25
26 There is a potential to streamline some of those, based on, you
27 know, minimizing the data pulls, minimizing the assessment time
28 that it takes, and that would directly related to how complicated
29 the assessment is.

30
31 The last matrix there shows you when data provision is conducted,
32 when interims are provided, and the "SDC" is status determination
33 criteria, and so how often the council is given a status for the
34 stock, and then the number of pieces of management advice, per
35 quarter per year, is the last row there for you. I kind of want
36 to take a minute to take questions.

37
38 **VICE CHAIRMAN NANCE:** Ryan, please.

39
40 **MR. RINDONE:** I wanted to provide some clarification here, and so,
41 when you guys are looking at this, if you remember back to our
42 SEDAR orientation presentation, we were talking, generally, that,
43 the more involved an assessment is, the more time it could take,
44 you know, the more topical working groups and things like that,
45 and so, when you're looking at this, and you see that it looks
46 like the period for assessing a stock could take, you know, beyond
47 a year, that may not be the case, as Dr. Siegfried alluded.

48

1 I will go back to using the example of cobia. You know, if we
2 were to request a stock assessment for cobia, the expectation would
3 be that, you know, between the start date and delivery to the
4 council would be a matter of months and not over a year, because
5 we're not anticipating making any material changes to that.

6
7 Something like red snapper would obviously take longer, and gray
8 triggerfish, and there's lots of updating of things that needs to
9 happen there, and that one would be expected to take longer, but,
10 you know, some of these species -- Like vermilion snapper wouldn't
11 be expected to take as long. Some of these other stocks that we
12 manage would take less time than is illustrated in the
13 generalization that is up here, and so that's just something to
14 keep in mind.

15
16 **DR. SIEGFRIED:** Thanks, Ryan. Are there any other questions about
17 how this calendar could be utilized? It's kind of a lot to go
18 through quickly.

19
20 **VICE CHAIRMAN NANCE:** I think, from my perspective, Katie, it gives
21 a good, a very good, analysis, a general overview, of what -- How
22 we get twelve stock assessments in an eight-year period, and I
23 think it does that, and I think it outlines, you know, the data
24 parts, the assessment, all of those things, when we do an interim
25 analysis, and so I think it gives a very good perspective. We'll
26 have to start doing it, to see how well life fits into the
27 generalities. Julie.

28
29 **DR. JULIE NEER:** Katie, hi. I just have a quick question, and who
30 are your six analysts, because I thought the Gulf only had five.
31 Are you counting yourself as one of those?

32
33 **DR. SIEGFRIED:** No, and we have six folks. We've got Skyler, Matt,
34 LaTreese, Franchesca, Molly, and Lisa, and so I should say all of
35 their last names, and I'm sorry.

36
37 **DR. NEER:** I know who it is.

38
39 **DR. SIEGFRIED:** So they're not all on one stock at a time, which
40 is the other thing that I was going to just bring up here too, but
41 those are the six analysts.

42
43 **DR. NEER:** Okay. Perfect. Thank you.

44
45 **VICE CHAIRMAN NANCE:** Okay, Katie. Let's go ahead and move on.
46 That would be great. Harry.

47
48 **MR. BLANCHET:** Just quick, but, for the new members, a sense of a

1 reality check, and how long did it take to go through red snapper,
2 before it finally failed?

3

4 **MR. RINDONE:** Harry, you're breaking up. It's hard to hear you.

5

6 **DR. SIEGFRIED:** I heard him.

7

8 **MR. RINDONE:** So red snapper was a longer assessment.

9

10 **VICE CHAIRMAN NANCE:** That's why this is a generalized diagram,
11 and we move through species, and, like Ryan pointed out, some
12 species are going to be less than this, and some a little bit more,
13 but I think this does a very good job of outlining how we can get
14 twelve different assessments in an eight-year period, and I think
15 that's the goal here.

16

17 **MR. RINDONE:** Another thing about red snapper is that, you know,
18 the last assessment was done under the auspices of a research
19 track, which we knew in advance was going to be a more drawn-out
20 process, and it's not a process that we're using anymore, because
21 of the strain that it creates for the Science Center and for the
22 council, and it was very resource intensive for ultimately what it
23 was, and so it was actually the second. The first one we had done
24 was scamp, that had taken quite some time, but it was somewhat
25 also confounded by COVID, and so it's just more -- It was deemed
26 more efficient to go back to the process that we had used in the
27 past.

28

29 **VICE CHAIRMAN NANCE:** Will, please.

30

31 **DR. PATTERSON:** Thanks, Mr. Chair. Hi, Katie. I'm looking at
32 your -- You know, at an individual line here, and I'm curious,
33 with current personnel time commitments, you know, for a given
34 analyst, does this sort of match what the expectations are now,
35 that you would have a period of a year-and-a-half or so between
36 major assessment assignments and some interim analyses, or other
37 stuff that would be on their plates during that interim period, or
38 is this a change?

39

40 **DR. SIEGFRIED:** Well, that's a good question, because, oftentimes,
41 the analysts are tasked with a number of things related to the
42 stock they just finished, and so this calendar doesn't actually
43 take into account the SSC meeting, where they present, if they end
44 up presenting to more than one SSC meeting, the multiple projection
45 run scenarios that they might be tasked with, et cetera, and so it
46 depends on the species, and, unfortunately, it depends on the
47 status of the stock how much post-work there is per assessment.

48

1 For instance, gag, you know, Lisa was still doing projections
2 earlier this calendar year, but it was two years ago that that
3 assessment was completed, and so that's why I tried to state at
4 the beginning that the white space is not actually white space.
5 There is a lot of other operational workload that ends up in there.
6 We can't always plan for it, but, by incorporating what you see
7 here, we think that we can meet the needs that we've seen happen
8 in the past for that sort of post-assessment work, but there's
9 also -- Go ahead.

10

11 **VICE CHAIRMAN NANCE:** Go ahead, Will.

12

13 **DR. PATTERSON:** Katie, go ahead and finish. I'm sorry. I thought
14 you had finished that, and I didn't mean to interrupt.

15

16 **DR. SIEGFRIED:** No, it's okay, and I was just still thinking, and
17 it really depends on whether the interim is accepted on first
18 blush, and another example is Skyler has presented repeated red
19 grouper interims, and so we were hoping that we can move to -- The
20 change we would like to make is presenting the one interim in
21 between, as the planned interim, as opposed to repeated interims,
22 especially if it's just looking at an index. We're hoping that
23 being able to look at the index online will be a better health
24 check, but we haven't finished that discussion with council staff
25 yet, and so we do need to talk with them a little bit more about
26 expectations between the two full stock assessments.

27

28 **DR. PATTERSON:** Thanks, Katie, and so, obviously, the spreadsheet
29 here is idealized, and it looks very neat, and, in reality, it
30 probably won't look quite as neat, but I'm curious, and I didn't
31 catch it at the beginning here, and so this proposal, this 8-2
32 proposal, where does it stand in the process of, you know, being
33 considered, being strongly considered, being accepted, and what
34 are the steps there, and how far along is this in that process?

35

36 **DR. SIEGFRIED:** So, from our perspective, and then maybe council
37 staff could weigh-in, if Carrie or John or Ryan wants to speak up
38 on their side of it, but our perspective, right now, is we just
39 got our 2026 stocks sort of nailed down for the Gulf on Monday.
40 What we would like to do is create a schedule that meets what we're
41 trying to do with this idealized schedule, given those species
42 specifications.

43

44 We'll then have to figure out the length of time each of the
45 assessments will take, based on previous statements of work and
46 then the TORs that we start to draft with council staff, and so
47 this approach has been received well so far, but the actual
48 practice of using it is what we're going to undertake in the next

1 few months, and maybe a council perspective would be helpful for
2 the other side.

3
4 **MR. RINDONE:** We'll just -- When we're talking about developing
5 the terms of reference, and thinking about the types of topical
6 groups that we're going to need, and how involved those will be -
7 - You know, they won't all require the same body of work that may
8 be necessary, and, you know, like commercial statistics for gray
9 triggerfish is likely not to be as much of a heavy lift as life
10 history and the ageing and everything that you're going to discuss
11 tomorrow. That's likely to be a more involved discussion, when we
12 do assess gray triggerfish.

13
14 You know, the same thing if we're looking at greater amberjack,
15 and we'll have to discuss management bias and its effects on
16 commercial landings and statistics related to that for greater
17 amberjack, but probably a heavier lift is going to be evaluating
18 external surveys, like the great amberjack count that's currently
19 going on and how that will play into its evaluation in that stock
20 assessment.

21
22 Some of these topical working groups could be one webinar, and
23 some of them may be more involved processes, and so we'll just
24 have to think about that when we're planning all these things out.
25 Carrie is loitering in the back.

26
27 **VICE CHAIRMAN NANCE:** Carrie, please.

28
29 **EXECUTIVE DIRECTOR SIMMONS:** Thank you, Mr. Chair, and so, I mean,
30 just to add to that, I mean, this is a work in progress, very much,
31 in my mind, and, I mean, we were just presented with this in more
32 detail on Monday of this week. I think, you know, this is a great
33 start, and there's lots of different ways that we can build upon
34 this. We haven't really seen how FWC's process is going to work
35 into this, and there's a lot of data and management procedure work
36 going on, and I think there's a lot of updates and information
37 also that can be shared there as well, and improvements that can
38 be made on that side of the house too.

39
40 We're going to hear projections, the tail-end, some presentations
41 there, and so I think trying to put all this together, as we're
42 moving forward, is what we're trying to do, and hopefully not add
43 too much confusion along the way, but I think we had identified
44 our key stocks, and I think we spent some time talking about that,
45 whereas the South Atlantic hasn't quite gotten there yet, just as
46 a first draft, to kind of move us forward, and so I think we need
47 to kind of continue to lay this out, with the Science Center, and
48 think about all the different ways we can kind of streamline things

1 and where we can fit in the less-complex, data-poor assessment
2 processes into this proposal.

3
4 **VICE CHAIRMAN NANCE:** Thank you. Will, please.

5
6 **DR. PATTERSON:** So I appreciate the enthusiasm and optimism, right,
7 and the goal of trying to become more organized. The only thing
8 that I would add to this, if I were the folks making these
9 decisions, is another line that is the oh-bleep line, that we
10 always seem to encounter, whether it's redoing red snapper or
11 revising things, and either it's going to fall into the open areas
12 now, for a given assessment scientist, or there needs to be some
13 extra capacity, whether that's adding an FTE or somehow hiring,
14 you know, more personnel, but it just seems like there's always
15 going to be something that pops up that you can't account for at
16 this stage.

17
18 **VICE CHAIRMAN NANCE:** You could even have -- You know, you've got
19 six stocks there, and you could have one of them as an extra one,
20 and you're really only assessing five, and you're having that extra
21 slot as if you need to have more time for Stock Number 1 again,
22 those types of things. John, please.

23
24 **MR. MARESKA:** Hi, Katie. Thanks for the presentation, and so,
25 looking at the theoretical calendar, it looks like great, and kind
26 of harping on Will's comment and the oh-bleep, and I was just kind
27 of curious how the data that's going to feed all the assessments
28 -- How the timeline for that fits into this potential calendar,
29 particular for those five species that you mentioned that the Gulf
30 Council has priority on, and, you know, they might be requesting
31 benchmarks of those species, rather than just an operational.

32
33 **DR. SIEGFRIED:** Sure, and so these calendars are built at the
34 center, with all of our workload taken into account, and so this
35 -- You know, you can see, in the second matrix there, that there's
36 only two species that get a data pull for a full assessment in
37 year-one, and then there's four interim analysis data pulls.

38
39 Of course, there is more people to do data pulls, but there's more
40 than just the Gulf that the center services, and so we've had to
41 take into account all of the data provider availability, and where
42 we are on automation, in order to put together realistic calendars
43 across-the-board, right, and so we've -- I believe Vivian Matter,
44 who lead our DOS branch, who gets all those data, and analyzes
45 them with her staff, from the data providers, and, if there's a
46 more detailed question, she can answer it, but she's been
47 instrumental with that.

1
2 Then our Fisheries Statistics Division director, and our division
3 director that runs all of our history data, and then our also our
4 division that runs all of our surveys, they've had to weigh-in on
5 how many species they can support across all of our cooperators.

6
7 That's one thing that is difficult at the steering committee
8 meetings, is this doesn't look like a heavy lift, but, when you
9 combine all of the people that we're servicing, all of the
10 management bodies, we've basically stated our capacity across all
11 of these calendars.

12
13 Now, to the oh-bleep point, which is an excellent point, which is
14 definitely something that we care a lot about, because say I have
15 someone who becomes incapacitated, for whatever reason, and I go
16 down to five analysts, right, and the reason that we want the
17 capacity for twelve, even though there is key stocks of five, is
18 to make sure those five are assessed and that there's room for
19 others.

20
21 Now, the amount of room for other species, besides the key species,
22 will depend on how complicated the key species assessments are and
23 if we have any kind of variability, you know, the human dimension
24 of what workload we can take on. If we have somebody that is not
25 able to take on an assessment, for whatever reason, we do have to
26 state that, right, and we have to say, okay, Stock 9 isn't going
27 to be able to be done this year, and we're going to have to cascade
28 that through the calendar, but we were hoping to get at the key
29 species, get at the timely objective of the councils, while also
30 maintaining our workload across all of our collaborators.

31
32 **MR. RINDONE:** Everybody take their multivitamins.

33
34 **DR. SIEGFRIED:** This is why we're presenting this multiple times,
35 and why we're communicating with Gulf Council staff multiple times,
36 because this is a lot of work, to herd all of these cats together
37 and get a calendar that we can actually execute, and the process
38 of actually scheduling is going to be more complicated, obviously,
39 if we have more than one person servicing a stock, if we have a
40 much more complicated, or much less complicated stock, but this
41 gives the council the tradeoff matrix, basically. This is what
42 happens when you extend the assessment timeline, or reduce it, and
43 this is how the stock will change compared to the idealized -- Or
44 sorry. The calendar will change compared to the idealized version.

45
46 **VICE CHAIRMAN NANCE:** Okay. Thank you, Katie. Let's go ahead and
47 move on. I think this is a good discussion on the generalized
48 part.

1
2 **DR. SIEGFRIED:** Great. Thanks. Okay, and so, as I've stated many
3 times, we're definitely trying to meet council objectives, and
4 we're trying to address primary council concerns, and so the first
5 two that I feel like I've mentioned, that we've addressed first,
6 are the insufficient frequency and timeliness of management
7 advice. The second was a lack of access to key data streams can
8 tend to lead to extra council requests, and so, if we set up our
9 management advice calendar, and we explain when the data are
10 available, and when we can do the assessment, it at least provides
11 managers with a forecast of when they can expect management advice.

12
13 We do still need to work on timeliness, and not that things are on
14 time, but with respect to recency of the terminal year of the
15 assessment, which will take quite a bit more work, because there's
16 both an assessment and a management component to that.

17
18 The other primary council concerns are on there, although I'm not
19 entirely sure they're addressed in this presentation, and I just
20 wanted them there for completeness, but that the current process
21 is sufficiently transparent, and that they want the external
22 reviewers to reproduce results, and we will continue to work on
23 that. That the TORs may not be met, I think we're going to continue
24 to work on that by collaborating with council staff to write the
25 TORs in the first place, which is what we did with SEDAR 98. Then
26 making sure that our documentation is less fragmented, in that the
27 projections are housed on the post-SEDAR tab of the SEDAR website
28 for the species.

29
30 The next question that we wanted to address was which stocks could
31 potentially be assessed using less-time-consuming approaches, and
32 now whether this is stock assessments with limited webinars, or
33 workshops, or something that's less complex, and we'll go over
34 that here.

35
36 As we develop the TORs collaboratively, and the center is taking
37 the first stab on that, in order to address any lingering issues
38 that we have from the previous assessment, we can have
39 negotiations, where the tradeoffs between more participation and
40 throughput are made clear.

41
42 For red snapper, it didn't seem, or feel like, it was a big
43 negotiation. I think we all knew what needed to happen, but, for
44 species where -- I could see this happening for gray triggerfish,
45 where we're putting together the terms of reference, and the
46 council staff has concerns that either we hadn't thought of, or
47 that we think are not as big of a concern, and we will need to
48 engage in negotiations about the TORs, in order to make sure that

1 the tradeoffs in the schedule remain clear.

2

3 We can potentially use less-time-consuming approaches like update
4 assessments, or simply updating projections, and, now, we've
5 explained that updated projections tend to be less and less certain
6 through time, and that potentially using interims that utilize an
7 index, that's updated year-to-year, could be a better approach
8 than the updated projections, but there may be times when an index
9 may not be as appropriate for interims as just running the
10 projections for the stock, and we would have to investigate which
11 species that might be true for.

12

13 Update assessments are less time consuming, in that there is no
14 participatory workshops, the same data are pulled, and the same
15 model is run, and so that could potentially be a less-time-
16 consuming approach, at least for the assessment analyst side.

17

18 Now, these approaches, especially update assessments, will be more
19 possible with more data automation improvements completed, and so,
20 at this point, we have a number of our data time series that are
21 delivered in a much more timely fashion, with much better working
22 papers, but we still have a ways to go with some of our data
23 automation efforts.

24

25 We can also consider less-complex assessment approaches, data-
26 limited methods, and like there is a Data-Limited Toolbox that you
27 all have seen used for lane snapper, more of the interim analyses
28 that you're used to seeing, or new management procedures. Now,
29 these need better testing, or some testing, through our desk MSE
30 simulations, and so that's something that we would like to do next,
31 and you will also see some -- I think there's some more in Nathan's
32 presentation about our interim analysis approach, but, if not,
33 that will be forthcoming.

34

35 I mentioned that we're not quite there with all of our data
36 automation efforts at the center, but we have made some significant
37 improvements. We have standardized and automated and streamlined
38 the provision of commercial finfish landings, recreational
39 removals, the length data, and the observer data. They are much
40 easier to get those data together, and the working papers are
41 superior to the ones before, and it's been so nice to be able to
42 get that information much more quickly, and we've not had many
43 issues with the accuracy of those pulls.

44

45 When there has been a problem with that, it's been noted, because
46 there's better QA/QC procedures in exploratory data analysis prior
47 to the provision.

48

1 Our working papers that document the data analyses are now
2 routinely provided for those sources, and many other that are not
3 yet automated, and those working papers themselves are now often
4 automated, in something called R Markdown, which is -- It makes
5 the writing process much smoother.

6
7 We do have AI work that is underway to identify fish species in
8 our camera surveys. Now, there has been careful progress made,
9 and it needs to continue to be careful and steady progress, in my
10 opinion, to make sure that we have continuity of our survey data,
11 and so we don't want to go quick-and-dirty. We want to make sure
12 that everything is complete, and reviewed, so that we don't
13 introduce unnecessary discontinuity in our survey data, which are
14 so important for a number of our pieces of management advice.

15
16 There is still some outstanding work that is needed to improve a
17 few key data provision processes, and age composition is one, which
18 we're actually having a workshop on that internally at the center,
19 and that really does affect most, if not all, of our assessments.
20 We've undergone a lot of public-facing improvements for our shrimp
21 data as well, and so there is definitely some work that needs to
22 continue, although I think that we we're aware of all of the work
23 that needs to happen, and we just need to be able to continue to
24 allocate resources to it.

25
26 In order to answer the question of which species we can simplify
27 the approach, or the model, we really needed to know what data are
28 available for those species, and, short of a full data triage --
29 You know, we spoke with council staff about what would be helpful
30 to see, and so which species can be assessed, and are any species
31 candidates for simpler modeling approaches depends on the data
32 availability, and so our first step here is this effort to catalog
33 data available for as many species as possible, without that full
34 data triage effort.

35
36 Then a number of species here have data available for an
37 assessment, or a revised assessment, at this time. Are there any
38 questions about the assessment process changes, because I'm going
39 to go into data availability, and I don't think that I'm coming
40 back to any assessment process changes for the remainder of the
41 presentation, and I can't see your faces, if you're --

42
43 **VICE CHAIRMAN NANCE:** I don't think so, Katie. Let's go ahead,
44 and I think we understand what we're trying to accomplish, and so,
45 if we go through these species now, and I think you've done a great
46 job in listing the data availability for each one of these.

47
48 **DR. SIEGFRIED:** Okay. Thanks. Now, this is a bit dry, and I can't

1 really make this that exciting for you, and it is just a cataloging
2 of what data we have available for each, but it's important,
3 because we can come back to this presentation in the future and
4 discuss more specifics about the species.

5
6 For yellowedge grouper, we have our commercial handline and
7 longline catch data available. There is a negligible recreational
8 component that those data are available. We have a SEAMAP summer
9 and fall groundfish index, our NMFS bottom longline index, and
10 then all of the life history and composition data, in order to
11 conduct the age-structured assessment.

12
13 For Spanish mackerel, we had the commercial hook-and-line and
14 gillnet catch data available, and the recreational private shore,
15 and then the charter and headboat components separately. The
16 shrimp bycatch data were available, though those need to be
17 revised, and we have the FWC vertical line index, the SEAMAP
18 groundfish early and groundfish late indices, and then the life
19 history and composition data for those.

20
21 For gray snapper, we had commercial handline, longline, and trap
22 landings, and we have the recreational private, separate from shore
23 and separate from charter/headboat, and we have the GFISHER index.
24 We have the SEAMAP summer groundfish, the FWRI age-zero and age-
25 one surveys, the reef visual census survey, and then the life
26 history and composition data.

27
28 For gag, we have our commercial handline and longline, and we have
29 all of the recreational modes, except for shore, broken out.
30 That's actually where we had the difficulty with the units, because
31 we did use SRFS data for the recreational private boat mode, but
32 shore was from the MRIP-FES survey. We have red tide information
33 about gag, and we have the MRIP index, which is actually not used
34 as often for other species anymore. The GFISHER index was not
35 used, as it is now for other species like gray snapper, and was
36 actually a subset that was used, due to selectivity issues that
37 came up during the panel discussions. We have the age-zero survey
38 and then the life history and compositions.

39
40 For greater amberjack, we have the commercial hook-and-line and
41 longline. We have recreational headboat separate from
42 recreational charter and private, which is interesting, because,
43 often, we have all of the for-hire together and private separate,
44 and the MRIP index, which is probably no longer supported. Then
45 the commercial longline index, the headboat index, and then the
46 GFISHER index, which is expanding to -- There is some work from
47 that group, that I heard about during the RESTORE proposal progress
48 report, of expanding to oil platforms, and then there is also other

1 work, through LGL, to look at other things about greater amberjack
2 abundance.

3
4 For scamp/yellowmouth, we have the commercial handline and
5 longline. We have our recreational headboat, and then again the
6 grouping of charter/private, and we have the reef fish observer
7 program vertical line survey and the GFISHER index.

8
9 For king mackerel, which is coming up next year, we have our
10 commercial hook-and-line, commercial gillnet, and then the
11 recreational headboat is separate from charter/private again
12 there, which we'll have to revisit when we come up with the TORs
13 for that, because of what we're going to do with the private boat
14 mode. The shrimp bycatch will also be revisited, with the new
15 bycatch methodology, and then we have two independent surveys, the
16 fall groundfish index and the plankton survey.

17
18 For cobia, we have a short list of commercial combined landings,
19 recreational combined landings, shrimp bycatch, which will
20 definitely be revisited for cobia, the MRIP index, which is
21 probably no longer supported, and the headboat index, which is
22 still supported, but there may be issues.

23
24 For vermilion, we have commercial as a combined landings stream,
25 recreational as a combined landings stream, shrimp bycatch again,
26 which will have to get revisited, and GFISHER was used, and it was
27 one of the first that it was used, and that will have an update,
28 the two SEAMAP surveys for summer groundfish and plankton, the
29 MRIP index, which is no longer supported for vermilion, the
30 commercial logbook index, and then our headboat index.

31
32 This might be the last one, and red grouper has the commercial
33 handline and longline and trap and then a recreational combined
34 fleet. We have red tide information for red grouper, and the
35 GFISHER index, as well as three other surveys, the summer
36 groundfish from SEAMAP, the bottom longline from NMFS, and then
37 the FWRI repetitive time drop hook-and-line survey.

38
39 Gray triggerfish, which is also coming up relatively soon, is one
40 commercial combined fleet, one recreational combined fleet, shrimp
41 bycatch, which is definitely getting revisited, and the GFISHER
42 index, which will have to be revisited. The last assessment was
43 stopped before we were able to actually implement that, as it was
44 available, and then the two SEAMAP surveys, the fall groundfish
45 and the SEAMAP plankton survey. Then, for tilefish, we have
46 commercial data and NMFS bottom longline.

47
48 For some of the more data-poor species, we do have some that are

1 captured by GFISHER. There's lane snapper, which we have catch
2 data and life history information, in addition to GFISHER. For
3 almaco jack, we've got catch data and minimal life history
4 information, in addition to GFISHER. Lesser amberjack has catches,
5 but very little life history information, and then snowy grouper,
6 speckled hind, wenchman snapper, and black sea bass all have
7 catches, life history data, size and age information, and GFISHER,
8 and so some of those species, for instance snowy grouper, we
9 probably could look at an assessment for that, but I think it was
10 thrown into SEDAR 49 last time, as a data-poor species, but the
11 amount of data has improved, with the GFISHER index.

12
13 That was hard to make exciting, but this is actually really
14 interesting, and so this is our region's, the Gulf of Mexico
15 region's, fisheries data timelines, and this is something that
16 Vivian and team, lots and lots of people, put this together.

17
18 This is a compilation that is meant to show what the primary data
19 source timelines are for the Gulf of Mexico federal fisheries stock
20 assessments, and so this is generalized. It's meant to show you
21 the data collection, data processing, quality checks, availability
22 of broad data, how long it takes to get the analyses, and then
23 when it's available for use in assessment.

24
25 Let me walk you through how this is put together. Along the top,
26 you've got your years and months, and, on the left-hand side, it
27 shows you the different data products that are used for our stock
28 assessments, the indices, the compositions and removals by source,
29 and then the colors are -- The green is the data collection period,
30 and the yellow is the time it takes to accumulate, process, and
31 then quality control those data.

32
33 The blue is the raw data availability timeline for analysis, and
34 so that's sort of when it goes to Vivian's team for work. The
35 orange is the data analysis time, how long it takes us to analyze
36 the data, and then red is the availability for stock assessments
37 or when the data provisioning can actually occur.

38
39 What you can see here is there is a big difference, across data
40 sources, of the time between when the last data piece is collected
41 and when it's available for use in the stock assessment. For
42 instance, at the top there, the removals, look at commercial
43 observer discards. At the end of that first year, it takes three
44 months to accumulate, process, and QC those data, and then the raw
45 data are available for analysis in Month 4 after the end of the
46 year.

47
48 Other time series, like say commercial age compositions, in the

1 second box on the left, that -- At the end of year, when those
2 data are gathered, it can take two full years to put all those
3 data together from all of our sources, whether it's our federal
4 sources, our state sources, or any sort of partners, other
5 partners. It can take two years, on average, to get those data
6 together.

7
8 It's not actually the time it takes to analyze those, to make them
9 available for use in stock assessment, and it seems to be the
10 accumulation, processing, and quality control time that is a big
11 time sink for our age compositions from commercial and recreational
12 fleets. Also, the time it takes to read either videos for GFISHER
13 or to process things from our plankton survey say, and so they
14 have to send those out to be analyzed elsewhere, for someone who
15 can identify the plankton.

16
17 Those three data sources are age compositions, the time it takes
18 to read the videos for the survey, and the plankton surveys seem
19 to take the longest, between the last date that they're collected
20 and the first day that they're available for use in stock
21 assessment.

22
23 **VICE CHAIRMAN NANCE:** Katie, can I ask a quick question, just a
24 real quick one from me?

25
26 **DR. SIEGFRIED:** Yes.

27
28 **VICE CHAIRMAN NANCE:** Once data has been collected, accumulated,
29 processed, and quality controlled, is that data locked, and you
30 never have to go back and look at it again, or do you have to do
31 this every single time for every assessment?

32
33 **DR. SIEGFRIED:** Well, the ideal would be to have them locked, but
34 I have come across cases where previous data changed from the data
35 pull from the assessment before, and so that's something we're
36 trying to eliminate, is the need to revisit prior data provision,
37 at this time, but, yes, the idea is that they would be locked,
38 but, anytime we've had a difference in data, and, you know, I've
39 seen this in the TORs -- You know, any difference that is greater
40 than 10 percent or something needed to be explained, that was
41 happening because some of the previous data provisions had to be
42 revisited.

43
44 **VICE CHAIRMAN NANCE:** Okay. Thank you. Will, please.

45
46 **DR. PATTERSON:** Thanks, Katie. This is a fascinating plot. We've
47 talked about it for years, but putting it together I'm sure wasn't
48 easy, and it's really -- I mean, this is the gist of it all, and

1 I can understand the plankton, you know, time to accumulate and
2 post-process and analyze data, because it has to go overseas and
3 back, as part of that process, and ageing takes time.

4
5 Things that are more confusing to me are the time that it takes to
6 do the quality control and produce the indices. I mean, as
7 indicated here, it's a five-month or longer process, and that just
8 doesn't seem -- It seems like that could be more efficient, and I
9 know that part of the automation process has tried to make those
10 things more efficient, but, yes, I just can't fathom why it would
11 take five months to produce an index that gets produced for lots
12 of things, lots of times.

13
14 I mean, clearly I'm ignorant of most of the stuff that has to go
15 into what those yellow boxes are, and blue boxes are, but, just on
16 its face, that seems like a long time.

17
18 **DR. SIEGFRIED:** Yes, I understand what you're saying, and I was
19 really hoping that the SSC could look at this, and give us that
20 sort of feedback, and so where do you see -- You know, what would
21 you like more explanation about, and we can potentially go back to
22 the people responsible for these, and just sort of get answers,
23 and it doesn't necessarily need to be a call-people-out thing, but
24 it would helpful to understand the bottlenecks, right?

25
26 If there's folks from the states, say, for compositions, that it's
27 taking a long time to provide those data, there may be a great
28 reason, or there could be a bad reason, and I don't know what the
29 reason is, but this has been -- This was put together by Vivian,
30 and others, just to get an idea of how long it was taking, and so
31 we can certainly go back and ask, you know, why is it taking two
32 months to do an index, when the idea is an index code is already
33 written, and is it -- Is the calendar here reflective of the fact
34 that they don't just spend their time doing the indices, and they
35 had to provide a little bit of buffer, in case they were tasked
36 with something else right away, and I can get those types of
37 answers and bring them back.

38
39 **VICE CHAIRMAN NANCE:** Vivian has her hand up, Katie, and so we'll
40 go ahead and have Vivian, please.

41
42 **DR. VIVIAN MATTER:** Good afternoon. I just wanted to clarify that,
43 Will, I think you're looking at the commercial logbook index, and
44 that five months of yellow is actually not the time needed to do
45 the index itself. That's represented by the orange box of one
46 month.

47
48 That five months is accumulating the data processing and QA/QC

1 that's done at the data source, and so that's how long it takes
2 the logbook program to receive all the information, to make sure
3 that there is, you know, no errors in that, and accumulating the
4 entire year's worth of logbook information, prior to being ready
5 for analysis for the full year.

6
7 I just wanted to clarify that, and that, also, this is intended to
8 represent just the last year of data, and so that's why that green
9 in the year-one is pretty much -- If you think about that as being
10 the terminal year, this is how long it takes to get all of that
11 data that's been collected in the green shading through those data
12 programs, accumulating processing and QA/QC procedures, and they,
13 of course, vary by data source. Where we are doing the analysis,
14 as Katie mentioned, is in the orange box, and so hopefully that
15 answers or clears things up there. Will, let me know if you have
16 any other questions on that.

17
18 **VICE CHAIRMAN NANCE:** Thank you, Vivian. Will, please.

19
20 **DR. PATTERSON:** Thanks, and so that does clear up some of the
21 ignorance I cited. However, if we just look at blue, orange, and
22 red, for all of the indices, it appears to be at least three
23 months, and sometimes as much as four, and I don't see anything
24 more than four, and so it just seems like, in our automated process
25 of calling up data that's been QA/QC'd, you already have the code
26 written, unless there is some new analysis or change, which, for
27 many of these, that's not the case. I'm still puzzled, but,
28 anyway, there's a lot that I don't know, and I'm just -- That kind
29 of struck me.

30
31 **VICE CHAIRMAN NANCE:** Let's go ahead and go on, Katie, or, Vivian,
32 if you wanted to say something, that's fine.

33
34 **DR. MATTER:** Just real quick, on the index portion, there's only
35 a maximum of two boxes there checked, and it may just be an issue
36 of like looking at it from the very top, but it's all one to two
37 months to do those.

38
39 **DR. PATTERSON:** Okay. Thanks.

40
41 **VICE CHAIRMAN NANCE:** Okay. Ryan, please.

42
43 **MR. RINDONE:** Thank you. I know, since AI is being applied for
44 reading the video data, and then making improvements there, and,
45 I mean, should our expectation be that, with time, the
46 accumulation, processing, and QC for the video indices will be
47 reduced?

1 **DR. SIEGFRIED:** That's the idea. It is species-specific at this
2 point though. When I've talked to Matt Campbell and his team, red
3 snapper is the farthest along, but, you know, we're on the years
4 timeframe before that would be reduced for lots of other species,
5 and, like I said, it's important that we go slow with that, so
6 that we don't -- You know, AI is going to be great, and it's going
7 to help in a lot of instances, but, from what I've seen, the reads,
8 so to speak, from the AI, versus the individual reader, and then
9 sort of the calibration -- We're still a little ways off from
10 there, even for red snapper, and so that is the idea, but it will
11 be species-specific.

12
13 **MR. RINDONE:** Do you think that -- Just a quick follow-up, Mr.
14 Chair. Do you think that that same technological approach could
15 be applied to the plankton indices, because I know those are
16 currently sent off to Poland, and they're read by people, and it
17 takes a long time.

18
19 **DR. SIEGFRIED:** I'm not entirely sure about that. I can definitely
20 ask the group if there's been any interest in utilizing AI to
21 identify plankton, but I haven't heard of that effort yet.

22
23 **MR. RINDONE:** Thank you.

24
25 **VICE CHAIRMAN NANCE:** Thank you. Harry, please.

26
27 **MR. BLANCHET:** This is -- I'm trying to figure out -- You've got
28 some areas where you have some white space between the blue and
29 the orange, and, in some cases, I can understand why, in terms of
30 logistics, but, in others, I don't understand quite why the gap is
31 there, and can you explain that? Thank you.

32
33 **DR. SIEGFRIED:** I would appreciate it if Vivian could jump in on
34 those few sources, and it looks like commercial length compositions
35 and recreational length compositions have spaces.

36
37 **DR. MATTER:** Yes, I can tackle this one. So, when you have that
38 white space, it's because you're waiting on another data source,
39 and so, for example, in the -- I can't see, because of the text
40 box here, but, for those length composition spaces, if it needs to
41 be weighted by the landings, the orange analyses can't occur until
42 the corresponding landings are available, and so you'll see that
43 first line is the commercial landings become available, in that
44 red 10 October month, and so then that's when the analyses could
45 be really completed for those commercial length comps, if they're
46 being weighted by the landings.

47
48 Similar to the observer discards, and you can get some information

1 from the observer data themselves, but I think a component of that
2 relies on the logbook information, and so then that's why it's
3 spaced the way it's spaced as well there.

4
5 **VICE CHAIRMAN NANCE:** Thank you. Katie, let's go ahead and do the
6 next two slides, and then we're going to break for lunch, and we'll
7 come back after lunch and maybe have a little bit of questions
8 from the SSC, because this is an important topic, and this will
9 give us some time to digest lunch, and digest your presentation,
10 and get some questions.

11
12 **DR. SIEGFRIED:** Sure. That sounds good. Okay, and so this is
13 just some additional details. I'm sorry, and I didn't mean to put
14 in automations, Jess.

15
16 **VICE CHAIRMAN NANCE:** You're perfect. It got Jessica -- It woke
17 her up.

18
19 **DR. SIEGFRIED:** This is meant to look at specifically compositions
20 and removals, and this is just additional information, and this is
21 something that we cited as something that needed to be investigated
22 a little bit, because you all seemed interested more in the blue,
23 orange, and red boxes, but we saw the large yellow boxes as, okay,
24 how can we get some of this information together and QA/QC'd.

25
26 The first box is our recreational landings, and we do need to --
27 When I was speaking with council staff here, it would be helpful
28 to be able to add in the other state survey information here, and
29 we just have Louisiana and Texas on there, but I think that we
30 would be able to get them on similar timelines, but it would be
31 nice to represent the other states here, and so the first box is
32 MRIP landings and discards, our headboat landings and discards,
33 and then our Louisiana and Texas creel surveys.

34
35 **MR. RINDONE:** Katie, specific to that, and we have John Mareska
36 and Trevor Moncrief here in the room too, but I guess my
37 presumption would be that -- It's looking like, in 2025 and
38 forward, that Mississippi and Alabama would be similar to Louisiana
39 in this respect, in terms of when the data are collected,
40 processing time, and when the data are available, and then Florida
41 is on a -- It's like a forty-five-day delay from the month, and so
42 processing time there -- We would probably just round-up to a two-
43 month period, and then that information would be available, and so
44 it would be similar. It would be similar to Texas.

45
46 **DR. SIEGFRIED:** Okay.

47
48 **VICE CHAIRMAN NANCE:** Jason.

1
2 **MR. ADRIANCE:** Thank you, Mr. Vice Chair. Just to Louisiana
3 availability, it's earlier than that, and I'm not sure where this
4 timeframe came from, but we're doing the QA/QC with every weekly
5 landings, which is about ten days post getting those, and the raw
6 data is usually available by mid-January, give or take.

7
8 **DR. SIEGFRIED:** Okay.

9
10 **VICE CHAIRMAN NANCE:** Thank you.

11
12 **DR. SIEGFRIED:** So it would be good to not only add the other
13 states, but to update that information, if we have this a little
14 bit off. We didn't figure it was going to be any longer than MRIP,
15 and so that jibes with what I was thinking it would be.

16
17 Okay, and then the other parts are the commercial length comps,
18 our commercial age comps, and our recreational age comps, and,
19 again, our age compositions are the things that seem to take the
20 longest, and so it would be really helpful to be able to get
21 together with the states, to figure out if there's a better way,
22 and I don't know if there's a better way, to get the state samples
23 in, so that we can try to stay within the one year, as opposed to
24 moving into a second year.

25
26 Again, I don't know if that's possible, and I am not part of these
27 collection programs, and it just may not be possible, but this can
28 just start the conversation of, okay, this is how long this has
29 been taking, and is there a way to streamline this, so that we can
30 get more timely management advice.

31
32 Then you could probably read all of these yourself, but it's --
33 This is meant to be region-specific, and they're meant to be what
34 we know at the time, and so any corrections, any adjustments, that
35 need to be made, please, you know, send us emails, if you have,
36 you know, a significantly differently timeline.

37
38 Then this is also meant to be a working document. As improvements
39 are made, I'm hoping that, you know, we can certainly adjust this,
40 so that it represents our current state of reality. The reason,
41 again, that we're so focused on this is because it affects our
42 terminal year of our assessments, which is part of the timeliness
43 problem. We want to reduce the amount of time between the terminal
44 year of the assessment and when management can take place, and so,
45 if we can streamline these data sources, then that would be helpful
46 towards that goal.

47
48 Then, as we're pulling in -- I understand there's quite a bit of

1 IRA money going around for databases for state survey samples, and
2 so this is something that can perform that -- You know, creating
3 that database, and adhering to those database deadlines, could
4 potentially improve our management advice timeliness as well, and
5 so this is meant to be informational, and it's meant to be
6 changeable, and it's meant to be a collaborative effort, to try to
7 get all of this documented.

8
9 **VICE CHAIRMAN NANCE:** Jason, go ahead. Jason had a question.

10
11 **MR. ADRIANCE:** Thanks. Just to that timeline, our age samples are
12 generally uploaded by March of the following year to Gulf States,
13 and they're available for NOAA to pull at that point, and so just
14 for updating that.

15
16 **DR. SIEGFRIED:** Okay. We could potentially do it state-by-state,
17 and I would have to talk to Vivian, if she got any of that
18 information, but, when we have it just TIP state samples, and state
19 rec samples, it's meant to not call out any particular state, and
20 it's just meant to get the longest it takes of any state, and
21 so it might be useful to go state-by-state, on a separate
22 spreadsheet, just so that we understand each state's timeline.
23 Thanks.

24
25 **VICE CHAIRMAN NANCE:** And you're not. Trevor. Trevor is going to
26 call it out though.

27
28 **MR. MONCRIEF:** No, but, I mean, some of the states might not be
29 having the same impact, and so I'm not going to speak for all of
30 them, but, for ours, I mean, it's been a fluctuation in biosampling
31 and everything else like that, staffing priorities and everything
32 else, and, when it comes down to it, it comes to a level of
33 prioritization for what we can accomplish.

34
35 Now, I will say that, when we have been requested, or with
36 something coming up, if it's made to be, you know, a higher-level
37 priority, say, you know, X species is undergoing an assessment,
38 and we need the data as quick as possible, we're usually able to
39 kind of reroute and focus on it, and so that might be one of the
40 things moving forward as well.

41
42 You know, as these things come up, trying to prioritize and
43 everything else, because there's a fair amount of hard parts to
44 deal with, and a minimal amount of funding and ability to do them
45 in a timely manner, and so that's all I've got to say about it,
46 but, yes, I think we can be more efficient.

47
48 **DR. SIEGFRIED:** Yes, absolutely, and we all have those struggles,

1 Trevor, I know. Were there other comments or questions?

2
3 **VICE CHAIRMAN NANCE:** No, Katie, and we'll go ahead and go to the
4 last slide.

5
6 **DR. SIEGFRIED:** Okay, and so this is just meant to recap, and let
7 you all know some next steps, and so we would like to take a look
8 at any data available for any other species of interest. We want
9 to make sure we don't go down -- I forget which species that Ryan
10 always mentions, but we don't want to go down a rabbit hole for a
11 species that are not, you know, high on the minds of managers at
12 this point, and, Ryan, you will have to tell them which species
13 you always say, but we would like to continue the conversations
14 with council staff to establish and describe this process.

15
16 I don't think this would go over even slightly well, and we would
17 not be able to put together a counter that worked for everybody,
18 if we didn't continue to talk with council staff. Communication
19 is absolutely key here, and individual councils, and not just
20 through the SEDAR Steering Committee process.

21
22 We want to develop project schedules for the stock to be assessed
23 beginning in 2026, which we finalized the species on Monday, and
24 so we'll get started on that as soon as we can, and then we want
25 to continue to conduct this research that feeds right into our
26 operational workload. We want to determine the best course of
27 action for providing management advice now, when we think we might
28 have biased data, more so than uncertain, and it's always
29 uncertain, but that's a big question, how biased data will affect
30 our management advice and what we can do about it.

31
32 Then determine the usefulness of any management procedures and the
33 interims between assessments, and are there ideal intervals, and
34 how does it affect the risk of overfishing, the frequency with
35 which each assessment is conducted, and I think that's all I have,
36 and I don't want to stand between you and lunch, and so I'll be
37 back after lunch, obviously, to discuss anything you all think of.

38
39 **VICE CHAIRMAN NANCE:** You're fine, Katie.

40
41 **DR. SIEGFRIED:** Thanks.

42
43 **VICE CHAIRMAN NANCE:** Thank you, and it was a great presentation.
44 I think it's one of those we need to kind of give some thought to,
45 because it impacts most of the things that we do, and it was very
46 well put together. I appreciate the time and effort of all the
47 staff that did that. We'll go ahead and break for lunch now, and
48 we'll come back at one o'clock Eastern Time.

1
2 (Whereupon, the meeting recessed for lunch on July 31, 2024.)
3

4 - - -

5
6 JULY 31, 2024
7

8 WEDNESDAY AFTERNOON SESSION
9

10 - - -
11

12 The Meeting of the Gulf of Mexico Fishery Management Council
13 Standing Scientific and Statistical Committees reconvened at the
14 Gulf Council Office in Tampa, Florida on Wednesday afternoon, July
15 31, 2024, and was called to order by Vice Chairman Jim Nance.
16

17 **VICE CHAIRMAN NANCE:** Okay. We'll go ahead and start our next
18 session, and, Katie, I think, from my perspective, we're, I think
19 at a stopping point, and so, if there's any other questions, we
20 may come back at a future time and do that, but we appreciate those
21 comments and that presentation.
22

23 **DR. SIEGFRIED:** Sounds good. Thank you.
24

25 **VICE CHAIRMAN NANCE:** Our next item is going to be Essential Fish
26 Habitat Contract Review, and we have Dr. Froeschke, and also Dr.
27 Hollensead, to be able to present.
28

29 **DR. BARBIERI:** Mr. Chair, are we going to start with this?
30

31 **VICE CHAIRMAN NANCE:** Yes, we're going to start with this. Thank
32 you. Ryan, can we do the scope of work, please?
33

34 **ESSENTIAL FISH HABITAT CONTRACT REVIEW: PROGRESS ON EFH DATA**
35 **COLLECTION**
36

37 **MR. RINDONE:** The council is developing a generic amendment to
38 update its essential fish habitat descriptions for managed finfish
39 and shrimp species, but, before generating new descriptions, it's
40 necessary to identify, collect, and catalog any of the available
41 contemporary benthic habitat spatial data throughout the Gulf,
42 and, to do this, the council has contracted with Dr. Bridgette
43 Froeschke from the University of Tampa.
44

45 The objectives of the council's contract were to compile
46 contemporary spatial habitat data layers across the Gulf, from
47 various sources, using statistical and GIS software to visualize,
48 analyze, and aggregate feature layers to create Gulf-wide maps for

1 each of these habitat types by zone, and so Dr. Hollensead is up
2 here at the podium, and she's going to provide a presentation
3 explaining the council's role in EFH management, and the rationale
4 for the contract work, and then Dr. Froeschke will provide a
5 progress report on that work to-date and example StoryMaps for
6 Texas and Louisiana.

7
8 You guys should review the objectives of the contract and the two
9 presentations and access the posted Google drive to review the
10 collected spatial feature layers, which are all organized by state
11 and data provider contacts. The SSC should then make
12 recommendations regarding any potential data gaps and provide
13 insight on which years of data may be the most reflective of
14 current distributions for each of these habitat types. Dr.
15 Froeschke will consider the feedback she receives from you guys
16 and submit a final report to the council for its consideration at
17 its next meeting in November of 2024, which is actually here in
18 St. Pete.

19
20 **VICE CHAIRMAN NANCE:** Thank you. Lisa, please.

21
22 **DR. LISA HOLLENSSEAD:** Thank you. I'm going to provide a quick
23 overview of the council's essential fish habitat process, as well
24 as introduce Dr. Bridgette Froeschke, and she's going to speak on
25 the progress of some essential fish habitat, or EFH, work
26 contracted by the council.

27
28 For the presentation outline, I'm going to go over what is EFH,
29 the current methodology for the council's EFH descriptions, a
30 little bit of history on the EFH management in the Gulf, as well
31 as go over the purpose and need for the contracting work and
32 outline the tasks that we are requesting from the SSC.

33
34 What is EFH? It was established with the implementation of the
35 1996 Sustainable Fisheries Act, and it has a very specific
36 definition, which is that outlined there, and it is those waters
37 and substrate necessary to fish for spawning, breeding, feeding,
38 or growth to maturity, and so that is its definition, and the
39 councils are tasked with creating amendments which describe EFH
40 for all of their managed species.

41
42 One of the products that comes out of this is to be able to inform
43 the consultation process that NOAA uses, and that is its own sort
44 of presentation, and so I'm not going to go into that today, but
45 there's a link there that will take you to the NOAA page, to have
46 a little bit more information on the EFH consultation process, and
47 so the council is responsible for describing EFH and managing it
48 for its managed species.

1
2 How it's done currently, it's sort of a qualitative method. Some
3 of you may recall that I went over this the last time that I
4 presented on EFH, which I now remember was actually three years
5 ago, and so it's good to have sort of a refresher on this, but the
6 Gulf is broken out into five ecoregions, sort of generally using
7 these sort of ecological bounds throughout the Gulf.

8
9 Here is a visualization of those five regions broken out, and so
10 these various layers are sort of built on each other, to describe
11 EFH, and so, again, first is these ecoregions, and these twelve
12 habitat types, and so these are the various habitat types that are
13 considered in the essential fish management process.

14
15 We then sort of stratify the Gulf based on water depth, and so
16 there is an estuarine boundary, which is going to be inside barrier
17 islands and estuaries. There is a nearshore boundary, which is
18 sixty feet of water depth or less, and then there's an offshore,
19 which is sixty feet or greater.

20
21 Then, using literature that is either peer-review or some of the
22 gray literature, for a particular species, we just sort of look at
23 these various life stages, pour through the literature, see what
24 those report out, based on where the distribution is in the
25 ecoregion or habitat zone, and what habitat type, and so,
26 specifically, for each life stage, you look at those sort of four
27 columns, and you start to glean an area for which fish have been
28 described in there, the habitat type they may be utilizing, and
29 then you can sort of quilt that together to get a description of
30 EFH in the Gulf for a species, and so that's sort of a qualitative
31 process of how it's done now.

32
33 The pros to this is it's conceptually very easy to understand,
34 sort of easy to compare, and it's very quick to sort of build these
35 out, but, as you can imagine, there is probably better ways to do
36 this, and so we'll just put a pin in that for now, but just to let
37 you all know this is how we currently describe -- The method with
38 which the Gulf currently describes EFH.

39
40 In addition to developing an amendment to describe EFH, which the
41 Gulf did in 2005, using this qualitative methodology that I just
42 went over, the spatial data to inform that were largely derived
43 from the NOAA Habitat Mapper from 1986, and so the data was a
44 little dated then, and it continues to be dated even today, and,
45 also, the council is responsible for conducting these five-year
46 reviews for their EFH designations, and so that was done in 2010
47 and 2016.

48

1 We haven't had one done for 2021, because, during the 2016 five-
2 year review, the NOAA Office of Habitat, when they were reviewing
3 these five-year reviews, recommended creating a new EFH amendment,
4 and so that's going to be a little bit heavier lift than these
5 reviews, and it's time to start looking for some more available
6 data sources, those sorts of things, as well as perhaps looking at
7 some other methodologies for describing EFH. This amendment will
8 cover the finfish and shrimp species managed by the Gulf Council.
9

10 Some of the new amendment objectives, which is currently sort of
11 being developed, was to consider the changes, as I mentioned, for
12 describing EFH, and so many of you would recall that, about three
13 years ago, I came to you with, hey, here's some new methodologies
14 that we're thinking about using, some kernel density estimation,
15 or perhaps boosted regression tree modeling, to get a little more
16 quantitative in the way that EFH was being described.
17

18 However, through that process, and the SSC review, a number of
19 issues came up of, hey, what data sources are we using, and is
20 there something else out there, and it seems like these key
21 components are sort of missing, and so we sort of pumped the brakes
22 a little bit on the development of that amendment and instead said,
23 hey, you sort of need to look at updating some of those habitat
24 spatial features to inform the EFH description, right, and so you
25 may have a Cadillac model, but if all you've got put in it for
26 fuel is cherry cola, it's not going to work, and so we want to
27 make sure that you have got, you know, the best available data.
28

29 Any data gap that's there, is that a real one, or is that just
30 something that somebody hasn't mapped, or it's not available, or
31 is it somewhere and we just didn't have time to do a thorough
32 review?
33

34 The council staff, you know, could use a little help here, and so
35 that's where we've got some contract work here, and the purpose
36 was to identify, catalog, and assess available contemporary
37 habitat datasets and provide metadata for those sources, most
38 especially, and so we would know, perhaps, if we need to quilt
39 these things together, what's an appropriate way to do that, so
40 that we can get a picture for the entire Gulf.
41

42 The need for these datasets is to update the EFH descriptions for
43 all finfish and shrimp species managed by the Gulf Council, and so
44 the advertising for this contract work began in early 2023. Dr.
45 Bridgette Froeschke was awarded that one-year contract, and she is
46 out at the University of Tampa. She's actually going to speak to
47 you, here just in a little bit, about her findings from this
48 exercise and give you an update on work to-date.

1
2 That's what she's going to do, and what we request of the SSC is,
3 when she's going through those reviews, and a lot of these data
4 sources and things like that are in your meeting materials. If
5 you wouldn't mind just looking through those, and, if you can tell
6 us some data source that you see that's real outstanding, that's
7 missing, that's very important, and perhaps it was just looked
8 over, but it can be identified for Dr. Froeschke, so she can hunt
9 that down.

10
11 Also, one of the things that came up, when we were first reviewing
12 this, is, you know, we've got data, for some of these habitat
13 types, that, you know, go back several decades, but, you know, is
14 the data that's described for something like marsh in Louisiana in
15 1970 probably the most representative of what we're seeing now?
16 Likely not, and so any feedback the SSC can give us on, hey, maybe
17 these are the times that you should look at, or the contemporary
18 data, and just go ahead and look at that. We'll probably keep
19 some of those older ones just archived, but, for the purposes of
20 this amendment, we would only use what was suggested by the SSC.

21
22 The final contract report will be presented to the Gulf Council in
23 November by Dr. Froeschke, and she will certainly take any
24 comments, or anything that you all have, recommendations, into the
25 contract work, and that will then be reported to the Gulf Council,
26 and so that will give her some time to incorporate you all's
27 feedback, and any potential new methodology for describing EFH,
28 like we had talked about earlier, perhaps those kernel density
29 estimates or boosted regression, we will get at that later, but,
30 first, we want to make sure that you know we've got all our boxes
31 checked, to make sure that we've done as thorough a job as
32 possible, looking at available data sources, and so that's the
33 task of the SSC today, is just to sort of give feedback on the
34 library she's going to provide to you.

35
36 **VICE CHAIRMAN NANCE:** Thank you. Was there -- My brain is old
37 sometimes, but wasn't -- Did LGL did some work on this, and present
38 it to the council, last year?

39
40 **DR. HOLLENSEAD:** No, not for EFH. The Fishery Ecosystem Plan.

41
42 **VICE CHAIRMAN NANCE:** Okay. Thank you. Okay. I was mixing them
43 up. Thank you.

44
45 **DR. HOLLENSEAD:** If there's no other questions, I'm going to let
46 Dr. Froeschke run the show.

47
48 **DR. BRIDGETTE FROESCHKE:** Thank you, Lisa. Again, I'm Bridgette

1 Froeschke, and I'm at the University of Tampa, in the Environmental
2 Studies Department, and I'm a spatial ecologist there, and I
3 primarily teach GIS, fisheries, and statistics. I was awarded
4 this contract a year ago, and I've done this in my research lab,
5 and I've had five research students help me conduct this, and so,
6 again, the goal for me to do is to tell you the methods that we've
7 used to try to attain all of this habitat data and then to ask you
8 nicely to let me know which data gaps I've missed, so that I don't
9 present it in November missing some data.

10

11 Overall, we spent most of the year trying to do data collection on
12 all spatial habitat data, and just the overall process. For data
13 analysis, we created all of the shapefiles, even if they started
14 as CSV files, or Excel files, and then we put them all in ArcPro,
15 obviously to make sure they worked, and the main component that
16 we've accomplished, that I am the most proud of, is the metadata
17 files that we've created for every single shapefile that we've
18 obtained.

19

20 I always push my students how important metadata is, so we have a
21 really good understanding of where it came from, and the
22 limitations, et cetera, of dealing with that.

23

24 For the data collection, we did, at first, just a general online
25 search, using keywords that are based off of essential fish
26 habitat, and this was -- I had a student per state, and so it was
27 first separated out by state, and it was their goal, and task,
28 with obviously me overseeing them, using keywords, just as simple
29 as "seagrass" and trying to find that on Google.

30

31 From that, we also, in that search, searched for anybody who might
32 be a player in federal and state agencies, so that we can reach
33 out to them as well for data, and ArcGIS Online we used, and a lot
34 of data can be published on there. Some of the issues with the
35 ArcGIS online data is it's not allowed to be modified, and so I
36 can see it online, but I can't necessarily do anything with it,
37 once it hits ArcPro.

38

39 We also tried to think outside the box and did a very thorough
40 search on Google Scholar, using these keywords to try to find
41 researchers that have maybe published papers using essential fish
42 habitat data, and then reaching out to them, if they would share
43 their data with us, or going backwards and tracking down their
44 data sources, if it was in their methods section.

45

46 Some of this led to some people saying that I don't have it, but
47 this person does, and so we had a lot of refers, and then there's
48 a lot of interactive webpages, which are fantastic, and we have

1 linked those in Google Drive, but not all of them allow you to
2 download data, but the contact information was provided for that.

3
4 For the metadata, these are the tables. I'll show you the Google
5 drive here in a little bit, but this is all of the data that was
6 filled out for every single shapefile that we've collected, and so
7 data title, and that's the name of the shapefile that you would
8 find within there, a brief description of the data, the data
9 creator, and so where it came from, the data that it was created,
10 the data format, and that was more did we start with it as a
11 shapefile, or did it start as a CSV file, what geographic extent,
12 and so, within there, it should also say what zone that data is
13 part of, and then what spatial resolution we have.

14
15 There is a list of attribute information, and not all of that is
16 completely full, or up-to-date, and that's because that
17 information isn't provided to us, or people do not correspond, and
18 there's some people that we've emailed, I don't know, one-thousand-
19 bazillion times, and they still won't answer us, and we have the
20 data source, data quality, and what I mean by data quality is
21 sometimes we got data that had, you know, maybe a thousand lines,
22 and 900 of them were N/A, and so we wanted to include -- Okay, and
23 we have this data, but there's a lot of N/A, and what the access
24 and use constraints are, and any contact information.

25
26 The contact information is from the people that we collected it
27 from, and, if they already had metadata, then it's on there, and
28 so a lot of data -- So like Florida has a GIS clearinghouse website
29 that a lot of the habitat data -- That we downloaded it from, and
30 it already has -- Some of those already have metadata, and so it
31 would be there in addition to whatever else we found.

32
33 From there, we were just trying to brainstorm ways, creative ways,
34 of sharing this data, instead of just presenting a geodatabase, if
35 you're interested in sharing this kind of data to the public, and
36 so I did have my students start working on StoryMaps, and I will
37 show you just -- I'm not going to go through every detail of the
38 StoryMaps, but just a couple of the StoryMaps, just to show you a
39 representation.

40
41 Right now, we very much have organized the data by state, and I
42 will show you that, in ArcPro, I've organized it by habitat type,
43 but, to search for it, and the different players, we've done it by
44 state. The idea of doing these StoryMaps are they're engaging,
45 and they're an interactive way of presenting spatial data, and
46 interactive meaning, as I'll show you in a minute, I can click on
47 a specific location of a map, and it will zoom into it, and I can
48 find out, from there, what the habitat data looks like, who it's

1 from, et cetera, and so it allows for that very interactive
2 component.

3
4 It's easy to navigate, and you do not have to have ArcPro on your
5 computer to use these. Anybody in the public can use these
6 StoryMaps, and so it goes to a broad audience. You can share it.
7 It's customized, and it provides -- So we were able to provide a
8 pretty comprehensive view of the habitat data and overlap within
9 that story, because there's a lot of text that goes into it, issues
10 or things that you see as you start analyzing the data, and so we
11 thought this was a great way to facilitate, or communicate, between
12 scientists, policy makers, and the public.

13
14 You can create these StoryMaps to be at any level that you want
15 to, and it could be as technical as you would want to, or it could
16 be as simplified as you want to, or somewhere in the middle, and
17 so, at the end of this project, I thought it would be a great way
18 to present that to people, and so here's just a couple of different
19 ones. Hopefully they work, or that you guys might have already
20 looked at.

21
22 Anybody with that link would ideally have access to this, and then
23 this is for the Louisiana data. All of the maps, any of the
24 StoryMaps, if you looked at them, they are in there by ecoregion.
25 You don't always see the different ecoregions, because I'm zoomed
26 in here to Louisiana, which I believe is mostly three, but then
27 you can go in and show that, okay, here's my oyster polygon, and
28 it tells you where it came from, and so this is from the Louisiana
29 Department of Wildlife and Fisheries, and the data was created on
30 June 1, 2023, and so it's just a brief summary of what's in the
31 metadata that a lot of people get bogged down on having to read.

32
33 I printed out the metadata, if you're interested, and it's 169
34 pages of metadata, but you can also quickly put that in these
35 StoryMaps, in order to understand what we're seeing. I'm not going
36 to go through each one, but what I wanted to show you is -- It
37 quit scrolling. What did I do wrong?

38
39 Okay, and so, when you have multiple zones, and so, if you've ever
40 used ArcPro, you know that sometimes it's really hard to see the
41 in-depth lines of certain areas, and so, within here, we were able
42 to highlight that, okay, here's Area A, B, and C that we want to
43 be able to see, and now, within the StoryMap, I can click within
44 that area, and it will pop up. Here, over to the right of it, I
45 can click on Number 2, and it will zoom-in there, and so then
46 people can go through and have a much more interactive approach to
47 these different types of things.

48

1 You can add as many interactive tools as you want to on here, and
2 tell as many stories as you want to, and you can add pictures to
3 it, if you want to, as well. So, if this is coming from Florida
4 Fish and Wildlife, and they've had some fun stories, and they want
5 to share how they collected their habitat data, and they want to
6 show people out there collecting data, to make it more engaging to
7 the public, you could.

8
9 Each one of these StoryMaps then would be created per state, and
10 per habitat type within the state, is how we have it now, but there
11 is no reason that it couldn't switch to where it was per habitat,
12 with all the states combined, and so hopefully you guys had a
13 chance to look through there, and I'm not going to give it as a
14 formal, formal thing, and I just wanted to show you what those
15 look like.

16
17 We also have a Texas one that is gone through, and so, like
18 specifically in Texas, we were able to collect seagrass data from
19 different sources, and so this allows us to describe and talk about
20 the different sources, and so some of the seagrass data was
21 presented in polygons, and some of the seagrass data from the Harte
22 Marine Institute was presented as points, and take it or leave it
23 what you want to do with a seagrass bed as a point, but that's
24 something that we can overlap and discuss in a StoryMap and words
25 to the public of even different data formats and why that might
26 be.

27
28 In addition to that, for the Google drive that you guys should
29 have all had access to, all of the data we've collected so far is
30 in here by state, and then a separate link for StoryMaps, and then,
31 if we go into the state file, there's a folder for shapefiles, and
32 that is every shapefile by habitat type.

33
34 If you looked at it beforehand, or notice now, there's not a folder
35 for every habitat type per state, and we didn't find every habitat
36 type out there. For example, like sargassum data, we did not find
37 much of, or it was more Gulf-wide, which I lumped all that into
38 the Mississippi folder, and so, like for Alabama, we didn't find
39 any Alabama-specific mangrove data, but we have Gulf-wide mangrove
40 data, and so that does show up in the Mississippi folder for that,
41 and mostly I did that because we've had zero luck getting anybody
42 from Mississippi to respond to us.

43
44 Zero people from Mississippi will answer us, and so the only
45 Mississippi data we've been able to use has been Gulf-wide, and so
46 Mississippi, and I was going to call him out, but he's not here,
47 and Sean Powers refuses to email us back. I've had John cc'd on
48 it, and Lisa cc'd, and he still won't answer us, and so you'll see

1 there's a lot of Sean Power data missing, and that's because he
2 won't give it to me, but Mississippi is also there. Any
3 Mississippi representatives that know somebody else that maybe I
4 should contact, or has better luck, please let me know, because
5 I'm about to just show up in their office.

6
7 **DR. BARBIERI:** A quick question, Bridgette. How many people from
8 Mississippi did you say?

9
10 **DR. B. FROESCHKE:** I don't know how many. It's on the contact
11 list. Everyone. Everyone. Zero people.

12
13 **DR. BARBIERI:** Zero?

14
15 **DR. B. FROESCHKE:** Zero people from Mississippi. Zero. So
16 everyone that we have contacted is on this table that's within the
17 Google drive, of, you know, their position, the contact
18 information, the title of work, anything about them that we know,
19 and then their response to us, and so, if there's a blank cell,
20 that means they didn't tell us anything. It wasn't just a one-
21 time email. It was several times, and then I involved Lisa or
22 John, both of them in the council, when need be, as a cc on here,
23 to try to get people to respond to us, but you can only go so far.
24 If they don't want to share the data, they don't want to share the
25 data.

26
27 We also have a separate file that tells you all the -- So the email
28 contact list, that's only the shapefiles that we actually
29 collected, and so the contact log is everyone we contacted,
30 regardless if they spoke to us or not, and the email contact list
31 is everyone that actually responded, and just in table format, a
32 small version of the metadata, and the name of all of the
33 shapefiles that correspond to that data source, and then the
34 metadata files are named the same thing as the shapefile data
35 source.

36
37 That metadata will be inserted into the shapefiles, the XML files,
38 and they're not there yet, until they get approved, and I want to
39 make sure that we didn't miss anything before they're actually
40 inputted into the shapefile, and so, right now, they're just
41 tables, and I don't want to have my students do all of that before
42 I get a very thorough look on every little tiny thing, but they
43 will be updated to the shapefile, so that, if anyone starts sharing
44 these shapefiles, the metadata will be attached within there.
45 Right now, they're separated. Yes, sir.

46
47 **DR. GRIFFITH:** When I got on that Google drive, it says it couldn't
48 load, and do you have any idea -- Is there something wrong with my

1 Google or something?

2

3 **DR. B. FROESCHKE:** Just right now it won't load? I'm guessing the
4 -- Can someone else try to download it, and see if it's on my end
5 or on the -- You should have viewer rights and not editor rights.
6 I was a little bit scared to let the public start editing in my
7 Google drive. You never know when you start putting this stuff
8 online, but Google has been a great way of adding this. I do want
9 to take a second, and can you unmute Zoe Golden, please? Zoe, did
10 I miss anything about how we did the process for collecting the
11 data?

12

13 **MS. ZOE GOLDEN:** It sounded good to me.

14

15 **DR. B. FROESCHKE:** Okay, and so Zoe Golden was my past research
16 student. She left me, and now is doing a master's degree at the
17 College of Charleston, but has stayed working for me, and so she's
18 still my lab manager from afar, and so we greatly appreciate you
19 calling in, Zoe, and doing all of this wonderful stuff for us.

20

21 **MS. GOLDEN:** Of course.

22

23 **DR. B. FROESCHKE:** Again, those are the tables, and what Lisa had
24 mentioned that we really are asking you is to tell us if we've
25 missed anything, and so I know, if you haven't looked at it before,
26 you can't look at it quickly here and just say, hey, you've missed
27 all of this, but if you could please contact me, or Lisa, or
28 anybody that we've missed, so that I can reach out to them. Even
29 if they won't respond to me, if you know them personally, maybe
30 you could start a communication email, and sometimes that helps a
31 little bit.

32

33 We do send out a general email to all of these people, saying what
34 the task is, and so sometimes especially researchers get scared
35 away, when they see management words in there, and some of them I
36 know personally, and I've reached out, and had a bit better luck
37 with that component, and then, also, if you have any ideas for
38 sharing this kind of information, that you think would be useful
39 for sharing to the council, and to the general public, that would
40 be greatly appreciated as well. Harry.

41

42 **VICE CHAIRMAN NANCE:** Harry, did you have a question?

43

44 **MS. MATOS:** You're unmuted, Harry, but we can't hear you.

45

46 **VICE CHAIRMAN NANCE:** Well, while Harry is unmuting, David, please.

47

48 **DR. GRIFFITH:** Thanks a lot. This is really interesting stuff,

1 but I was just scrolling through some of the map things that you
2 put up for Texas, and I noticed that you had different years of
3 information, and so, over time, do you show, you know, the changes
4 in like seagrass, submerged aquatic vegetation, and coral reefs
5 and stuff like that? Is that what you're doing in this?
6

7 **DR. B. FROESCHKE:** Some of the data, yes, we're able to do that,
8 depending on if they have multiple years. When they do have
9 multiple years, we've separate them out in years, so we can look
10 at that. Sometimes the data files say this ranges from 2000 to
11 2020, but it doesn't tell you which data point corresponds to that
12 year, and so we can't look at those discrepancies, but, like for
13 Texas, we can with the seagrass data, because they provided us an
14 Excel file, ultimately, for every seagrass, per year that they
15 have collected it, and so then you can overlap those on top of
16 that, but most states did not give us data at that fine tune of a
17 scale, where you could really look at yearly components, and it's
18 more of a range of data, and then we completed these polygons, et
19 cetera, at this year and this time.
20

21 **VICE CHAIRMAN NANCE:** Will.
22

23 **DR. PATTERSON:** Thanks, and so my first question was about sort of
24 the temporal issue, and also some of the habitats that are
25 ephemeral, which you just addressed, but, secondly, if you had
26 data from the same systems, and the same taxa, like seagrass or
27 oysters, and there were conflicts, different patterns observed,
28 and not just the resolution of the data, but how did you handle
29 that, if it ever occurred?
30

31 **DR. B. FROESCHKE:** So I'm going to answer that, but, generally, I
32 was only contracted to collect the data, and so the idea of the
33 StoryMaps is then I can present it to the council of here is the
34 conflict in the data, and then it's up to them of how that
35 ultimately is handled, and so I'm trying to identify those
36 conflicts, but not make the decision on how the data will be
37 handled afterwards.
38

39 **VICE CHAIRMAN NANCE:** Harry, were you able to unmute?
40

41 **MR. BLANCHET:** I was. I was -- I had muted in too many places.
42 In the Louisiana StoryMaps, you had some information on the
43 vegetation coverage, and some of those were limited, in terms of
44 characterizing the vegetation, and there were some very straight
45 lines that separated what you described as brackish and saltmarsh
46 and non-brackish and saltmarsh, and I saw that you had some
47 information, in the shapefiles, regarding the 2021 marsh types,
48 but I didn't see any contact with the State of Louisiana, the state

1 folks that are actually involved with some of those surveys, and
2 with some of the management pieces of it, and so CPRA, Coastal
3 Protection and Restoration Authority, might have some information.
4

5 The other thing that jumped out, to me, was -- This was something
6 that came up during the discussion of the Great Red Snapper Count,
7 and sorry to bring that up, but a lot of the information off of
8 Louisiana is uncharacterized bottom.
9

10 There are a lot of oil companies surveying that BOEM has, and that
11 you may be able to get access to, that would be transects that
12 actually cover information on sediments and topography and such
13 that, wherever they had to run pipelines or they were doing other
14 things that were related to bottom coverage. There may be a lot
15 of information that BOEM has available on surface sediments that
16 is not here, or is not captured in the NOAA dataset.
17

18 **DR. B. FROESCHKE:** Okay. Thank you.
19

20 **VICE CHAIRMAN NANCE:** Trevor, please.
21

22 **MR. MONCRIEF:** Trevor Moncrief of Mississippi.
23

24 **DR. B. FROESCHKE:** We still like you.
25

26 **MR. MONCRIEF:** Can you tell me where exactly those emails would
27 have come from, like the address or anything else like that?
28

29 **DR. B. FROESCHKE:** So I am cc'd on all of them, and so it would be
30 a University of Tampa, a UT, email, but it was several people, and
31 so, Zoe, did you email anybody from Mississippi, or was it mostly
32 me, Allie, and Promise?
33

34 **MS. GOLDEN:** I didn't do -- I didn't email anyone from Mississippi.
35

36 **DR. B. FROESCHKE:** Okay. Zoe is the one that tried her hardest to
37 contact Sean Powers, who ignores us. I think --
38

39 **VICE CHAIRMAN NANCE:** Sean is from Alabama though.
40

41 **DR. B. FROESCHKE:** I know, but he's the only one that won't answer
42 us. It was either myself or Promise Perella or Allie Hodges.
43

44 **VICE CHAIRMAN NANCE:** I guess it depends, and I hate to say this,
45 but, for Mississippi, for example, it depends on who you email.
46 Trevor may not have seen anything.
47

48 **DR. B. FROESCHKE:** Well, I can't even guarantee that I emailed

1 him.

2

3 **MR. MONCRIEF:** I was on the list, and I see zero emails, right,
4 which is not a thing, and I'm not worried about that, but we do
5 have oyster shapefiles, and artificial reef shapefiles, ready and
6 available.

7

8 **DR. B. FROESCHKE:** So some of that I believe -- I believe we do
9 have some artificial reef data from Mississippi.

10

11 **MR. MONCRIEF:** Yes, and you did in the folder.

12

13 **DR. B. FROESCHKE:** Okay.

14

15 **MR. MONCRIEF:** So we've got some stuff, and so, now that I'm aware
16 of it, I will make sure, but I will say that I also don't get any
17 of the emails from SEDAR or anything else like that, and so it
18 could be an IT problem for us.

19

20 **DR. B. FROESCHKE:** Okay. Maybe I am in your spam a lot.

21

22 **VICE CHAIRMAN NANCE:** Block that sender.

23

24 **DR. B. FROESCHKE:** Yes, and I also have put all of the shapefiles
25 -- Again, I want to make sure they work, but I do have them here
26 in ArcPro by habitat type, and so, if there's any specific
27 shapefile, or any particular area that you would like for me to
28 zoom into, or to show you, I am happy to do that.

29

30 I know, in the past, we didn't have data on the Middle Grounds,
31 the Florida Middle Grounds, and so I do have that from the GFISHER
32 data. That I did not put into the Google drive. I wasn't quite
33 sure yet what the regulations are on sharing that data with the
34 general public, since this is public information, and if it was
35 ready yet, but I do have that data in here that we can look at,
36 but, if there's any habitat type that you would like for me to
37 pull up, that I have for your state, I'm happy to zoom in and let
38 you see that, or if this is something that you would like to
39 process.

40

41 An issue with ArcPro is, if I share this with you, you have to
42 have access to ArcPro, and so it's not real useful, which is also
43 where the StoryMaps come into play.

44

45 **VICE CHAIRMAN NANCE:** Jason, please.

46

47 **MR. ADRIANCE:** Thanks. On the Louisiana public oyster seed
48 grounds, and the oyster leases, just because they're designated as

1 such, it doesn't necessarily mean that they're productive either,
2 just as a --

3
4 **DR. B. FROESCHKE:** So they're marked, but that doesn't mean that
5 there's live oysters there?

6
7 **MR. ADRIANCE:** Correct, and so like Vermillion Bay, for example,
8 almost the entire bay is designated as a public seed ground, but
9 very rarely are there oysters in there. Depending on the year,
10 maybe towards the outer fringes of the bay, near the Gulf, and
11 then, just because someone may have a lease, that lease may not be
12 productive.

13
14 **DR. B. FROESCHKE:** So is there data available for us to try to
15 tease that apart, or we just need to make those limitations in the
16 shapefile or the metadata available?

17
18 **MR. ADRIANCE:** We likely have data for the seed grounds, but, for
19 the public leases, that you may just have to -- If oyster fishermen
20 are willing to talk with you, but we really don't -- We just get
21 oyster areas. We get landings by oyster areas, and not necessarily
22 specific leases.

23
24 **DR. B. FROESCHKE:** Yes, Dr. Froeschke.

25
26 **DR. FROESCHKE:** So my question is more to the SSC, but will you
27 scroll up on the GFISHER data, just the legend? While she's
28 bringing that up, from the earlier presentation, you saw that the
29 habitat types, and there's a number of those, and so, for example,
30 hardbottom rock reef is a habitat type, and many of those would
31 fall into that, and not all of them, but I guess my initial
32 thinking, for example, is we would take something like that, and
33 then you would take all of the hardbottom, essentially everything
34 but the artificial stuff, and you would collapse that into a single
35 reef habitat, for the purposes of artificial reef the way we have
36 it. Does that seem like a reasonable approach, or is there value
37 in retaining these and trying to make use of it in that way?

38
39 **VICE CHAIRMAN NANCE:** To me, I mean, you have the initial data,
40 and how you collapse those into hardbottom, mud, those types of
41 things, you could do, because you could always go back to the
42 simple data, and so I guess it depends on the question you're
43 asking, the hardbottom against mud and those types of things.

44
45 **DR. FROESCHKE:** As a follow-up, I guess it kind of depends, or
46 maybe it's premature at this time, but, if you were to do a model-
47 based approach, where you would try to account for differences in
48 the performance of, for example, a flat bottom, versus a ledge,

1 versus a high-relief artificial -- Or a high-relief reef, and I
2 could see that would be valuable, if you were to do some sort of
3 regression-based approach.

4
5 The way that we do it now is, if it falls into a habitat type,
6 it's simply just a linkage, and so it wouldn't matter in the way
7 that it would be visualized, and so maybe that's just something
8 that, as we come back, and as Lisa alluded to, that we might
9 consider some methodological updates, that we may need to revisit
10 that, as some point.

11
12 **VICE CHAIRMAN NANCE:** Luiz, please.

13
14 **DR. BARBIERI:** Just a comment to his comment, Bridgette, and I
15 think that the magnitude of this project -- I mean, the variety of
16 habitats that are looked at, the variety of programs, right, the
17 geographic scale, and the whole thing is massive, and so it's
18 difficult to get to that level of detail, John, but, for example,
19 the GFISHER group has their own criteria for habitat
20 classification, right, multilayered, right, that they use, but
21 they apply that, depending on how those data are going to be used,
22 and then they have a way to also quantify it, but, you know, all
23 of that information may not be readily available, right, when we
24 look at this scale, I'm thinking.

25
26 I'm thinking, you know, to answer your question, you have to
27 identify an area of interest and then say, okay, now that you have
28 the sources there all lined up, you know where to go to do a deeper
29 dive, right?

30
31 **DR. B. FROESCHKE:** Yes.

32
33 **DR. FROESCHKE:** One more, and then I will stop. Let me just ask
34 it a different way then. One difficult problem, or recurring
35 problem, that's come up through this is, in the Gulf, the
36 artificial structures are a very important feature, and they are
37 widely recognized, but they are not considered as essential fish
38 habitat, because it's not recognized as a habitat type, and so a
39 fun fact is we did this in 2013, and it was a white paper that the
40 staff put together on that.

41
42 That's one of the most downloaded documents on our website, for a
43 long time, and, ultimately, the council decided, for various
44 reasons, not to go down that path, but, for something like this,
45 it would seem that we would need to remove the artificial
46 structures, at minimum, from the data, for the purposes of what
47 we're trying to do. Does that seem reasonable?

48

1 **DR. B. FROESCHKE:** I will add to that that I did have my students,
2 or my team and I, and we did collect artificial reef data. That's
3 actually more accessible than any other habitat, or if you want to
4 call it habitat, type data that we could find, and so it is in
5 there. I did collect artificial reef data, and I do have it
6 mapped, and it is, I know, not considered essential fish habitat,
7 but we did collect that data, to have that available as well.

8
9 **VICE CHAIRMAN NANCE:** Trevor.

10
11 **MR. MONCRIEF:** A philosophical question is why would it not be
12 essential? Because it doesn't meet a definition?

13
14 **DR. FROESCHKE:** It gets problematic, and so the short story is
15 that it conflicts potentially with other marine laws, and part of
16 the -- For example, when you put a platform in, the original
17 contract says you've got to take it out, and so that's a conflict,
18 and then the concept of marine dumping, and this is out of my
19 expertise, but these are the things that we talked about, for
20 example, to leave in.

21
22 When we started talking about that, that's when Exxon started
23 showing up at the Gulf Council meetings, just as kind of an
24 interesting sidenote, but there are a number of those kinds of
25 issues that seemed like they were getting complicated, but it
26 wasn't anything necessarily -- We never got to the point where we
27 were discussing ecological performance.

28
29 **VICE CHAIRMAN NANCE:** It's almost like you're saying essential
30 fish habitat is permanent fish habitat. If something goes in, and
31 it comes out eventually, it doesn't mean that it's not utilized
32 while it's there. Any other questions from the SSC? It was a
33 great presentation.

34
35 **DR. B. FROESCHKE:** Thank you.

36
37 **VICE CHAIRMAN NANCE:** And a lot of work.

38
39 **DR. B. FROESCHKE:** Thank you.

40
41 **VICE CHAIRMAN NANCE:** Thank you for putting that together.

42
43 **DR. B. FROESCHKE:** I just wanted to take a second, for any of my
44 other students, if they showed up, to thank them. This is a big
45 undertaking. At the University of Tampa, we only have
46 undergraduate students, and so that's who did a lot of this, was
47 undergrads, and I think they've done phenomenal work, for not being
48 graduate students, and so thank you to all of them.

1
2 **VICE CHAIRMAN NANCE:** Okay. If you do have comments, after you
3 look through your state and those types of things, please get back,
4 and I think you'll be able to provide information back.

5
6 **DR. B. FROESCHKE:** I will be presenting the final document to the
7 council in November, and so, if you have feedback, if you could
8 get it to me quickly, and not like the day before I present it at
9 the council, I would highly, highly appreciate that. Thank you,
10 guys.

11
12 **VICE CHAIRMAN NANCE:** Thank you. Lisa, is that presentation done?
13 Okay. Perfect. So we have a few extra minutes here. I'm going
14 to go back to our pre-lunch discussion that we had on the SEDAR
15 assessment process changes. Is there any other -- Katie, you're
16 still on, I assume?

17
18 **DR. SIEGFRIED:** Yes, I'm here.

19
20 **SEDAR ASSESSMENT PROCESS CHANGES AND MODEL COMPLEXITY**
21 **(CONTINUED)**

22
23 **VICE CHAIRMAN NANCE:** Perfect. Okay. We have a few minutes. Is
24 there any other discussion that we would like to have on that
25 particular subject? Luiz, please.

26
27 **DR. BARBIERI:** Thank you, Mr. Chairman. I do. Now, you know,
28 this might be taking more time than, you know, we are willing to
29 go through with this discussion, but, to me, the nature of, you
30 know, Katie's presentation primarily -- You know, it really, to
31 me, puts the SSC, right, in a position to evaluate where we are,
32 where our regional assessment enterprise, so to speak, right, to
33 conduct the assessments and to evaluate the throughput, the
34 capacity, and how that's going to interface with the management
35 needs.

36
37 Of course, because we play a key role, right, in reviewing so many
38 assessments, and actually providing the ABC recommendations to the
39 council, I think that this discussion is necessary, and so, if we
40 have a little time, Mr. Chairman, I would say -- I mean, folks,
41 jump right in, if you feel that that's not necessary fine, but I
42 would like to go back to Katie's Slide Number 7.

43
44 **VICE CHAIRMAN NANCE:** Jess, if you could bring that one up, please.

45
46 **DR. BARBIERI:** Looking at this slide, right, for SSC discussion,
47 I'm thinking that Katie's presentation, you know, outlined what
48 their general gameplan is, right, and this is being discussed

1 within the Science Center and with all the other regional partners,
2 through the SEDAR Steering Committee process, but, of course, as
3 I just mentioned, the SSC plays a key role in this, and do we have
4 any comments, or reactions?

5
6 How do we react to this plan, right, of right-sizing the stock
7 assessments, to the benefit of throughput, right, and
8 responsiveness to council management needs, and so, you know, this,
9 I guess, was the previous meeting, I believe, when Katie gave
10 already an introductory presentation to this same -- You know, the
11 same tone that she has here, and, I mean, in this presentation,
12 she's saying which stocks could be assessed using less-time-
13 consuming approaches, right, and so we, as an SSC, have to evaluate
14 -- You know, do we always want to see, you know, a statistical
15 catch-at-age model assessment?

16
17 Is that the only thing that's going to satisfy it? I mean, up to
18 now, the SEDAR process, and the Science Center, have been primarily
19 focused on conducting these assessments using these highly-complex
20 models, right, that I would say 99.9 percent, and correct me if
21 I'm wrong, Katie, but 99.9 percent of those assessments are
22 actually statistical catch-at-age models, where sometimes the data
23 is not available, or some of the life history information is
24 missing, and so process error exists in there already, and the
25 ability to resolve issues gets complicated, because some of these
26 models, depending on the species, right, are not very well
27 informed.

28
29 What happens is, you know, the council is trying -- I mean the
30 center is trying to conduct these assessments, and they bring them
31 before the SSC, and we have seen several of those here, where we
32 can't -- Sometimes we become highly critical and ask for more,
33 either more projections or revised analysis, and, you know, all of
34 this is causing delays in the process.

35
36 Another thing is this, quote, unquote, you know, lesser analysis,
37 right, that involves interim analysis, index-based-type
38 assessments for management advice, that we also, at times, feel
39 uncomfortable with, and we have expressed this uncomfortableness,
40 and we are reluctant to provide management advice, based on that
41 analysis, because we feel it's not as complete, and so how do you
42 reconcile the fact, right, that capacity that we have now, with
43 the number of stocks that the council manages within these FMPs,
44 and that we have to provide management advice, and how you
45 reconcile that with, you know, the fact that we seem to always
46 want to just have more detail and just be leaning, right, on
47 analysis that involves more complex models? That's just a
48 philosophical question.

1
2 **VICE CHAIRMAN NANCE:** Wouldn't we though, in a -- As an assessment
3 comes up, and we're developing the terms of reference, and wouldn't
4 we, at that point, develop the complexity of the model that we
5 would like to see? Would that be the place where that happens?
6 So, as we have a species coming up, and we say, okay, here's what
7 we've done in the past, and would we want to do a less-complex
8 model this time, or do we want to do a more complex, and here's
9 why, the reason for either of those. Ryan, please.

10
11 **MR. RINDONE:** So I'm going to take bits and pieces of this. I
12 feel like what happened was our technological capability grew at
13 a faster rate than our data availability by species, and now we're
14 at that point where we need to kind of get those to reconverge.
15 We've been having conversations about this for as long as I've
16 been here, and, you know, there was a strong push, for a while, to
17 use SS anywhere and everywhere that was possible, because, oh, it
18 can be set up in so many different ways, and it can be made to do
19 all these different things, but one of the things that you guys
20 have discussed often has been how many things are estimated
21 externally, how many things are fixed because of a lack of other
22 information, proxy values used and the like, and how appropriate
23 all of that is.

24
25 All of that is based into the shift that you guys have demonstrated
26 with your treatment of our ABC Control Rule, in that you don't
27 treat it for much at all anymore, because of all of the things
28 that have been listed in the past.

29
30 I think that's ultimately what got us here. As far as like what
31 to do next, and I know that Cassidy had mentioned this some, and
32 Katie has mentioned this before, about using management
33 procedures, and MSE simulation, to try and see -- So, if we take
34 something we're doing for a particular species, like, you know, a
35 statistical catch-at-age model, and then we do something much more
36 pared down.

37
38 As far as the performance and the quality of the advice that is
39 generated, like how dissimilar are they, and I would say that --
40 I would expect that there's not a single species that we assess
41 that we could not, or that we should not, do that for, and so,
42 when we think about what we've done for the interim analyses, we've
43 kind of graduated from this idea of using a single representative
44 index of relative abundance to considering, you know, one or two
45 indices, but also considering some ancillary information.

46
47 Like, for red grouper this last time, you know, we looked at the
48 NMFS bottom longline index, but we also got a look at some of the

1 video data, and we also got a look at some of the length comp
2 information, and, well, that's not everything that was included in
3 SEDAR 61, but it certainly checks a lot of critical boxes, and so
4 you have length comps from a representative fleet that catches the
5 same fish that the private guys catch, and that the hook-and-line
6 commercial guys catch, and you have the composite video index from
7 GFISHER, which catches fish in nearshore waters, all the way out
8 to -- What does FWC's go down to, a hundred meters or something
9 like that?

10

11 So it gets down to 330 feet, and, you know, there are decent-sized
12 fish down there, we expect, and it's certainly within the scope of
13 what red grouper was originally considered in, which is the
14 shallow-water grouper complex, and then the NMFS bottom longline
15 index would catch, you know, most of your brood stock, and so you
16 wouldn't expect those smaller, you know, two and three-year-old
17 females to be caught by that, and then they aren't.

18

19 With just those few pieces of information, you now have a pretty
20 decent amount to look at, right, to be able to figure out what's
21 going on with red grouper, but you didn't need the kitchen sink,
22 and so taking -- Learning from that example, and trying to apply
23 that moving forward, and like those are the sorts of things that
24 we can work with the Science Center on, to identify, based on all
25 the slides that Katie had presented in here about the different
26 data that were available for each species, and try and figure out
27 like, if we had to put our finger on a couple of these things, to
28 talk about for interim analyses, or another type of management
29 procedure, like what can we pick?

30

31 What are the appropriate things, and that will be, obviously, a
32 species-specific discussion, but, from what Katie presented, and
33 my own knowledge, for reef fish anyway, I mean, GFISHER seems like
34 it's going to end up being an important component of that puzzle.

35

36 **VICE CHAIRMAN NANCE:** Luiz, to that point?

37

38 **DR. BARBIERI:** Mr. Chairman, just to that point, just as a quick
39 follow-up, my question here is we were told that this is a work-
40 in-progress, right, and so this was presented here, and we asked
41 a few questions, and the answer was, well, this is not yet
42 completed, and so, to me, as we look at this plan, right, what's
43 outlined here in Slide Number 7, if we have a problem with this,
44 or if we have recommendations to make, this would be the time,
45 because the plan is still not completely finished.

46

47 It would be much more difficult later on, right, after they
48 completely operationalize and implement this thing, for us to get

1 at these points and say, well, we are not comfortable with this
2 analysis for this stock, and so, you know, I'm trying to see if
3 we, as an SSC, can provide as much input, at this state, and
4 provide guidance to them on things that we feel could be
5 problematic, right, so that the plan can be continued.

6
7 **VICE CHAIRMAN NANCE:** What we could do, in a way, is, at our next
8 meeting, carve out a half-hour, or forty-five minutes, for us to
9 discuss this in detail, and I'm not sure we're going to get very
10 far today on providing information, but we've seen this, and we've
11 heard the presentation, and so, if we have some time carved out,
12 then we can come and be able to send, as a group, those
13 recommendations.

14
15 **DR. BARBIERI:** Right, and that would work, but the SEDAR Steering
16 Committee has been receiving these presentations, and discussing
17 all of this with the Science Center, right, and so there will be
18 a follow-up at the next meeting, whenever it is.

19
20 **VICE CHAIRMAN NANCE:** When is that one?

21
22 **DR. BARBIERI:** In the spring of next year.

23
24 **VICE CHAIRMAN NANCE:** So we've got -- Okay.

25
26 **DR. BARBIERI:** We do, yes, and I'm not saying that we don't. I'm
27 not saying that we need to have all of this completed today, but
28 I just want to highlight that the opportunity for the SSC to
29 provide meaningful input into this process is between now and the
30 end of year, before that presentation to the SEDAR Steering
31 Committee is completed.

32
33 **VICE CHAIRMAN NANCE:** Perfect. Steve, please.

34
35 **DR. SCYPHERS:** Thanks, Mr. Chair. I was just going to support
36 Luiz's point, and Ryan's response, and I think, at least speaking
37 for myself, it's largely been a -- Yes, wanting the full kitchen
38 sink, versus not, and it's sort of a comfort level, and I think,
39 as we kind of better understand, and this sort of segues to
40 Nathan's work a bit, and if we better understand kind of how some
41 of these interim analyses -- Like the reliability of them, right,
42 you know, and can we trust an index based approach? If you compare
43 an index-based approach to, you know, the projections from a Stock
44 Synthesis model, for the same time periods, you know, you would
45 get similar forecasts out, you know, and you would estimate similar
46 trajectories, or at least in the same ballpark.

47
48 I think, to the extent that these things can be demonstrated, and

1 I think there's building evidence for them, right, and there was
2 a manuscript published, a year or two or three ago, that looked at
3 some of these interim analyses, and there's Nathan's work, and
4 Cassidy's MSE work, and simulation work, and I think we're marching
5 in that direction, but I think a lot of it is -- At least for me,
6 you know, can we demonstrate that we're essentially able to provide
7 the same, or very, very similar, advice, right, and will we nail
8 the same number, to the ones place, or the decimal? Probably not,
9 but who cares, right, and can we get at least in the ballpark, so
10 that the advice we're giving is appropriate, both biologically and
11 socioeconomically.

12
13 **VICE CHAIRMAN NANCE:** Thank you, and I did appreciate the time
14 that the center took in putting this presentation together, and
15 they have it by species, and they have the data that are available
16 for each of those species, and so I think that was -- That really
17 is a benefit to us, to see what is available.

18
19 Also, the species that are captured by GFISHER, and that are not
20 part of that group, and so there's some information here. We'll
21 spend some time and take a look at this, and I think, at the next
22 meeting, Ryan, if we can, just schedule some time, forty-five
23 minutes or that type of thing, where we can have a discussion and
24 provide any input back to the center and the council, that type of
25 thing, where we would like to see this move. Any other -- Paul,
26 please.

27
28 **DR. MICKLE:** I will comment on that very quickly, briefly, but we
29 always try to take a basket approach with these conversations, and
30 we always end up, at the end, talking about -- We almost always
31 agree that it's species-dependent.

32
33 When interim analyses sometimes work is when we're confident in
34 what we're seeing, and what the fishermen and the fisherwomen are
35 saying, and what we're seeing in the indices, and so it's hard to
36 get philosophical, when deep down I -- You can disagree with me,
37 but it comes down to species dependencies, but I have a totally
38 different comment after that. Thank you.

39
40 **VICE CHAIRMAN NANCE:** Tom and then Andrew.

41
42 **DR. FRAZER:** I was just going to kind of -- I mean, as a council
43 member, and I don't know if I want to speak for the whole council,
44 right, but, I mean, when I look at -- I mean, I really appreciated
45 this conversation, and then the presentation, but what I took away
46 from that is that, moving forward, you're going to have twelve
47 kind of target species, and they're going to be assessed every
48 eight years, right, and that's kind of your benchmark, right, and

1 so then the question is, in the interim, you know, do you have one
2 of these other approaches that are going to allow you to respond
3 to something that are -- You know, that's happening in real time.

4
5 That's what -- I mean, that's what the council is forced to deal
6 with, right, people coming and giving public comment that says,
7 you know, red grouper are eating the bottom of my boat, you know,
8 and there are so many of them, but the reality is -- What I saw is
9 that the work schedule will never allow you to respond in real
10 time to what fishermen are seeing on the water, and so what I would
11 think would be important for the SSC, right, is a couple of things.

12
13 How do you use those interim data products, right, because there
14 are two things that are going to happen. The original assessment
15 is going to have, you know, some uncertainty associated with it,
16 you know, because the -- Kind of the more incremental methods are
17 going to have less certainty, certainly, around them, and I'm not
18 sure that you're ever going to be able to use them, and, in fact,
19 Clay has kind of said this, and they moved from kind of making
20 management advice to more of a health assessment, but what -- I
21 mean, so let's say I had an assessment in 2000, right, and the --
22 You know, I had, hypothetically, an OFL of one million pounds,
23 right, and an ABC of 750,000 pounds.

24
25 Then I had some indices that are going all the way through this,
26 and I'm not sure that I would ever have enough confidence in it,
27 because the confidence intervals are going to be so high, to say
28 that I have so many more fish, right, that now is the time to
29 respond, you know, or I'm going to adjust the quota, because we
30 don't have the data there.

31
32 My real question is for kind of the economists, right, here,
33 because, when we talk about managing fisheries, we talk about
34 things like stability, right, and particularly from the commercial
35 side, and I'm not so much sure about the recreational side, but
36 there's a cost to mobilizing and changing regulations, and things
37 of that nature, and it's almost, to me, like you should manage
38 fisheries over a five-year period, right, and just say this is
39 where we're at, this is the goal, and our indices should say, hey,
40 you know what, if we are either way above the line, or way below
41 the line, we're not going to do anything, right, because it just
42 means we're ticking right along, and so but I don't know what those
43 extreme values would look like.

44
45 You know, are they two standard deviations away from, you know,
46 the reference value, or something like that, and so I just look at
47 -- I think I'm looking at the world a different way, and I don't
48 have any confidence that we'll ever get the resources, as a nation,

1 to have a lot more data collection efforts. I think we're going
2 to have to streamline these things quite a bit, and so I think
3 we're moving into a new phase of management, and I think that's
4 where the MSE stuff has come into play.

5
6 Those are the types of insights that I would be looking for from
7 the SSC, is what's the value of, you know, managing for a stable
8 fishery, right, and things of that nature. Just some thoughts.

9
10 **VICE CHAIRMAN NANCE:** Thank you. Andrew, please.

11
12 **DR. ROPICKI:** This is just getting in the weeds a little bit, but
13 talking about what the fishers are seeing on the water, and there
14 was one point in there, and I was looking at the yellowedge grouper
15 slide, and it says negligible recreational component, and that
16 might be the case, but we do have some anecdotal evidence, and I
17 think it was the October council meeting, where you had a number
18 of fishermen get up, in public comment, and kind of indicate that
19 there is more recreational effort being devoted to those deepwater
20 grouper species. Like I said, it's getting in the weeds, but that
21 one bullet point might need to be reexamined. It was anecdotal
22 evidence, but --

23
24 **MR. RINDONE:** Yes, and we had talked about that a lot, over the
25 last couple of meetings, about the representative of the
26 recreational data, specifically for like the midwater snapper
27 species and the deepwater groupers, mostly because the vessels
28 that are targeting those fish don't launch from a public park.
29 They're returning to -- They're leaving from and returning to
30 private access points that are not ever going to be included in
31 APAIS, and so the catch side of that is going completely
32 unrecorded.

33
34 The effort might be recorded, but it's not paired well with the
35 harvest that those boats are actually doing, and so I think what
36 Katie has got on the slide isn't -- It isn't incorrect, and this
37 is based on the data that we have, and this is what we're seeing,
38 but this is also where, you know, like having people that are
39 actively engaged in fishery dynamics is helpful, because they can
40 point those sorts of things out, and, in those cases, it may be
41 that, you know, we just don't really consider the recreational
42 data we have to be that informative, and so maybe we don't use it,
43 and that's certainly something that we could talk about in those
44 situations.

45
46 It may be that -- Like, for those species, I mean, they are very
47 data-limited, and an index-based approach may ultimately be the
48 only think that we can do for some of them.

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VICE CHAIRMAN NANCE: Trevor.

MR. MONCRIEF: Along those same lines, but probably negligible in comparison to the magnitude of the other fishery, but that one is growing, right, and that's without a doubt, but I was going to try and touch on what Tom said, without sounding like I'm getting on my soapbox or anything else like that, but I agree with what you said.

The recreational fishery, and the commercial fishery, regardless of it, stability in seasons is kind of the route that you want to go down, and, when we've had these health checks and everything else, you know, we've been able to look at them and say, well, there's a little more fish, or like, well, there's a little bit less, or whatever else, and it doesn't culminate into a decision or anything else, and it comes down the road, and you almost wonder if -- This is different than how we've ever thought about it, I think, but so let's take, for example, gag.

It's a hot topic, and greater amberjack, things like that, things with fairly restricted seasons that have come up, and there is little opportunity to ever gain any of those days, or access, back, across the fishery.

I mean, it takes a lot of time, and so you almost wonder if this is one of those tools to try to increase the access, and then create the stability, right, because, at some point, you've got to have the stability first, to be able to continue along that stretch, but, in general, yes, I just do agree that, in a perfect-world scenario, you're five years at a time, five to eight years at a time, but five years at a time, at minimum, of this is what we're doing, and then you see how the stock reacts, and then you continue down.

You continue to fluctuate changes and everything else, and you can do all the analysis that you possibly can, but I don't think what we're collecting is really robust enough to do it at that small of a timescale, and so that's more soapbox than anything, but I figured I would throw it in there.

VICE CHAIRMAN NANCE: Thank you, Trevor. Paul.

DR. MICKLE: Katie, can we go to Slide 23? I just want to make this comment, to shed a little light on how data scientists perceive this figure. A lot of data scientists work at NGI, and specifically NCEI, on multiple projects, but I want to mention this, because it gives some relevancy, or perception, of how

1 complicated the data process is.

2

3 When you look at the green areas, that's actually data creation
4 and not collection. Data creation is included in counting
5 otoliths, and so that's data creation too, and so, when you think
6 about these colors over a timeline, they're not really accurately
7 representing data creation and what's going on, and I'm not saying
8 change anything, but maybe identifying that data creation is a
9 very complicated process, on what metric you're actually focusing
10 in on, whether it's intercept data, you know, or otolith-reading
11 data, and it really comes down to data creation, collation, and
12 then automation.

13

14 Hopefully that provides a little bit of perception on kind of how
15 data scientists view the process of getting it to the analysis
16 stage and really understanding that every single step of it, except
17 putting your hands on the specimen, or the inorganic thing you're
18 measuring, can be automated. Every single step can be automated,
19 and it's actually very cheap, once you get to the automation stage,
20 and so I just wanted to make those comments, to give some relevancy
21 of how long it takes to get data to the analysis, the analytical,
22 step, so there could be some appreciation of what goes on, and how
23 expensive it becomes, and, you know, data collection is kind of
24 misleading, in a way, when you think about it. Thank you.

25

26 **VICE CHAIRMAN NANCE:** Paul, thank you. We'll go ahead and end
27 with that. I think that was a good ending, and we'll go ahead and
28 take a fifteen-minute break, and we'll come back at twenty to
29 three, and we'll have our final presentation for the day.

30

31 (Whereupon, a brief recess was taken.)

32

33 **VICE CHAIRMAN NANCE:** Okay. It's time to get back together. If
34 everyone could take their seats, we'll go ahead and get started.
35 I would like to introduce Dr. Hyman. He's here to give us a
36 presentation on Influence of Timing and Duration of Recreational
37 Seasonal Harvest Restrictions on Gag Effort, Harvest, and Discards
38 in the Gulf of Mexico. Ryan, if you would give us the scope of
39 work, please, and then we'll go ahead and get started.

40

41 **INFLUENCE OF TIMING AND DURATION OF RECREATIONAL SEASONAL**
42 **HARVEST RESTRICTIONS ON GAG EFFORT, HARVEST, AND DISCARDS IN THE**
43 **GULF OF MEXICO**

44

45 **MR. RINDONE:** All right, and so Dr. Challen Hyman is here from the
46 University of South Florida to present research on the effects of
47 modifications to recreational fishing season duration for Gulf gag
48 grouper on fishing effort, harvest, and discards, and he's going

1 to describe the relationships between these factors and how
2 accounting for them can assist fisheries managers in better
3 aligning fishing seasons with management goals, and so you guys
4 should review the information presented, ask him some questions,
5 and make recommendations to him, and the council, as appropriate.
6 It's all yours.

7
8 **DR. CHALLEN HYMAN:** While things are getting started, my name is
9 Challen Hyman, and, when I'm not flipping tables in the back of
10 the council, I am a post-doc researcher under council member and
11 Dean of USF, Tom Frazer, and, for the last year, just over a year
12 now, I've been looking into the gag recreational fishery, looking
13 into some of the implications of management and, you know, the
14 timing and duration of some of these temporal harvest restrictions
15 on essentially how anglers will respond, in their behavior, with
16 respect to the gag fishery.

17
18 The work that I'll be presenting on today is a combination of two
19 manuscripts. The first is going to be focused on the effort model
20 that I'll be presenting, kind of in context with everything here,
21 and that one just -- That manuscript just got accepted, and that's
22 in the background information that was presented in the meeting
23 materials, and then there's a second paper on gag CPUE, and gag
24 proportional harvest, that I am preparing at this moment.

25
26 I would like to briefly recognize my coauthors, Dr. Dave Chagaris,
27 who I believe is still on the SSC, and I knew was a changeover,
28 and Dr. Frazer, who are on both of these manuscripts, as well as
29 Dr. Mike Drexler, from the Ocean Conservancy, who is on the effort
30 manuscript exclusively.

31
32 I almost removed this slide, but I'm really glad that I didn't,
33 given the SSC changeover. I don't necessarily think that you guys
34 need a ton of background material on this relatively hot topic,
35 but, you know, just to cover some bases.

36
37 The Gulf of Mexico gag stock is overfished, and overfishing is
38 occurring, and this is a graphic from the last gag health check,
39 back in September of 2023, that kind of shows this population
40 decline over the last twenty years or so, and, as of SEDAR 72,
41 which identified this overfished and overfishing status, it
42 prompted action, and action was incumbent on the council, and the
43 SSC, to essentially impose management restrictions which would
44 reverse this trajectory.

45
46 The council responded, and I believe under the SSC's
47 recommendations, to drastically reduce the gag recreational
48 fishing quota, I think by 80 percent, and they also moved the

1 season start date from June 1 to September 1, and someone please
2 correct me if I'm mistaken, but I believe that shift, from June to
3 September 1, was to accommodate the fact that the catch rates were
4 a little bit lower in September, relative to June, and so, by
5 shifting the season start date from June to September, you
6 essentially increased your season length from -- I believe it was
7 projected to be twenty-five days in June, to about sixty days, if
8 you started the season on September 1, and I think, in reality,
9 that ended up being forty-nine days in 2023.

10
11 This raised a few questions, namely around that shift in the season
12 start date, and I'm going to be generalizing broadly here, but,
13 essentially, there were several lines of thinking, and some
14 uncertainty, behind the change in that season start date, and I'll
15 get a little bit esoteric here, but all of these management
16 restrictions, and changes, were well-documented in Amendment 56,
17 and, looking into some of the public comments on Amendment 56, and
18 the responses from the National Marine Fisheries Service and the
19 council, it led to two different camps.

20
21 The first, which was advocated by the council and the National
22 Marine Fisheries Service, appeared to indicate that there wasn't
23 a lot of information on what was going to happen with respect to
24 discards, and discard rates, as you shifted the season from June
25 to September, and, here, the idea was that it might not notably be
26 affected by shifts in the season start date, and, if there isn't
27 enough information to tell one way or another, you might as well
28 go ahead and manage to the harvest rate, which is exactly what
29 happened.

30
31 In contrast, there was another camp, that was championed by certain
32 advocate groups, that was indicating that, hey, discards may
33 actually be varying annually, due to things like seasonal patterns
34 in catchability, as well as potential interactions with other major
35 fisheries within the multispecies reef fish complex. People are
36 still going to be fishing on the reefs, and their gear might still
37 be encountering gag when the season is closed, and they might be
38 still catching gag as bycatch, and then forced to throw them back.

39
40 For an example of this, and this was one that was commonly raised
41 at the time, was the catch rates for gag might remain high,
42 specifically in June, because of red snapper season, which is
43 almost far and away the most popular reef fish recreationally
44 within the Gulf of Mexico, and, therefore, if anglers were already
45 prompted to go out and fish on reefs, in June for example, and
46 they were just going to be catching, and throwing back, gag in
47 that period of high effort, well, then, if you want to reduce dead
48 discards, you may as well keep the gag season in June, when they're

1 fishing on those reefs anyway, and thereby reducing dead discards,
2 and maybe reducing some of your fishing pressure.

3
4 I thought this was a pretty interesting hypothesis, and there might
5 be available data to test these two competing viewpoints, and so
6 the objectives for my research here was first to develop a multi-
7 model statistical framework to predict recreational effort on the
8 reef fishery, gag catch per unit effort, and the proportion of gag
9 harvested using the MRIP-FES dataset.

10
11 Once I had that multi-model framework in place, I then simulated
12 different season start dates, and differences in season duration,
13 to examine the corresponding behavior and angler responses with
14 respect to gag harvest and gag discard projections. Essentially,
15 I just wanted to know what was the potential consequences of these
16 different counterfactual situations.

17
18 Before I get too, too far into the weeds of my modeling, my
19 simulation frameworks, just for the study region, I focused, again,
20 on the Gulf of Mexico gag stock, and I was primarily interested in
21 essentially the fishing pressure along the west side, or the Gulf
22 of Mexico side, of Florida and the Florida Peninsula, and the
23 reason was that available evidence from the MRIP-FES dataset
24 suggested that the vast majority of gag, upwards of 95 percent in
25 recent years, are caught along this coastline, and so it didn't
26 really make sense to expand that to other states, at least at this
27 time.

28
29 The other thing I did here, as you can see in this figure, was I
30 stratified the Florida coastline based on the MRIP Florida Sub-
31 State Regions 1 and 2, and that's going to be referred to,
32 throughout the rest of the presentation, as the Panhandle and the
33 Peninsula, and, here, I was essentially thinking that there might
34 be differences in angler behavior that was -- There might be reason
35 to segregate these different areas, based on differences in angler
36 behavior and angler responses, to things like gag CPUE, responses
37 to management of different species within the multispecies
38 fishery, such as red snapper, for example, et cetera.

39
40 With respect to the overview for the rest of this presentation,
41 first, I will be going over my multi-modeling framework, and this
42 will be mostly conceptual. I didn't want to get too into the weeds
43 with the different statistical models that I used, and so I'm not
44 going to present the equations in the main part of the slide show.

45
46 However, for the motivated audience member who would like these
47 equations, they are in the supplemental slides, with animations,
48 and so I'm happy to talk about them after the main part of the

1 talk concludes.
2
3 Once I go over the model framework, I'll basically describe some
4 of the modeling diagnostics, and, here, I'm going to just simplify
5 things to the in-sample fit and some of the out-of-sample cross-
6 validation procedures that I used. Once I go over the three
7 different models, I will briefly discuss the simulation
8 methodology that I used to develop these different season
9 counterfactual simulations, and then, finally, I'll go over the
10 simulation results and the inference and potential implications
11 from a management perspective.
12
13 With the modeling framework in mind, what I'm going to show you
14 here is essentially three different models. The name will be in
15 sort of these rounded rectangles, similar to what you see on the
16 side of the screen that says "model", and then beneath them will
17 be all of the different predictors that I included in the models.
18
19 Fundamentally, I started with effort, because, presumably, if you
20 don't have anyone fishing on the reef, there are going to be no
21 gag caught, there are going to be no gag harvested, and there won't
22 be any discarded, and so it made sense to make this the fundamental
23 model within the hierarchy, and, here specifically, I want to make
24 a point to note that these are going to be reef angler trips only,
25 and that's our metric for effort, and, when I say a reef trip, how
26 we quantified this was we looked in the MRIP dataset, and we
27 essentially would count a reef trip if the interviewees identified
28 one of the species within the reef complex as one that they
29 targeted as a primary target or a secondary target or if they
30 caught and released one of the reef species.
31
32 The thinking was that, if you were targeting a reef species, or if
33 you caught one, and even if you didn't keep it, odds are you were
34 fishing near a reef at some point along that trip, and that was a
35 reef trip.
36
37 In terms of the actual model, this was a gamma generalized linear
38 model, and I modeled both the mean and the variance here, and,
39 essentially, the predictors that I included in this model were
40 region and the fraction of the season open in a given month for
41 gag and red snapper, and you will see different management and
42 species considerations that aren't necessarily just gag, namely
43 gag, red snapper, and red grouper.
44
45 What we did here was first we tabulated, in terms of the number of
46 -- In terms of angler preference, using the recreational dataset,
47 and we essentially counted up the number, or the frequency, of
48 anglers that were directly targeting any of the reef fish species

1 within the complex, and the three most popular species within that
2 complex are going to be red snapper, gag, and red grouper, in that
3 order, and we were thinking that general reef fish effort --
4 Anglers might be responding, in terms of effort, with respect to
5 management changes in the top three most-highly-prioritized
6 species.

7
8 The only reason that I did not include red grouper in these
9 management terms, and I only used gag and red snapper, is that red
10 grouper's temporal harvest restrictions were relatively constant
11 throughout the time series, up until around 2022, in response to
12 the last benchmark stock assessment, and so we didn't have a lot
13 of contrast in that data, and so I was forced to only use the
14 fraction of the month open for gag and red snapper.

15
16 Then, briefly, just to go over the spatiotemporal resolution of
17 these models, I was focused on -- I used a month resolution,
18 instead of a wave, and that was essentially the finest temporal
19 resolution that I was comfortable going to, and so the
20 spatiotemporal resolution, for all of these models, will be region
21 and month, and I was looking at data from the MRIP-FES dataset
22 from 2004 all the way up to 2023.

23
24 In terms of -- In addition to the fraction of a month open to
25 fishing for gag and red snapper, I also included a season length
26 variable for both of these species, and this is to get at some of
27 these concentration effects, whereby, if the season is shortened
28 for this highly-prioritized species, anglers might respond to
29 reductions in the fishing season by fishing harder in the time
30 that the fishery remains open, and this has been documented in a
31 few different places.

32
33 The infamous, now infamous, Sean Powers has several papers on
34 concentration effects that they observed in red snapper, and I
35 believe Dr. Froeschke, and Nick Farmer, and some of his colleagues,
36 in 2020, also released a paper indicating concentration effects
37 for red snapper, and so we wanted to include that as a predictor
38 in this model.

39
40 In addition, we were also using region-specific indices of
41 abundance for gag, red snapper, and red grouper, for each of these
42 two regions, and, essentially, the thinking here was that anglers
43 are motivated to fish by availability of the fish that they want
44 to fish for, and so if you -- Presumably anglers are going to be
45 -- They are going to be deciding, or electing, to embark on a
46 fishing trip based on what they have previously already witnessed,
47 and so a lagged CPUE for each of these three species seemed to be
48 an appropriate predictor in this model, in order to essentially

1 predict and account for patterns in angler behavior and effort in
2 the present, and so, essentially, we were using a lagged indicator,
3 or indices of abundance, for each of these species in these two
4 regions.

5
6 In addition, there are also going to be seasonal changes in effort
7 that are related to weather patterns, for example, and people like
8 to fish when the weather is nice, and there are also different
9 anthropogenic factors that might lead to different patterns,
10 seasonal patterns, in fishing pressure, including when kids are
11 going to school, when people typically take vacation days, et
12 cetera, and I didn't want to mechanistically model every potential
13 seasonal effect, and I just wanted to account for them in these
14 models.

15
16 What I did was I included four different harmonic variables, and
17 these are just sine and cosine waves, oscillating on a twelve-
18 month and six-month periodicity, and all this was -- The reason
19 this was included in the model, again, was to just account for
20 some of those seasonal patterns that I didn't want to
21 deterministically model.

22
23 Finally, I was also including several different economic terms in
24 this model. The first was going to be inflation-adjusted fuel
25 prices, because fishing is expensive, and fuel prices are
26 expensive, and, if the fuel prices get too high, people might not
27 want to fish as often. In addition, we accounted for inflation-
28 adjusted Florida median income and the number of twelve-month
29 saltwater license sales in Florida at any given year. Again, these
30 were in -- The motivation for including these different economic
31 terms was simply to account for some of these other underlying
32 patterns, or potential patterns, in recreational effort.

33
34 Moving to the CPUE model, gag CPUE here is going to be defined as
35 essentially the observed harvest, unobserved harvest, and the
36 total number of fish released, divided by the number of reef angler
37 trips, and, here, I was using an average CPUE estimate for --
38 Essentially as my response variable for each region and month in
39 the time series considered.

40
41 This was a hurdle gamma model, and so I essentially was accounting
42 for the probability of observing zero CPUE, as well as the
43 probability, or essentially modeling the mean, of non-zero data,
44 and so that's going to be any time that they got a positive catch.

45
46 For the predictors included in this model, again, I used region,
47 and, here, I used two different region-specific indices of
48 abundance for gag. I'm sorry. One region-specific indices of

1 abundance for gag and one general juvenile index. Essentially,
2 here, I was predicting, or we were predicting, that the gag CPUE
3 in the present was going to be a function of what we had previously
4 observed, and this has been used in several different predictive
5 models, in both commercial and recreational fisheries.

6
7 In addition, I was including the FWRI age-zero juvenile index of
8 abundance from the previous year, and the thinking was that, if
9 there was high recruitment in the previous year, that might
10 influence catch in the next year. In addition, I was including my
11 temporal management variables, and so the fraction of a month open
12 for gag and red snapper, and the thinking was that, if the season
13 is open, anglers might be more motivated to target gag. Ergo, you
14 would get a higher gag CPUE, but the opposite could be observed,
15 when you are including both red snapper and red grouper seasons
16 that are open.

17
18 Essentially, the thinking here was that, when red snapper season
19 is open, anglers might be prioritizing red snapper over red grouper
20 and targeting different places in the water column.

21
22 Any experienced angler will tell you that snapper tend to sit a
23 little bit higher above the water column than gag. Gag are farther
24 down near the seafloor, whereas snappers tend to sit a little bit
25 higher above the reef in the water column, and experienced
26 fishermen might be able to prioritize snapper and fish in such a
27 way that they don't encounter gag as frequently, and so that was
28 why we included those different temporal management effects for
29 both gag and red snapper in the CPUE model.

30
31 In addition, I also included seasonal terms in this CPUE model as
32 well, and the reason -- This was more for characterizing and
33 accounting for patterns in ontology, or endogeny, excuse me, and
34 gag are well known to form seasonal spawning aggregations, in late
35 fall and winter, before migrating farther offshore, and, in
36 addition, there is a documented pattern of emigration of juvenile
37 gag from nursery grounds, primarily seagrass meadows, onto
38 offshore shallow-water reefs, just in -- I believe it is early
39 fall, following the first cold snap, and, again, I didn't want to
40 mechanistically include all of these different variables
41 specifically, but I just wanted to account for them, with some of
42 these seasonal patterns, and so I included these harmonic
43 regression terms in the CPUE model as well.

44
45 In addition, there's been some evidence, from different pieces of
46 peer-reviewed literature, indicating that certain species within
47 the reef complex vary in their catchability in response to
48 temperature.

1
2 I am failing to remember the piece, the specific journal entry in
3 mind, but, essentially, and I believe it was in 2022, but they
4 were looking at catchability of several warm and cold-water reef
5 species, and catchability tended to increase as temperature
6 increased with the warm-water species, and catchability decreased
7 as temperature increased with the cold-water species.

8
9 Given that, and anecdotal evidence that gag tend not to bite in as
10 high frequency when the water gets too warm, I included sea surface
11 temperature, average sea surface temperature, in each of these
12 regions, as a predictor.

13
14 Then, finally, I included effort as a predictor in the CPUE model,
15 and the thinking is that, if there's a finite amount of fish in
16 the water, the more people that are actually going out to embark
17 on a fishing trip, the lower the CPUE at large, and so we expected
18 there to be a negative effect of effort, in terms of angler trips,
19 with respect to CPUE.

20
21 Then, finally, for the proportional harvest model, essentially,
22 here, we were looking at the proportion, the average proportion,
23 of gag harvested, either observed harvest or unobserved harvest,
24 divided by total catch, and this was modeled using a beta
25 regression model, and this is going to be essentially just modeling
26 proportions.

27
28 Here, we included region, and the fraction of a month open to the
29 harvest for gag, and region-specific gag CPUE presently, and the
30 thinking here was that, given a finite bag limit, the higher the
31 CPUE, it would tend to have a lower average proportion of harvest,
32 because anglers are catching, and encountering, gag that they're
33 no longer able to keep, once they have essentially met their bag
34 limit, and, in addition, I also included some seasonal terms, and
35 I will explain the reason why in just a little bit, as well as
36 some different regulations, including the bag limit and the size
37 limit.

38
39 One thing that you will notice is that, in each of these models,
40 there are going to be -- The response variable for one model will
41 wind up as a predictor in the next model, and, with respect to
42 out-of-sample cross-validation, which is essentially measuring the
43 predictive power of these models, well, if you're predicting into
44 the future, you're not necessarily -- If you're predicting CPUE in
45 the future, for example, you're not necessarily going to have
46 observed effort in the future, and so, with this -- For my out-
47 of-sample cross-validation, essentially what I did was I would
48 first predict effort and then propagate the uncertainty in those

1 effort predictions into the model for CPUE, and I would predict,
2 or I would propagate, the uncertainty in the CPUE model as a
3 predictor in the proportional harvest model.

4
5 I can get into exactly how I did that in just a few slides, when
6 I go over the simulation methodology, but, for now, just note that,
7 when you see these out-of-sample cross-validation plots, note that
8 the uncertainty in the previous model is propagated through, to
9 make these as realistically accurate, in terms of their predictive
10 power, as possible. I think I noted that the probability
11 distributions that I employed here for the effort CPUE and
12 proportional harvest models for gamma, hurdle gamma, beta,
13 respectively.

14
15 I should note that all of these response variables were weighted
16 using the MRIP-FES weights, and so, for effort, that is a weighted
17 sum, and then I used weighted averages for CPUE and for
18 proportional harvest.

19
20 For the effort model, this is just going to be the in-sample fit,
21 and so what you're going to see on the Y-axis are reef angler trips
22 for the Peninsula and the Panhandle. The black, or I guess gray,
23 dots are going to be the observations for angler trips in each
24 region year, and the blue is going to be the model fit, and so the
25 solid blue line is going to be the median estimate for effort in
26 any given region month, and the gray band, where you see it, is
27 going to be the 80 percent confidence interval.

28
29 I should note that these are Bayesian estimates, and these are all
30 Bayesian models, and so, essentially, I'm going to refer to either
31 Bayesian confidence interval, or credible interval, somewhat
32 interchangeably.

33
34 In terms of the in-sample fit, I was pretty happy with this,
35 particularly with the Panhandle. First, it's a little bit easier
36 to model effort in the Panhandle, because it's so cyclical, and
37 sinusoidal in nature, but, also, there aren't as many -- It doesn't
38 appear to be quite as many reef species that they're targeting in
39 the Panhandle, relative to the Peninsula, where you have a larger
40 diversity of fish, or species, in the reef fish complex that are
41 highly sought after, whereas effort in the Panhandle appears to
42 be, and this is speculation on my part, and I should note that
43 this is not anything that is data-based, but it does seem like
44 it's a little bit more predictable in the Panhandle, potentially
45 for that reason.

46
47 You know, any person who knows how to put a linear, or nonlinear,
48 model together can throw enough terms into a model and get a good

1 in-sample fit, and what we actually care about is the predictive
2 power of these models. When you withhold samples, or withhold
3 data, from the dataset you're training these models on, how well
4 will these models begin to predict out-of-sample, and that gives
5 us an idea of how reliable they are when we're trying to predict
6 things like counterfactual simulations.

7
8 With that, for each of these models, I withheld fifty data points,
9 and I wanted them to be about equal, in terms of the -- Withholding
10 them from the Panhandle and the Peninsula, but, here, what you're
11 seeing are the black dots are, again, going to be observed withheld
12 observations for each given region, in a given month, and they're
13 basically ordered in terms of increasing value, just so you can
14 see how the model would fit or how the model performed with respect
15 to these out-of-sample predictions at higher and higher values.

16
17 The blue, or colored, bands are going to be the posterior
18 predictive -- They're basically the model's predictions. The
19 colored dot is the median value, and the error bar is going to be
20 an 80 percent confidence interval. When the error bars are blue,
21 that indicates that the withheld value was captured by -- It was
22 captured by the 80 percent interval, and, anytime you see a red
23 interval, that is going to be a prediction that failed to capture
24 the withheld value in its 80 percent interval.

25
26 On average, if the model is performing as anticipated, essentially,
27 these out-of-sample predictions should, by their nature, account,
28 or capture, about 80 percent of the withheld samples, and that's
29 the nature of what an 80 percent credible interval, or confidence
30 interval, is, and, here -- I believe, in the Panhandle, it was 87
31 percent, and 84 percent in the Peninsula, and so, if anything, the
32 model was a little bit underconfident, which is good to see, and
33 so so-far-so-good.

34
35 With respect to the CPUE model, this is the in-sample fit, ranging
36 from 2004 all the way up to 2023, and these are just going to be
37 monthly estimates of CPUE, and, in addition, you have the model's
38 median estimate, and those 80 percent confidence intervals, and,
39 again, I was reasonably pleased with the in-sample fit here. It
40 seemed to miss in a few places earlier on, but it generally tracked
41 with the oscillations and the seasonal patterns in CPUE in both of
42 these different regions.

43
44 In addition, we also wanted to get an idea of what the out-of-
45 sample predictive power of this model was, and keep in mind that
46 uncertainty in effort is propagated through this CPUE model, and,
47 essentially, here is the out-of-sample predictions.

48

1 It did a little bit worse than the effort model, where essentially
2 I believe it was 84 and 80 percent of withheld values were captured
3 within the respective nominal 80 percent credible intervals, but,
4 still, it seemed to be performing fairly well, and so the out-of-
5 sample predictions indicated that both of these first two models
6 were reliable in tracking essentially the time series patterns
7 that we observed within the dataset and had reasonably high
8 predictive power.

9
10 That brings me to the proportional harvest model, which is,
11 unfortunately, quite a bit messier. These estimates are going to
12 be the average proportion of gag harvested in the time series, and
13 the main difference here is that, whereas the black dots still
14 refer to observed values, the size of the dot now is going to give
15 you an indication of how many interviews in that region month had
16 a positive number of interviewers specify a gag catch.

17
18 Essentially, in the earlier part of the time series, especially in
19 the Panhandle, note that the dots are a lot larger, and that
20 corresponds to higher numbers of interviewees signifying they
21 caught at least one gag. Well, as the gag population has tended
22 to go down, particularly in the Panhandle, we get fewer and fewer
23 interviewees that actually have indicated they caught a gag in the
24 first place, leading to more and more erratic estimates.

25
26 I'm not going to look anyone in the face and say that this is the
27 best model that I've ever built. Especially in the Panhandle, the
28 80 percent credible intervals span almost the entire probability
29 space, and, for this particular quantity, I've tried binomial
30 regression models, a zero-inflated model, and, most recently, a
31 harvest per unit effort model, that seems to be predicting a little
32 bit better, but for now -- The only reason that I didn't produce
33 the harvest per unit effort model was that I finished analyzing
34 it, I believe, earlier in the week, last week, and I just didn't
35 have time to put it together.

36
37 However, in the Peninsula, it does do a little bit better, and
38 note that some of these gaps in data points are going to refer to
39 those withheld estimates that I used for the cross-validation
40 procedure, and, while it does tend to do a little bit better
41 earlier in the time series, again, as we begin to have lower and
42 lower gag populations, the estimates tend to get a little bit more
43 erratic.

44
45 One thing that I did note, that was slightly interesting, was these
46 dips in the CPUE, or the number of animals harvested, or the
47 proportion of animals harvested, in August, September, and
48 October, and this was seen in both the MRIP-FES dataset, and I've

1 also been working a little bit with the SRFs dataset as well, and
2 we get similar dips, and the best -- From what I understand,
3 essentially, this might be changes in the size frequency
4 composition of gag that anglers might be encountering as a result
5 of some of those -- That juvenile emigration that occurs after the
6 first cold snap in the fall.

7
8 However, because this phenomenon seems to be very hard, or
9 inconsistent, because cold snaps can occur in numerous time points,
10 or the first cold snap can occur at numerous time points in that
11 fall period, this was not something that the model was able to
12 pick up very reliably, at least within the peninsula, and I don't
13 really see it occur in the Panhandle at all, but that might just
14 be because of how noisy the data was. With respect to the out-
15 of-sample cross-validation here, again, this is not the best model
16 that I've ever designed.

17
18 **MR. RINDONE:** Challen, can I interrupt? Can you go back one slide?

19
20 **DR. HYMAN:** Absolutely.

21
22 **MR. RINDONE:** Can you mention again what you were just saying about
23 when the juveniles move after the first cold snap?

24
25 **DR. HYMAN:** Yes, and so this is just a hypothesis that I had, but,
26 essentially, there's a slight dip in the proportion of harvest, or
27 the proportion of animals harvested, when the season was open,
28 and, obviously, when the season is closed, nothing is being
29 harvested, and my thinking was that, essentially, as juveniles are
30 emigrating from these seagrass meadows in early fall, that's going
31 to be a higher number of undersized individuals that anglers might
32 be encountering, and that would lead to a potentially lower number,
33 or a smaller proportion, of animals harvested. It's just a
34 hypothesis, and, again, the data are noisy, and inconsistent, and
35 it was just one thing that I had noted that might be slightly
36 interesting.

37
38 **MR. RINDONE:** So, when I'm -- This is just to help me understand
39 what I'm looking at here, and so, when I'm looking at these data
40 for Peninsular Florida, specifically in the expansion box that you
41 have here, I'm assuming that the first peak is essentially
42 corresponding with the month of June, and the June 1 opening of
43 the fishing season, and then July, August, September, October,
44 something to that effect, I mean, and so like as it's wearing on,
45 and so, I mean, we see that in the landings also, but, as far as
46 the length compositions that have come out of that, the lengths
47 tend to be a little bit higher in June, but they're not so
48 disparate, at least for the private recreational mode.

1
2 The length comps will be a little bit larger in June than they
3 will later in the season, but, when you have that dip, that also
4 corresponds to the hottest months, and so I don't know that the
5 amount of discards that are observed is that materially different
6 though between the opening of the season and larger on in the
7 season.

8
9 Like, if there's a bunch of undersized fish that are being
10 discarded, like in October, or were being discarded in October and
11 November, both from what I remember from SEDAR 72 and from personal
12 fishing experience, and I don't know, and I just -- I don't know
13 if I am completely onboard with the hypothesis, and that's all.

14
15 **DR. HYMAN:** It was just a hypothesis, and it's not something that
16 I'm going to -- It's not the hill that I want to die on, and it's
17 not something that I want to defend, but it was something that I
18 noted might be interesting, and I was trying to figure out why I
19 saw that consistent dip, even after accounting for CPUE, and so
20 I'm not -- I'm still new to this fishery, and I will not pretend
21 to -- That this deterministically answers that question one way or
22 another, but that was just something that I thought was
23 interesting, and that was one potential reason why, but, if that
24 is not supported by anecdotal evidence, or the other pieces of
25 information in the data, I'm not going to fight you on that at
26 all.

27
28 **MR. RINDONE:** I think that dip is probably most likely related to
29 temperature, and, at the beginning of the season especially, you
30 have folks that are already running out deep for red snapper, red
31 grouper, other species, and so they're willing to get into, you
32 know, thirty-plus meters of water anyway, and the gag harvest
33 that's going to be in that area is going to be, you know,
34 individuals that are a little bit larger than those that would be
35 around, you know, ten or twenty meters, obviously, and, the deeper
36 you go, obviously, the higher the probability would be that you
37 could encounter a male, and most of the harvest in the fall tends
38 to be near to shore, because, as that temperature drops -- This is
39 what the fishermen were saying, that, as that temperature drops,
40 the bit nearshore tends to pick up substantially, but you can find
41 those fish near-to-shore even in the summertime.

42
43 Tag data shows those three, four, five-year-old fish will stay
44 around the same general area, and even the same reef, for extended
45 periods of time, and so I think Angela's work only showed a couple
46 of fish moving off, at about eight years old, I think is what it
47 was, and so I think temperature might be a big driver there.

48

1 **VICE CHAIRMAN NANCE:** We have a couple more questions.
2
3 **DR. HYMAN:** Absolutely.
4
5 **VICE CHAIRMAN NANCE:** Luiz.
6
7 **DR. BARBIERI:** Thank you, Challen, and great presentation, and
8 this is not really a question, and it's just a -- You are
9 brainstorming here about what this might be, right, and trying to
10 read the tea leaves, so to speak, on where --
11
12 **DR. HYMAN:** Noisy tea leaves.
13
14 **DR. BARBIERI:** So I'm wondering, you know, the zoom-in there,
15 right, if that's representative of some of the pattern that was
16 detected and if this could mean that you had an availability of
17 fish at the beginning of the season, right, in June, and that,
18 progressively, especially with the overlap of red snapper, you
19 deplete a little bit, right, of what's available there, but then,
20 as you get a little into the fall, you know, late summer or early
21 fall, because you have that spike in catchability that seems to
22 happen, right, you're actually catching more, and so you have this
23 additional bump in harvest, right, that happens because that of
24 that little bit of spike in catchability, and could that be it, or
25 it was just completely adjusted for catchability as well?
26
27 **DR. HYMAN:** No, and that absolutely could be plausible, as far as
28 from what I know. Again, this is -- I've only been working with
29 the MRIP dataset, and so there are -- I'm going to be the first to
30 admit that there are aspects of the biology and ecology of the
31 species, and the angler dynamics, that I am not fully -- Still
32 fully aware of, or understand, and, again, it's just a hypothesis,
33 and that seems like it's more plausible, and so I totally agree.
34
35 **VICE CHAIRMAN NANCE:** A follow-up, Luiz?
36
37 **DR. BARBIERI:** Just a quick follow-up, and absolutely. I mean,
38 all of us will interpret this a different way, right, based on our
39 personal knowledge and how we interpret things, but it's nice to
40 see this being picked up by the model, right, that you've actually
41 been able to get the data to show it, and then the model, the
42 estimation model there, is actually picking up the same pattern,
43 or very similar.
44
45 **DR. HYMAN:** Yes, but I will note with a considerable amount of
46 uncertainty, and so that -- Again, the dataset, as the population
47 dropped off, got noisier and noisier. I could have included
48 observation uncertainty in these models, but, even then, the

1 observation uncertainty was so high that any states-based
2 framework would have probably blown up. In terms of the -- But
3 yes, and thank you, guys, for both pointing those things out.
4

5 **VICE CHAIRMAN NANCE:** Jason had a question.
6

7 **DR. HYMAN:** Absolutely.
8

9 **MR. ADRIANCE:** Thanks. Could you back up? I don't know if this
10 is me just trying to find a pattern that is not necessarily there,
11 but those dips, those flat dips, seem to be very consistent
12 beginning in 2013, and I can't remember my MRIP milestones at the
13 moment, and was there something that occurred with the survey that
14 may be influencing that?
15

16 **MR. RINDONE:** The APAIS expansion. Prior to that, APAIS was -- I
17 forget at what point in the early afternoon the sampling was
18 stopping, and then the program expanded to continue sampling into
19 I think up to like 8:00 p.m., or something like that, like into
20 the early evening hours, and so the time period in which catch
21 could be recorded was expanded considerably, and it did a better
22 job, at that point, of being able to capture harvest, especially
23 from areas that are further offshore, because, you know, if you're
24 going sixty miles, you're probably not going to be back by lunch.
25

26 **VICE CHAIRMAN NANCE:** Thank you, Ryan. Ralph.
27

28 **MR. TOWNSEND:** Just a notational question, and can you define A,
29 B1, and B2? I think I know what they are, but I thought I was
30 ask, to make sure that I wasn't misinterpreting them. It's on
31 page 7, I think it is, of your presentation.
32

33 **DR. HYMAN:** Yes, and I'm sorry that I didn't say it specifically.
34 I believe that A refers to observed harvest, B1 refers to
35 unobserved harvest, and B2 are the animals that are reported to be
36 released, and so A and B1 are going to be like harvest in general,
37 observed and unobserved, and then B2 are going to be your discards.
38

39 **MR. RINDONE:** So B1 is your observed dead discards.
40

41 **DR. HYMAN:** Thank you.
42

43 **MR. RINDONE:** A1 is your directed harvest, the fish that are
44 retained, and B1 is your observed dead discards, and so a fish
45 that's let go, but it's let go and it's observed to be dead, you
46 know, floating on the surface or something like that, and B2 are
47 your live discards, and so, when we're applying a discard mortality
48 rate, that's applied to that B2 fraction, but that's also a

1 considerably uncertain component of the catch.

2

3 **VICE CHAIRMAN NANCE:** Thank you. Jack, please.

4

5 **DR. ISAACS:** Well, I was really heartened to see the inclusion of
6 economic terms in your effort model, by the way, and that's
7 something that's often overlooked, and you did a pretty thorough
8 job here. You included a price variable, an income variable, and
9 this is a normal good, and you would expect it to be positively
10 related to income, and a population variable too, in license sales,
11 and so it's pretty thorough there. Your license sales, did that
12 include non-resident licenses too? Do you know, or --

13

14 **DR. HYMAN:** No, not to the best of my knowledge. That data is
15 very difficult to come by, and I had a lot of -- I would like to
16 have included that term specifically, but I had a very hard time
17 finding information on license sales that was out-of-state.
18 Otherwise, I would have included it.

19

20 **DR. ISAACS:** Very good, and, of course, it's one thing too with
21 Florida, that I would really like to see in your results too, to
22 see which of these variables were significant, because a state
23 like Florida, with a lot of tourism and out-of-state visitors, the
24 Florida median income may not be as relevant as you would like it
25 to be, if you include -- If your visitors included a lot of people
26 from other states, but the selection of terms -- I appreciate what
27 you're doing there, in terms of reflecting the economics.

28

29 **VICE CHAIRMAN NANCE:** Thank you.

30

31 **DR. HYMAN:** Thank you. I'm really happy to hear that. Okay.

32

33 **VICE CHAIRMAN NANCE:** We can continue. Yes, go ahead.

34

35 **DR. HYMAN:** All right, and so, again, in terms of the out-of-
36 sample cross-validation, and, again, I'm not terribly proud of
37 this model. It was the best that I could do at the time, and I
38 think we've got one that performs a little bit better now, and,
39 even though it's successfully capturing the right number of
40 withheld data points within the predictive intervals, I mean, in
41 some cases for the Panhandle, the predictive intervals range almost
42 the entire probability space, and so, again, I will not pretend
43 that this is a terribly-great model.

44

45 What I will add is that, in most of these instances, where the
46 confidence intervals are quite substantial, that corresponds to
47 very low catch values, and so, when we're actually trying to
48 recreate total harvest, essentially, the number of -- Essentially,

1 if you're multiplying an uncertain proportion by a very, very low
2 number, you still have relatively high accuracy, because the number
3 won't change too much, but, again, that's sort of grasping at
4 straws.

5
6 It does tend to do a little bit better in the Peninsula, and notice
7 there's a difference in scale. Whereas the Panhandle goes from
8 zero to one, the Peninsula only goes to zero to 0.6, but, again,
9 in some of these instances, particularly when there are much
10 higher, or relatively higher, proportions of gag harvested in the
11 Peninsula, the confidence interval is still very, very wide, and
12 so it's something I'm actively working on to improve.

13
14 In terms of the simulation conditions, essentially, what I did
15 here was I wanted to simulate, or hold as many variables as I could
16 constant, and only manipulate the temporal harvest restrictions,
17 to see what all would happen, and so, in terms of constants, for
18 all of the CPUE variables, and that's going to be gag, red grouper,
19 and red snapper, those are going to be held at their 2023 values,
20 based on the MRIP-FES dataset.

21
22 In terms of the seasonal and weather patterns, like sea surface
23 temperature, and, by the way, Ryan, that was a very strong
24 predictor of gag CPUE, and so that's not terribly surprising, but
25 these were held at the monthly average in each region throughout
26 the time series, and I figured that an average might be decent, in
27 order to project what might happen in the future.

28
29 Then, in terms of the economic variables that were just mentioned
30 earlier, those were held at 2023 values, because, obviously, 2024
31 values have not been published yet. Those data have not been
32 completed.

33
34 Then, in terms of the red snapper season, which was something that
35 was included in all of the models, that was fixed at the newly-
36 released 2024 season, or I guess not newly-released anymore, but
37 this included both the season as it was initially announced, as
38 well as the reopening dates in the fall, and so what was taken
39 into account, and then, finally, in terms of discard mortality,
40 this was very difficult to tease apart, based on the literature.

41
42 There were very few papers on commercial or recreational gag
43 discard mortality. The two that I found that seemed most reliable
44 were Beverly Sauls' 2014 paper on recreational gag discard
45 mortality and then Jeff Pulver's commercial dead discard
46 mortality, and I think he published that in 2017.

47
48 Both of these papers indicated that discard mortality varied

1 seasonally, likely due to fluctuations in temperature. However,
2 neither of those papers were -- It was not terribly easy to
3 disentangle what the magnitude of that temperature fluctuation, or
4 seasonal fluctuation, in discard mortality was, and that's not a
5 dig on them, and that was because those papers were looking at
6 different -- They were focused on different aspects of discard
7 mortality, like depth and size, and so they wanted to account for
8 seasonal changes, but they weren't necessarily concerned about
9 them from the perspective of someone who is modeling them later
10 on.

11
12 I did the best that I could here, which was I essentially made
13 discard mortality a function of sea surface temperature, and I
14 fixed it to a 15 percent average, based on Bev Sauls' 2014 paper,
15 and so this is essentially what it ended up looking like in the
16 Panhandle and the Peninsula, ranging from I believe 2 percent to
17 25 percent in the Panhandle and from about 5 percent to just under
18 30 percent in the Peninsula.

19
20 Before anyone tells me that these might not be -- These magnitudes
21 might be fairly large, I agree, and what was interesting was that
22 I also performed quite a bit of sensitivity analysis to this curve,
23 and one of the things that I found was that the results were not
24 terribly sensitive to this discard mortality curve, and I will
25 show you why in just a few slides, but, for now, what I would like
26 you guys to know is that, unless you crank this to something
27 extremely unrealistic, like 50 percent mortality in the hottest
28 months, it doesn't actually change the conclusions from the
29 simulations all that much, which was something that I thought was
30 quite interesting.

31
32 In terms of what I actually manipulated, I looked at three
33 different season start dates, one June 1, one September 1, and
34 then I tried one November 1. These were based off of the -- The
35 first two were based off of Amendment 56's different proposed
36 season start dates, and I just also wanted to look at what would
37 happen if we started the season a little bit later in the year,
38 closer toward the start of winter.

39
40 In addition, I did two different season durations, a one and a
41 two-month season, just to model what might happen as we restrict
42 the gag season more and more, if ACLs, or if catch limits,
43 essentially get exceeded in the recreational fishery, like what
44 happened in 2023.

45
46 **VICE CHAIRMAN NANCE:** We have one question.

47
48 **DR. HYMAN:** Absolutely.

1
2 **VICE CHAIRMAN NANCE:** John, please.
3
4 **DR. FROESCHKE:** I guess maybe I missed this, but this function is
5 just a function of -- This curve is just a function of sea surface
6 temperature, and there's no depth?
7
8 **DR. HYMAN:** There is no depth component. I didn't have depth from
9 the MRIP-FES dataset, for like where they were discarding these
10 fish, but I agree that that's something that should be taken into
11 account, and that's part of the work that we're going to be looking
12 at in the very near future.
13
14 **DR. FROESCHKE:** The reason I ask is that it would -- I would
15 predict that there's an interactive effect, in that the season --
16 The period of the curve that's the highest is also corresponding
17 to the time that the depth is the deepest, and so that curve may
18 be much differently shaped in practice.
19
20 **DR. HYMAN:** Wouldn't that amplify the curve?
21
22 **DR. FROESCHKE:** I think it would, yes, but I'm just not sure of
23 how that would -- If that were true, how that would cascade to the
24 rest of the results, and that's what I wasn't sure.
25
26 **DR. HYMAN:** I'm really glad you said that. Can you hold that
27 thought up until the second-to-last slide, because I would love
28 your thoughts on the simulation right at the end, because that
29 might be quite helpful.
30
31 **VICE CHAIRMAN NANCE:** He may not remember that long, but we'll
32 prompt him.
33
34 **DR. HYMAN:** Okay. Cool. Thanks, John. In terms of the simulation
35 framework, recall that I was using a Bayesian estimation
36 methodology, and, for people who are not familiar with Bayesian
37 methods, I understand, and, essentially, in terms of when you run
38 these models, in a Bayesian model output, instead of getting one
39 coefficient estimate, one estimate per coefficient, and some
40 related standard error, or other uncertainty value, instead what
41 you get is an array of thousands of estimates of each coefficient
42 in the model, and we refer to any one set of coefficient estimates
43 as a posterior scan, and, because we get thousands of these, it
44 actually makes the posterior inference, or like using the model
45 for things like simulations, quite nice to work with.
46
47 Essentially, what I did here was, to propagate uncertainty in
48 effort through CPUE, and then uncertainty in CPUE in the proportion

1 of gag harvested, was, for each one of these iterations, and so
2 from one to a thousand, first, I would simulate effort based on
3 the conditions in that counterfactual data frame that I referenced
4 earlier with both the fixed and the manipulated variable
5 coefficients.

6
7 Once I had that effort estimate, I then simulated a gag CPUE
8 estimate using that conditional data frame, and then also plugging
9 in the estimates for effort as a predictor in the data frame, when
10 I was simulating gag CPUE, and so the uncertainty, from iteration
11 to iteration, to effort was propagated into the estimates for gag
12 CPUE, and then the same thing happened with proportional harvest,
13 where, each time I would estimate, or simulate, a set of estimates
14 for proportional harvest, I included uncertainty in CPUE, by
15 including the variation in CPUE as a predictor in changing that
16 iteratively as I went through this -- As I went through iteration
17 to iteration, from one to a thousand. This is how uncertainty was
18 propagated through both in the out-of-sample cross-validation
19 procedure as well as in the simulation methodology.

20
21 In terms of the estimated quantities, once I had the simulations
22 run for effort, CPUE, and proportion of gag harvested, essentially,
23 I could get quantities, like catch, harvest, and the number of
24 animals discarded, and so, for each posterior scan, because I did
25 this also iteratively, essentially what I would do was multiply
26 effort and CPUE together, to get gag catch, and I multiplied that
27 by the proportion of animals harvested, to get a total harvest and
28 a discard variable, or value, and then, finally, to get dead
29 discards, I just multiplied discards by a seasonal discard
30 mortality estimate, and so that's going to be that discard
31 mortality function. This is essentially how I obtained some of
32 the values that I actually wanted to look into.

33
34 For the actual simulation, I'm going to just present the simulation
35 results for angler effort, harvest, and dead discards, and I'm
36 also going to be showing total removals, which is just the sum of
37 harvest and dead discards, under the different simulation
38 conditions.

39
40 Right now, what I'm going to show you here are the monthly
41 estimates, and so, when we add across regions, the monthly
42 estimates for the one-month seasons for June, September, and
43 November start dates, and June will always be in red, and September
44 will always be the yellowish color, and November will always be
45 blue, and they're always going to be in the same place.

46
47 This is the total number of angler trips, and I will give everyone
48 three guesses to figure out when red snapper season is, and it's

1 the -- Right in June and July, you get this huge spike, and this
2 was mostly from the Panhandle, in response to the snapper season,
3 but what you also see is this little spike that kind of moves
4 along, based on when the season start date is, and that's going to
5 be the spike in effort that was detected from the effort model
6 when the gag season is actually open, and so anglers are shifting
7 some of their behavior, primarily in the Peninsula, in response to
8 when gag grouper are available to be retained and harvested.

9
10 In terms of actual harvest, you get spikes exactly when the season
11 is open, which, again, is not surprising, and they're not going to
12 have -- The proportion of animals harvested will be zero anytime
13 -- Or is expected to be zero anytime that the season is not open,
14 and, in addition, what Ryan had referenced earlier about, you know,
15 gag not biting in as high of a frequency when the waters are
16 hotter, was also picked up by the model, and so, as you can see,
17 the harvest, when the season is open in September, is a little bit
18 lower than when the waters are a little bit cooler in November and
19 June.

20
21 In terms of dead discards, you also get the spike, and this is
22 essentially because, when the season was open, anglers did indeed
23 seem to be targeting gag in higher frequencies, and so the catch
24 rates were a little bit higher when the season was open, and that
25 translated to both higher harvest and higher discards, and, as a
26 result, higher dead discards as well.

27
28 However, it's nice to see monthly estimates, to see what the time
29 series looks like, but, actually, what managers probably want is
30 a cumulative estimate, what happens in total to dead discards,
31 what happens in total to the total number of gag harvested as you
32 are changing these differences in start dates.

33
34 For that, I was really interested in the cumulative estimates, and
35 so, here, all I was doing was, first, for each individual
36 iteration, for any given quantity involving discards, you simply
37 first add up across regions, and that's sort of what I had already
38 just showed you, where you had essentially a single number for
39 each month throughout the Gulf coast of Florida, and then, to get
40 the cumulative estimate for each month, essentially, you just add
41 up all the values preceding that month.

42
43 For example, the cumulative estimate for discards in February is
44 going to be the sum of January and February for those monthly
45 iterations, and the cumulative sum for March is just going to be
46 the sum of discards for January, February, and March, et cetera,
47 and that gives you an idea of the cumulative value, whereby, by
48 December, that's just the total number of discards that are

1 estimated for that specific simulation condition. In terms of the
2 cumulative estimates, what you're going to see on the top are dead
3 discards.

4
5 **MR. RINDONE:** We were just validating in our own minds, and is
6 this numbers of fish?

7
8 **DR. HYMAN:** Yes, these are all numbers of fish, because I don't
9 have weight for discards, and, also, don't put any stock into these
10 numbers, and it was just to show you what I did, and not necessarily
11 -- These weren't numbers that were any sort of data. It was just
12 to show you the methodology and the procedure. Sorry. I should
13 have mentioned that.

14
15 **MR. RINDONE:** I will let my heartrate go back down.

16
17 **DR. HYMAN:** Sorry about that. No, and I was just adding -- I
18 wanted to show you what I did, and please do not take into account
19 any of these numbers. Those are not real. It's just to show you
20 what I did. Sorry. It's just the methodology and not the actual
21 values.

22
23 **MR. RINDONE:** This might be something that you can think about as
24 you continue to work on this sometime, because something that we've
25 discussed for some other species, species like yellowtail snapper,
26 mangrove snapper, and some others, is the probability that some of
27 our discard estimates aren't accounting for double counting, and
28 so the same fish being discarded more than once within a calendar
29 year, or even in a fishing season, and I think Dr. Froeschke, in
30 the back, was talking about something, or working on something,
31 with mangos at some point.

32
33 I know that there is a couple of guys that are looking at the same
34 thing for yellowtail down in the Keys right now, but, especially
35 in the winter months, when you have more concentrated effort nearer
36 to shore, it's entirely plausible that the same gag could be caught
37 and released more than once in the same year.

38
39 **DR. HYMAN:** That is a really good point. That is something that
40 I had not considered at all. Thank you. I'm not sure how to
41 account for that directly, but I would love to --

42
43 **MR. RINDONE:** At this point, I don't think we can, I mean, without
44 some sort of, you know, repeated release estimate, from a mark-
45 recapture study or something like that, and I don't know how you
46 would, but, you know, if anyone wants to apply for funding for
47 something like that, wouldn't that be interesting?

48

1 **DR. HYMAN:** Cool, and so, going to the cumulative estimates, and
2 these are actual data, the actual simulations, and not just numbers
3 I used to illustrate the methodology, and the top row is going to
4 be the cumulative estimate for dead discards. The middle row is
5 going to be the total number of animals harvested, and the bottom
6 is going to be the sum of the first two, and that's going to be
7 the total removals.

8
9 The reason that I didn't animate this one is I kind of wanted to
10 toggle back and forth between cumulative estimates for the one-
11 month and the two-month seasons. This is just going to be for the
12 one-month season, and then the next slide is going to be two
13 months, so that you can see exactly how things will change.

14
15 It looks like, and this is based on the harvest rates, that the
16 harvest rate -- Because the harvest rate in September is a little
17 bit lower than that in November and in June, you do wind up with
18 fewer animals harvested with a September 1 season. However, if
19 you're looking at dead discards, and you're noticing there's not
20 a whole lot of change, that's kind of the point.

21
22 I was pretty floored by this finding, and I was expecting there to
23 be some sort of magical season, where you could optimize the
24 fishery to maximize the number of animals harvested and minimize
25 dead discards, and it seems like, in every simulation that I ran,
26 and I've ran a lot of different ones, and did a lot of validation
27 before I brought these models to you guys today, and, in almost
28 every simulation, the cumulative dead discards don't really
29 change, depending on when you set the start date, and that's one
30 finding that I'm quite confident in.

31
32 No matter how I've up the methodology, no matter how I've changed,
33 or tinkered, with the models, that result always seems to come
34 through, and I thought that was quite interesting.

35
36 Moving from the one-month to the two-month seasons, and I'm just
37 going to kind of toggle back and forth, so you can see, and I'm
38 focusing specifically on the number of animals harvested here,
39 but, while the number of gag harvested does increase as you shift
40 from a one-month to a two-month season, the magnitude, or the
41 percent, of that increase varies depending on what season and start
42 date you're looking at.

43
44 Moving from a one-month to a two-month season in June, you go from
45 around 135,000 animals, median, extracted to around 155,000,
46 although there is some substantial uncertainty in that confidence
47 interval estimate.

1 However, when you're starting in September, you're going from
2 around 60,000 animals removed, for a one-month season in September,
3 to just over 100,000, if you move it to a two-month season, and
4 what was kind of nice to see was that around 100,000 gag removed
5 was almost exactly what was removed in 2023, and so it was nice to
6 see that this was lining up with the MRIP-FES estimates.

7
8 **VICE CHAIRMAN NANCE:** Why does the confidence interval change so
9 much?

10
11 **DR. HYMAN:** From one to the other?

12
13 **VICE CHAIRMAN NANCE:** Yes.

14
15 **DR. HYMAN:** The confidence interval changes substantially in June,
16 because of the -- Essentially, the concentration effort, for the
17 length of the red snapper season, particularly in the Panhandle,
18 is both very strong and quite uncertain, and so, when you have a
19 very narrow season, it -- The model is fairly uncertain, in terms
20 of effort, and, because that is propagated through all of the other
21 models, it leads to relatively higher confidence -- Relatively
22 higher uncertainty in the total number of animals removed.

23
24 Then, finally, moving from 135,000 animals to 155,000 animals I
25 think is like a 20 percent increase, where it's closer to a 70
26 percent increase in September, as you move from a one to a two-
27 month season, and then moving from a one-month to a two-month
28 season in November shifts it from around 125,000 to almost 240,000
29 gag removed, on average, and so the percent increase, as you move
30 from a June 1 to a September 1 to a November 1 season, and you
31 change it from a one to a two-month season, and so you increase
32 the length, the magnitude of that increase will go up as you move
33 it later and later in the year.

34
35 I think a lot of that is due the nature of the interactions between,
36 or potential interactions between, the nature of the catch rate as
37 well as the season concentration effects that we included in the
38 effort and the CPUE models.

39
40 I was really puzzled as to why there was no real change, or no
41 apparent change, in cumulative dead discards as you move the season
42 start dates, and, again, I was really expecting there to be
43 something, a magical season, where, again, you could optimize
44 harvest and minimize dead discards, and I was really puzzled as to
45 why, but, when you overlay some of these simulations on top of one
46 another, and this is just the one-month seasons for June, September
47 1, and November, and this is catch by the way, you can begin to
48 understand why.

1
2 The red is going to correspond to a June start date, yellow is
3 going to correspond to September, and blue is going to correspond
4 to the November start date, and, where the models overlap, you can
5 just picture that as essentially what the model thinks that catch
6 will be when the season is not open, essentially.

7
8 The dashed line that you see in this plot is essentially me
9 overlaying that temperature-induced mortality curve, essentially
10 just scaled up so that you can fit it on the plot, and what you
11 will notice is that, essentially, the changes in the catch rate
12 will affect both harvest and discards, when the season is open.

13
14 However, the catch rate is related to the sea surface temperature,
15 and so the catch rate is almost a mirror image of the mortality
16 curve that you see here, and so essentially what is happening is,
17 because the proportion of gag harvested is relatively insensitive
18 to seasonality, once the season is actually open, the seasonal
19 changes in discard mortality appear to be offset by changes in the
20 catch rate, and so, even though you're catching a little bit fewer
21 gag, in total, in September versus June or November, those fewer
22 gag, according -- With this mortality curve, it appears to give
23 you a larger number of dead discards, and so, John, this is where
24 I'm pulling you back in here.

25
26 If the discard mortality curve is changed, it changes to where it
27 might be potentially more concentrated in a given point of the
28 year, that might change the simulation a little bit, and I would
29 be interested to hear what a more realistic discard mortality curve
30 would look like, because that might actually change the findings.

31
32 **DR. FROESCHKE:** I guess I would just be curious -- This assumes
33 that the average depth distribution of the animals is the same in
34 June or September, and I don't know that that's true or it isn't
35 true.

36
37 **DR. HYMAN:** I don't personally think it's true. Anecdotal evidence
38 indicates that they would move deeper, in response to warmer
39 surface waters, but, without any -- It was difficult to get an
40 idea of what depth recreational anglers were catching these animals
41 at from the FES dataset. Ryan.

42
43 **MR. RINDONE:** I would kind of be interested to look at weights, if
44 we could look at weights, by month specifically, and I wonder how
45 much that might play into it. My own personal experience would
46 tell you that the weight-to-length ratio of fish that I would catch
47 in say August and September -- Like those fish are generally
48 skinnier, lighter fish. You know, they've -- They're in a period

1 where they're not feeding as much, because the water is hot, and
2 not that they're not feeding at all, but they're generally not
3 feeding as much, and the water is hot, but you move into like
4 October, November, December, and those fish start to fatten up a
5 little bit ahead of the spawn, both just from -- Especially as you
6 get to like December of January.

7
8 You know, gonad weight starts to become a factor for the females,
9 but, I mean, they're generally fully-bellied fish, pretty
10 reliably, but, in the summer, you know, when you gut fish, you get
11 a lot more empty stomachs than you do full stomachs, and so -- I
12 don't know, and it would be interesting to look at weights, like
13 weight composition by month, if that's something that we could do,
14 and I don't know how much of those data we actually have.

15
16 **DR. HYMAN:** In the recreational dataset -- Because I tried that.
17 I thought of -- I wanted to see if that would work, and one of the
18 -- You don't get a -- You don't get a noticeable trend, and I
19 wonder if that's because of high-grading. You don't know the
20 weight of the animal that they're discarding, and you only know
21 the weight of the animal that they brought back to shore, and I
22 don't know how to get around that, other than to use a fisheries-
23 independent survey, or maybe leverage observer data.

24
25 **MR. RINDONE:** The observer data is so sparse, and I wonder if you
26 would be able to get enough out of just the harvest data. I mean,
27 not at this point anymore, but maybe some of the historical
28 information. I don't know.

29
30 **VICE CHAIRMAN NANCE:** It does have depth though. Jeff's paper,
31 while he was looking at one specific thing, and, you know, I know
32 depth is in there, and so I'm not sure how much data there is, and
33 I'm not sure if that dataset is available.

34
35 **MR. RINDONE:** Well, to your original question to John, about like,
36 you know, what would you pick for a different discard mortality
37 rate for the recreational fleet, and so 12 percent is what was
38 used in SEDAR 72, as I'm sure you saw, and you're adding a discrete
39 temperature effect here, and so it makes sense that you would have
40 a slightly different estimate compared to what was used there.

41
42 As far as what is the likelihood of catching an undersized fish in
43 June, and, if we're thinking about it from a regulatory discards
44 due to management bias related to minimum size limit, and we're
45 thinking that, you know, the majority of our June anglers are
46 probably fishing offshore for a combination of reef fish species,
47 and I guess I would think that the odds of them discarding
48 undersized fish would be a little bit less if they're fishing in

1 deeper waters.

2

3 Then spearfishermen, you would hope, you know, that are fishing
4 closer to shore anyway, because there's a fair amount of that that
5 happens in the beginning of like when the season opens, they ought
6 not be shooting undersized fish, and so, when you get into November
7 though, I mean, I think you do run into some undersized fish,
8 because you're fishing closer to shore, and so, just by a function
9 of your proximity to juvenile habitat, it's possible to catch some
10 twenty-two or twenty-three inchers, absolutely.

11

12 The deeper you go, generally speaking, for most reef fish species,
13 the bigger the fish get, and so it would be cool to loop in depth
14 there as well. I know depth was a consideration of some of the
15 analyses in SEDAR 72.

16

17 **VICE CHAIRMAN NANCE:** Luiz, please.

18

19 **DR. BARBIERI:** Just a quick question, Challen, just to make sure
20 that I understand this correct. By catch here, do you mean total
21 removals?

22

23 **DR. HYMAN:** Total removals, total number of animals caught or
24 discarded.

25

26 **DR. BARBIERI:** A plus B1. I see. Okay.

27

28 **VICE CHAIRMAN NANCE:** John, to that point, and then Ralph.

29

30 **DR. FROESCHKE:** Well, just thinking about this, a long time ago,
31 with Amendment 32, we tried to do this spatially-based, and just
32 gag discard mortality as a function of depth, and it seems, to me,
33 if you're looking at a two-factor model, the depth would explain
34 the vast majority of the variance, rather than the temperature,
35 and I just can't square my mind how that overlays on top of this.

36

37 **VICE CHAIRMAN NANCE:** Ralph, please.

38

39 **MR. TOWNSEND:** The first thing that I wanted to say is I think the
40 idea of trying to figure out behavioral response to regulation is
41 absolutely key to moving ahead, and so this kind of research I
42 think is really important to figuring out how regulation will
43 really work.

44

45 I did have a couple of clarifying questions. One was which fleet
46 is being modeled here? Is it basically only private, because it's
47 -- The data is from what's intercepted at public launches, and so
48 it's basically only private boats, and it doesn't catch headboats

1 and charter boats, and is that correct?

2
3 **DR. HYMAN:** I did include charter and private. I did not -- I
4 don't think there are many headboats that encounter or catch gag
5 in any high frequency, and it was only the recreational fleet, and
6 I combined charter and private.

7
8 **MR. TOWNSEND:** But the charter -- Are the charter boats also
9 leaving from the public launches, or are they leaving from private
10 -- My question is, is it a selection of part of the fleet based on
11 where the data is coming from? How much of the catch is being
12 modeled by this, is my question.

13
14 **DR. HYMAN:** Ryan, did you want to --

15
16 **MR. RINDONE:** I mean, I can take it if you would like, and so some
17 of the for-hire fleet will leave from private access points, and
18 like some of them launch from their own backyards. They have
19 clients meet them at their homes, and they leave directly from
20 their own backyards, and some of them meet clients at public
21 marinas.

22
23 Private fishermen, obviously, are leaving from a combination of
24 places, including public and private access points, and so the
25 APAIS data -- The Access Point Angler Intercept Survey is the part
26 of the Marine Recreational Information Program survey that
27 specifically looks at catch, and not effort, and so that's only
28 going to be able to function in areas where those surveys can't
29 have access, and some private marinas will allow those staff in to
30 conduct the survey, and some won't.

31
32 By and large, most people don't let people they don't know in their
33 backyards, and so the private angling effort from private access
34 points is going to go largely unaccounted for there. The
35 representativeness of the data in total -- You know, it's not
36 unrepresentative, but it's not comprehensively representative.

37
38 For the headboat situation, there are some headboats that do pretty
39 well on gag when the season is open, and I'm thinking of people
40 that operate like mostly right out of here, Johns Pass and Madeira
41 Beach, and there's some headboats that can really get into gag, if
42 they choose to, but also, like you had mentioned in the beginning
43 of your presentation, if you modify your fishing tactics a little
44 bit, you can do pretty well to avoid grouper species.

45
46 I mean, it's not 100 percent, but you can reduce your grouper
47 harvest considerably by fishing off the bottom just a little bit
48 more, and you can still get into snapper pretty well, just off the

1 bottom, and so --

2

3 **MR. TOWNSEND:** But I guess my question is, is this -- Do we know
4 if there's a bias in the -- I know it's not the whole. I know
5 it's not a census, but the question is do we have a sense of how
6 much the catch it does represent, and if there's any bias in
7 whether it represents one sector, and, as you mentioned, headboats
8 have an ability to do -- Headboats, in general, have targeting
9 abilities that are probably better than other vessels, just because
10 of the nature of what they do, and so do we know anything about
11 that, and should that -- Because, as presented, it's attempting -
12 - If I just look at it as a non -- If I hadn't actually read the
13 paper, and looked at the data, I would say, oh, this represents
14 the whole fishery, and I'm looking at it and saying, well, maybe
15 it does, and maybe it doesn't, and what do we know?

16

17 **MR. RINDONE:** I don't know that we necessarily know the degree to
18 which it is not surveying private effort from private access
19 points, and so the Fishing Effort Survey, which is the effort
20 component of all of this, is sent to registered anglers in general,
21 regardless of from where they fish, whether it's private or public
22 access, but that's primarily going to be measuring the frequency
23 with which they go fishing and not -- It doesn't have anything to
24 do with, you know, what you actually caught, and so I don't -- I
25 don't know that there's a discrete way for us to be able to
26 determine that, but, Luiz, with SRFS, is there any -- I don't know
27 if there's any improvement there on that specific topic of
28 understanding the representativeness.

29

30 **DR. BARBIERI:** Not really, not that I can think of, and, Ralph,
31 just to make sure that I understood your question, are you asking
32 whether -- If the total catch, right, landings plus discards, if
33 the total catch is mostly coming from one particular sector, like
34 the private rec versus the for-hire in the recreational, and is
35 that it?

36

37 **MR. TOWNSEND:** Well, this data, this model, tells us that -- Well,
38 it tells us a couple of things, that September results in less
39 catch than June and November, and it tells us that the discard
40 pattern doesn't matter, but that's based on the sample that this
41 data was trained on, and so the question is, is the sample that
42 this data is trained on -- Because the regulations, after all,
43 apply to the entire fishery, and not just to this sample, and so
44 my question is do we know how representative the -- Because this
45 is modeling behavior, right, and it's modeling behavior of a
46 certain set of actors, those that are captured in the data, and we
47 certainly want to know behavior. The question is are we capturing
48 the behavior of a nonrepresentative 20 percent or a very

1 representative 80 percent, and do we have any sense of that?

2
3 **DR. FRAZER:** I mean, you've hit at kind of a critical issue with
4 the MRIP sampling to begin with, and I know that there are a number
5 of groups discussing it, right, particularly in Florida, because
6 there are so many private access points, and so the direct answer
7 to your question is I don't think that we have a good handle on
8 whether or not those samples are representative, either one of
9 those, or equally representative.

10
11 **DR. HYMAN:** I would note that the use of the -- The FES weights
12 are intended to correct for some of those potential biases and
13 basically allow us to weight the individual interview responses as
14 closely to what -- As closely to the population level as is
15 feasible. However, yes, there's been a number of issues raised
16 with FES weighting estimates, and that is a huge caveat.

17
18 I think, if you read the paper, then, yes, it's a giant caveat in
19 the discussion, and this is the best that we could do with the
20 available data that we had, but, yes, there are notable issues
21 with nonresponse bias.

22
23 **MR. TOWNSEND:** But the weighting factor, essentially using the
24 weights that you think are correct for the representation,
25 essentially says you think the rest of the fleet behaves the same
26 as your sample does, and so it's not the weighting factor, but
27 it's the assumption that everyone behaves the same as your sample,
28 is the question.

29
30 **DR. HYMAN:** Yes.

31
32 **MR. TOWNSEND:** The second question I had was I looked at the data
33 that you're working with, and there are a wide variety of closures,
34 in this sample, for the June and September, but, for November, it
35 looks, to me, like the only closures -- The only experience we
36 have with closures, or openings, in November are with those weekend
37 closures in red snapper, and so my question is how do you think
38 the -- Given that there's a lot of variance in November, whereas
39 there is in June and September, should we be more cautious about
40 interpreting the November data than we are the June and September
41 data?

42
43 **DR. HYMAN:** Yes, and you beat me to it, and so two things here.
44 One is that I also tried the fraction of weekends open to the red
45 snapper recreational fishery, because, one, most folks who are
46 fishing in the private rec fleet are going to be fishing on the
47 weekends anyway, and the second major caveat was that the
48 management seasons were beginning to predict outside of the data

1 that the model was trained on, and so we're essentially
2 extrapolating here, and, anytime you extrapolate, you get into
3 dangerous territory, and so, for both of those reasons, I would,
4 you know, take this with its appropriate caution, along with a
5 number of the other caveats that have been raised over the course
6 of the presentation.

7
8 I would say that one of the reasons that I just left in the fraction
9 of the month open to red snapper, instead of the fraction of
10 weekends open for the red snapper fishery, was that it didn't
11 necessarily appear to change how the model behaved, and so I
12 thought that simpler was better, if you can get away with it.
13 However, I did take a look at that, and so I was less concerned
14 with weekends, or fraction of the weekends available, for red
15 snapper, the red snapper fishery. However, predicting outside of
16 the range of some of these predictors was one of the areas that I
17 was rather concerned about.

18
19 **MR. TOWNSEND:** Can I ask if I interpreted the data correctly, or
20 the simulations correctly, that the model is saying, when they
21 season is open, for every fish they catch and keep, they're
22 discarding two to three? I was just taking the numbers of the
23 discards that you were looking at and assuming the 15 percent
24 mortality, which, again, I didn't do seasonally, and I should have
25 done that, but it's a very large -- Even when they can keep the
26 fish, it's a very large discard percentage in this fleet.

27
28 **DR. HYMAN:** Yes, and I think that's right. As long as you're
29 looking at the -- Sorry, and it took me a minute to think about
30 that in my head, but, if you're talking about the proportion of
31 gag harvested among those caught, yes, it seems like it's -- At
32 least the weighted estimates indicate that it's between 20 and 25
33 percent.

34
35 However, in certain times of year, and take this with a grain of
36 salt, because there's some considerable uncertainty later on in
37 the time series, and so the fluctuations get a little bit higher,
38 but, generally, it's between 20 and 30 percent.

39
40 **MR. RINDONE:** I think the caught-to-discarded ratio, eyeballing
41 this from SEDAR 72, is about one-to-five or one-to-six.

42
43 **DR. HYMAN:** Okay.

44
45 **VICE CHAIRMAN NANCE:** Luiz, please.

46
47 **DR. BARBIERI:** Ralph, to that point, I mean, this is why -- Which
48 that's a very important issue, right, for us to figure out, and

1 then your previous question about how representative this is, and,
2 I mean, this is the problem with these types of generalized
3 surveys, that the data -- You don't have enough specialization,
4 right, to have all the detail that you need, and so you're going
5 to have -- Especially in a multispecies fishery of this nature,
6 how do you determine who is targeting a species, versus another,
7 when they go out there and fish for X, and then angler avidity is
8 very different if people fish different numbers of times and their
9 ability to catch -- You know, catchability between anglers is very
10 different, or it can be very different.

11
12 I think that this points to all of these issues that additional
13 research, that is really focused on angler behavior, right, to
14 your previous point, would be super important to supplement these
15 types of things, to allow us to move to the next step.

16
17 **VICE CHAIRMAN NANCE:** Thank you, Luiz. Any other questions or
18 comments? I think it was a great presentation. A lot of effort.

19
20 **DR. HYMAN:** Pun intended?

21
22 **VICE CHAIRMAN NANCE:** There you go.

23
24 **DR. HYMAN:** Then I will just quickly go to the takeaways and next
25 steps and wrap it up. Thank you, guys, for listening to me for
26 what is probably well over an hour at this point, and I really
27 appreciated the feedback, the questions, the points, and I just
28 got down here from the Chesapeake Bay, and modeling blue crabs is
29 a little bit different from modeling reef fish, and a recreational
30 fishery, and so all of these comments are very, very much
31 appreciated.

32
33 In terms of the takeaways and next steps, take the word "strongly"
34 in this with a grain of salt, and I want to soften that, but
35 cumulative harvest does appear to be affected by both the season
36 start date and the season duration, and it looks like the season
37 duration increases harvest and discard rates, but not necessarily
38 in a linear or uniform fashion.

39
40 Depending on what the season start date is, the duration of the
41 season will change the magnitude of the number of animals removed,
42 and so that was one thing that I had not expected, but it was quite
43 interesting, and, yes, the degree of increase would vary by the
44 season start date.

45
46 The big takeaway though is that, you know, the position of the
47 council, and the National Marine Fisheries Service, was there
48 wasn't really enough evidence to indicate one way or another if

1 dead discards were going to be affected by when you set the gag
2 season, and all available evidence, based on this dataset and these
3 model simulations, indicate that dead discards are largely
4 insensitive to that season start date.

5
6 A bit of that is because of the hypothesized seasonal mortality
7 curve, although, if that mortality curve, or that seasonal
8 mortality, is different from the one that I used, that wave
9 function, that might change slightly. However, the general nature,
10 the higher discard mortality in the period where catchability is
11 a little bit lower, is probably still going to hold, and so, as
12 long as the discard mortality is higher when catchability is lower,
13 that's going to offset the total number of dead discards.

14
15 How exactly it would do so, I'm not sure, but, in playing around
16 with the sensitivity of the entire model, and the simulations to
17 those discard mortality curves, it did seem to indicate that it
18 was generally going to offset the number of dead discards, and so
19 the upshot here is that the available evidence suggests that
20 managers should continue to manage these seasons, at least with
21 respect to gag, with the aim of controlling harvest.

22
23 That was what you guys were already doing, and shifting from June
24 to September, in order to lengthen the season, seems like it was
25 a pretty -- It seems like it was at least not a harmful thing, in
26 terms of fishing pressure, to the recreational gag fishery. It's
27 the highly controversial take that you guys did a great job, and
28 this was hopefully reaffirming to some of the positions that you
29 guys took in 2022 and 2023.

30
31 In terms of next steps, I've been partnering a bit with FWC, to
32 use their charter observer program, to get a better understanding
33 of dead discards and discard mortality, just like what was raised
34 earlier on in this talk, and that does seem to be the greatest
35 ambiguity here, is what is the actual nature of that mortality
36 curve throughout the season.

37
38 By looking at some of the observer data in the charter fleet that
39 FWC has, you get more detailed catch information, such as the depth
40 of the gag caught throughout the season, the size of the gag caught
41 throughout the season, on average, and you can begin to get a
42 better idea of the nature of the discards, and exactly where
43 they're being caught, and extrapolate and get a better idea of
44 what the seasonal discard mortality looks like for the recreational
45 fleet, and, with that, and the size of gag caught throughout the
46 time of year.

47
48 Then, in terms of acknowledgements, I just wanted to briefly say

1 thank you to Mike Drexler, who is an author on the effort
2 manuscript, or I guess the effort paper, and, also, thank you to
3 John, wherever he ran off to, who was really helpful, especially
4 in the beginning, when I was coming down here and didn't have a
5 ton of context for this fishery, in terms of providing some of
6 that context and the nature of the recreational fleet for reef
7 fish.

8
9 Then I also want to acknowledge some of my colleagues that I've
10 been working with at FWC, Beverly Sauls, Dr. Chloe Ramsay, and
11 Tiffanie Cross, who have also been really helpful, and a delight
12 to work with, and I'm excited to continue to partner with them in
13 the future, and so, with that, again, thank you for listening to
14 me today, and I hope this was at least a helpful start into the
15 nature of how discards vary as a function of season start date and
16 season duration. Thanks.

17
18 **VICE CHAIRMAN NANCE:** Thank you very much. Tom, any questions?

19
20 **DR. FRAZER:** I think you've made a good transition from blue crabs
21 to gag. We'll get you there.

22
23 **VICE CHAIRMAN NANCE:** Invertebrates are good too though, Tom. Any
24 questions from the SSC? Will, please.

25
26 **DR. PATTERSON:** Can you put up the slide that has your one-month
27 season and then dead discards, harvest, and then total removals?
28 Your conclusion is that season -- That changing the season for gag
29 doesn't have a big effect on the discards.

30
31 **DR. HYMAN:** Cumulatively.

32
33 **DR. PATTERSON:** Cumulatively, but the uncertainty is so great in
34 your estimates that can we really say anything about differences
35 among seasons? The second thing is, you know, a big part of
36 management is not just the total removals, but also the harvest,
37 right, and I know recreational fisheries want access, but gag
38 fishermen, in my experience, want to bring home a gag, and so, in
39 that context, it seems like season does have an effect, and the
40 one measure that you can really point to is a lower harvest, and
41 not necessarily dead discards, cumulative removals, but you do see
42 lower harvest in September, the September season.

43
44 **DR. HYMAN:** Yes, and so thank you. Those are both really good
45 points. What I -- I hope I said it right in the conclusions, but
46 what I wanted to say was that the available evidence, right now,
47 does not indicate that dead discards are sensitive to the season
48 start date.

1
2 If the models get better, or if there is a better evidence to
3 indicate otherwise, then I think that those conclusions would
4 change. It's just that I couldn't see it here, and I want to be
5 -- If I wasn't very explicit about that, I do want to be explicit,
6 especially given some of the uncertainties in specifically the
7 proportional harvest model, and so, if I didn't specify that
8 explicitly, I apologize, and that's very much a good point.

9
10 In terms of the total number of animals removed, I actually think
11 that, because -- I was just looking at a one-month or a two-month
12 season, but, in reality, the council is managing -- It sets the
13 season duration based on an ACL, and so, in theory, if you're
14 trying to manage this based on the weight of gag removed, or a
15 biomass, then the season length isn't going to just be a month.
16 It's going to be up until that gets hit.

17
18 My understanding was that the shift from the June 1 to the
19 September 1 season was so that the season would be longer, given
20 a fixed catch threshold, and so that, I think, is worth pointing
21 out. The simulation was just to see what would happen with
22 different season durations, and I don't necessarily think that
23 management would follow something like this, just a one-month
24 season without paying attention to the catch quotas.

25
26 **VICE CHAIRMAN NANCE:** Tom.

27
28 **DR. FRAZER:** So I just wanted to have a conversation with Will,
29 just thinking about that, and, I mean, so I would agree with that.
30 I mean, people that are going to target gag want to bring them
31 home, for the most part, right, but, when we're thinking about
32 this particular fishery, and setting the seasons, I mean, it's not
33 just a decision that was made in isolation by the council.

34
35 I mean, we had to think about what the state is doing quite a bit
36 as well, right, and there was a preference for that nearshore late
37 fall and early winter fishery, and so, you know, we had to go there
38 a little bit. I think that you don't catch as big of a fish in
39 that nearshore area, at that time of year, and so it's kind of a
40 tradeoff, and so that's why we started to explore this a little
41 bit.

42
43 **VICE CHAIRMAN NANCE:** Thanks, Tom. Trevor, please.

44
45 **MR. MONCRIEF:** I know you got beat up with questions, but I think
46 this is an interesting one to have, and to think about, because
47 the ramifications of this fishery, and what it's kind of going
48 through, and it would be real interesting to see, in the future,

1 how the seasons play out, in comparison to kind of what we've seen
2 today, and I think it kind of highlights that, a lot of times, we
3 have to make changes, or suggest changes, or provide
4 recommendations, for the council to make decisions, with the
5 assumption that the overall system will be robust enough to react
6 to those changes.

7
8 At times, like with this fishery, it's tough to see whether that's
9 going to play out or not. If you do change it to a month, or
10 change it to a different month, is that going to have a response?
11 It's kind of tough to see until you play it out.

12
13 **VICE CHAIRMAN NANCE:** Ralph, please.

14
15 **MR. TOWNSEND:** Well, just to follow-up on Tom's and Will's points,
16 I mean, the issue of what harvesters want, what the recreational
17 harvesters want, depends on the season. Who is fishing in the
18 summer is almost certainly different from who is fishing in
19 September. There's a lot of schoolteachers that aren't fishing in
20 September, I don't think, and then, in November and December, when
21 you've probably got people coming here who aren't necessarily
22 residents fishing, you've got a different group of people.

23
24 My point being, if you're really trying to -- If you're trying to
25 think of -- If you're trying to measure the impact on harvesters,
26 you've got to recognize who is harvesting the fish, and what their
27 individual goals are, that somebody who is a meat fisher wants big
28 fish, and somebody who wants to catch a fish is in a different
29 situation, and it seems to me that the seasonal -- I'm not
30 suggesting that this is something that is easy to get at, but I
31 think it gets at the question of what harvesters want interacts
32 with the seasons that you choose.

33
34 **DR. FRAZER:** Yes, and I don't disagree with you at all there,
35 right, and, I mean, again, part of the reason for exploring this
36 is this question of, hey, you know, why don't we just compress all
37 of that effort in June, right, and leave that fall, but, you know,
38 there's a heck of a lot of people that want to fish in that
39 shallower water in Florida in the winter, right, because they can
40 target and they can access those gag.

41
42 What I don't know, if there's no difference here, right, is
43 somebody like you to tell me that, you know what, if you cut out
44 that September or November shallow-water gag fishery, how much
45 revenue did the State of Florida lose, right, because, you know,
46 I don't know how to evaluate that, if there's a tradeoff there.
47 There doesn't appear to be a tradeoff in the biology here, but
48 there very may well be a tradeoff in the economics.

1
2 **VICE CHAIRMAN NANCE:** Ryan.

3
4 **MR. RINDONE:** Thanks, and so, to the different demographics of
5 people, I think to some degree that could be true, especially with
6 respect to like out-of-state fishing effort coming down and
7 vacationing during the summertime and things like that, but, at
8 the same time -- Steven, do you know of, or have you done anything,
9 that looks at that specifically, like variations in demographics
10 of anglers by time of year?

11
12 **DR. SCYPHERS:** So I have not directly, but I believe Ed Camp, at
13 UF, was working on this with some of the MRIP data, because there's
14 some limited ability to figure out where people are coming from
15 for the trips, based upon what they're landing, and, the last I
16 heard on this, Ed was putting together like county-level extension
17 reports, and Andrew may be able to know more about this, but I
18 know this is somewhere that he was going with it.

19
20 **DR. ROPICKI:** Yes, and they're called the CEFI documents, and
21 they're actually maintained on the economic impact analysis
22 program, Christa Court's program in food and resource economics at
23 UF, and I can get a link to the page for everyone, if they want to
24 see it for rec fishing.

25
26 **MR. RINDONE:** Thanks. We'll get that sent around to everybody.
27 Regarding motivations though, like regardless of demographic, the
28 catch-and-release fishery for gag is fledgling and recent, and
29 there are people who are starting to engage in that more,
30 especially in the fall and winter months, when they can be -- The
31 water clears up pretty well, and then, you know, ten or twenty
32 feet, like you can sight-cast to them, and it's great fun, but,
33 again, that's only in a specific time of year, but, by and large,
34 if you're going fishing for gag, the purpose is to keep one, and
35 so like the motivation is consistent across-the-board.

36
37 There are, obviously, other species that we manage, you know,
38 things that are usually closed, like goliath grouper, and that's
39 almost exclusively catch-and-release. They have a very small
40 handful of Florida tags, that don't seem to be available to the
41 lifetime license holders, and some of our pelagic species -- People
42 have a lot of fun catching those, and the jacks, catching
43 amberjack, and, if you want something to yank really hard on the
44 line, amberjack is a great candidate for that, but, by and large,
45 reef fish, for most of the species, the purpose is harvest.

46
47 **VICE CHAIRMAN NANCE:** Thanks. Harry, please.

1 **MR. BLANCHET:** Thank you, sir. I might be wrong about this, but
2 it seems that you're saying that the dead discards are equivalent,
3 but, if we're using management based on an ABC, that's typically
4 harvested fish, you end up with a longer season in September, to
5 catch the same amount of fish landed, and you're going to end up
6 with a higher number of discards, or am I reading this draft wrong?
7

8 **DR. HYMAN:** Yes, I think that's right, and one of the things that
9 I struggled with early on -- Go ahead. Sorry.
10

11 **MR. BLANCHET:** So they're really not equivalent, and they're only
12 equivalent if you're looking at it in a one-month time period and
13 not on a seasonal basis.
14

15 **DR. HYMAN:** So, yes, that's a really good caveat. In that case,
16 if I could pose a question, and, Ryan, or Nathan, you were nodding
17 your head, and would a better version of this entail essentially
18 keeping the season going until the catch quota is met, and then
19 look at how discards, dead discards, might change? Thanks.
20

21 **VICE CHAIRMAN NANCE:** Any other --
22

23 **MR. RINDONE:** I was reading something that -- Say it again.
24

25 **DR. HYMAN:** That was to Nathan and Harry.
26

27 **MR. RINDONE:** Then why is Nathan looking at me?
28

29 **DR. NATHAN VAUGHN:** I'm working very hard to keep my mouth closed.
30 Just one other quick point, and, yes, I agree that that would be
31 a much better way to look at this, for sort of an apples-to-apples,
32 is the same landings during the open season of a variable length,
33 but just one thing that I think is a segue into what I will talk
34 about tomorrow, that I think everyone needs to look at, and sort
35 of think on, is the very large amount of dead discards that are
36 coming from the closed season, that we're not capturing at the
37 moment.
38

39 A little bit of my talk tomorrow will be mentioning that, and how
40 we're looking to incorporate it into stock assessment, but I don't
41 even want to think about the implications if we try to -- Like, if
42 we run projections with this flat discarding rate, just think about
43 it.
44

45 **VICE CHAIRMAN NANCE:** Well, we'll look forward to that tomorrow.
46 That will be good. Any other questions or comments? Okay. I
47 think we've had a good day, and I think excellent presentations.
48 Thank you very much.

1
2 **DR. HYMAN:** Thanks for having me, guys. I appreciate it, and I
3 hope it was helpful.
4

5 **VICE CHAIRMAN NANCE:** We'll go ahead and open it up now to our
6 public comment section of the meeting, and do we have any online,
7 Jess? Bernie?
8

9 **MS. BERNADINE ROY:** None.
10

11 **VICE CHAIRMAN NANCE:** Okay. We'll give them a second here to
12 chime-in.
13

14 **MR. RINDONE:** While we're waiting on that, Mr. Vice Chair, I will
15 note that Dr. Bridgette Froeschke has asked that the SSC pass along
16 any new contacts or other data sources not already identified by
17 her presentation by August 30, and, if anyone needs her email
18 address, we can provide that.
19

20 **VICE CHAIRMAN NANCE:** Okay. No public comment today, and so
21 thanks. We'll go ahead and adjourn, and we'll see everybody at
22 8:30 in the morning, here, and we have a full day tomorrow.
23

24 (Whereupon, the meeting recessed on July 31, 2024.)
25

26 - - -
27

28 AUGUST 1, 2024
29

30 THURSDAY MORNING SESSION
31

32 - - -
33

34 The Meeting of the Gulf of Mexico Fishery Management Council
35 Standing Scientific and Statistical Committees reconvened at the
36 Gulf Council Office in Tampa, Florida on Thursday, August 1, 2024,
37 and was called to order by Vice Chairman Jim Nance.
38

39 **VICE CHAIRMAN NANCE:** We'll go ahead and start our meeting this
40 morning. We appreciate all those in the room and all those online,
41 and we'll go ahead. Our first presentation is going to be -- There
42 is it right there. We're going to have our discussion on the ABC
43 Control Rule modifications. Shannon, are you on? Katie is on?
44 Okay. Katie, we'll go ahead and turn the time over to you, and
45 I'll have Ryan go through our scope of work, and then, Katie, we'll
46 go ahead and turn the time over for your presentation.
47

48 **DR. SIEGFRIED:** Okay.

1
2 **DISCUSSION: ACCEPTABLE BIOLOGICAL CATCH CONTROL RULE**
3 **MODIFICATIONS**
4

5 **MR. RINDONE:** Good morning, everyone. Shannon and Katie will be
6 reviewing presentations on an alternative approach to the current
7 Acceptable Biological Catch Control Rule, which is used by the SSC
8 for determining scientific uncertainty between the overfishing
9 limit and the ABC.

10
11 This information has been incrementally presented to the SSC over
12 the last couple of years, and the rule has been in place since
13 2011. However, you guys have regularly expressed a desire to
14 revisit it, and hence all these presentations that we've had over
15 the last couple of years, and this stems largely from the
16 propensity of the buffer that is determined by our current P*
17 approach, generally resulting in a difference between the OFL and
18 the ABC that's not representative of the uncertainty identified in
19 the assessment, and so, as an example, when we SEDAR 52 for red
20 snapper, the buffer that was generated, using that P* approach,
21 between the OFL and ABC was only 2.58 percent.

22
23 Right now, the alternative approach that you guys used, using the
24 yield at -- 75 percent of the yield at F at MSY yields a buffer of
25 about 13.7 percent, and so just to illustrate a difference there.

26
27 The SSC is going to review these presentations, and the background
28 materials provided, and should focus its effort on how best to
29 revise the control rule, and you guys should make any revisions
30 and recommendations, as appropriate, and I will add that it would
31 be great to get some direction today, and not necessarily -- We're
32 certainly not expecting that like, oh, we've redeveloped the entire
33 control rule, but, you know, this is the compass heading that we're
34 going to take, and development can proceed from there.

35
36 We have a pretty busy meeting scheduled already for October, but
37 we can certainly put some time on the board in February to have
38 some meaningful discussion about the sorts of things that you guys
39 want to discretely account for, the sorts of things that you would
40 rather take a more generalized approach on, but, at least for
41 today, after this presentation, you know, it would be great to
42 have, like I said, a compass heading of the direction that we're
43 going to go.

44
45 **VICE CHAIRMAN NANCE:** Katie, before you start your presentation,
46 I want to agree with Ryan, and it's the fact that we've had
47 discussions on this quite a few times over the past couple of
48 years, and we need to kind of focus what direction we want to go

1 in, and so think about that as we're having the presentation, and
2 we'll have discussions, and we need to make some decisions on where
3 we want to go from here. Katie, you're all set.

4
5 **DR. SIEGFRIED:** Great. Thank you, Mr. Chair. Okay, and so I
6 couldn't agree more, and I think that we need to go ahead and
7 recommend a way forward. You all can have your discussion and
8 decide that, and hopefully this presentation will give you our
9 current status and a proposal for a way forward.

10
11 Since it is a new SSC, and it's been a little while since you've
12 all seen this, it seemed like a good time to go ahead and go over
13 some of the foundations, as well as sort of our current status,
14 and so the -- I wanted to go over the rules and responsibilities
15 of an ABC Control Rule, and you probably have all seen this in
16 some form or another, but, basically, the idea is that there's two
17 sets of responsibilities and roles, one for the SSC and one for
18 the council, and, as catch increases from the green to the red,
19 you can see that you get closer and closer to the overfishing
20 limit, and so I will start with that.

21
22 The overfishing limit is the catch expected when fishing at that
23 MFMT, which is the catch with a 50 percent probability of exceeding
24 the true OFL, as determined by the stock assessment. We tend to
25 have very narrow distributions for OFL, which I will show you soon,
26 and so that's the overfishing limit.

27
28 Then the SSC sets the ABC, which is the catch reduced below OFL to
29 account for scientific uncertainty, and so that's catch with less
30 than 50 percent probability of exceeding the true OFL. Those are
31 within the purview of the SSC, and then the council could further
32 decrement the ABC to an ACL, which is a catch that invokes
33 accountability measures, or even further to an ACT, which would be
34 below the ACL, to account for management uncertainty or to achieve
35 an optimum yield in some other fashion, with other sources of
36 uncertainty accounted for.

37
38 The ABC Control Rule is an agreed-upon procedure. It's adopted in
39 the FMP, and it's for setting the ABC for a stock, or a stock
40 complex, as a function of the scientific uncertainty in the
41 estimate of OFL and any other scientific uncertainty. The council
42 must establish this, based on the scientific advice from its SSC,
43 and then the SSC must recommend the ABC to the council, and that's
44 one of their fundamental roles, and they may recommend an ABC that
45 differs from the result of the ABC Control Rule, but they must
46 provide justification.

47
48 It can be data-limited, in some circumstances, and it can involve

1 complex drivers, based on a measured stock biomass, measured
2 uncertainty in the assessment or elsewhere, forecasts of
3 environmental effects, and the like.

4
5 Actual ABC Control Rules do vary by council, as it is, you know,
6 a decision of each council. Some councils have decided to adopt
7 a single framework for all their FMPs, and others have different
8 frameworks for each FMP. Most attempt, to various degrees, to set
9 ABCs below the OFL, in a way that reflects uncertainty, and it
10 seems to be based quite a bit on data uncertainty and risk
11 assessment, but how they do it varies a great deal.

12
13 I wasn't in my current position in the Gulf for the establishment
14 of this, and this is why Shannon is on the line. She has been
15 part of this since the beginning, and, if there are any questions
16 about discussions back in the day, that the SSC members aren't
17 aware of, then we have her on the line to contribute to that
18 discussion, but, currently, the ABC Control Rule for reef fish, in
19 Tier 1, is as follows.

20
21 The condition for use is that the assessment estimates MSY
22 reference points, and it could be based on a proxy, and produces
23 a PDF, probability distribution function, of OFL. The choice of
24 P^* is based on the level of uncertainty considered in the
25 assessment using a risk determination table, and I will show visual
26 figures of this later as well, and I won't just be describing it
27 in words.

28
29 The risk determination table includes a level of assessment and
30 use of FMSY proxies, for example SPR 30, and we've discussed SPR
31 40, and there is also other similar approaches, like F of 0.1, and
32 there could be a characterization of uncertainty that's
33 considered, whether it's fully integrated assessments, and there
34 is sensitivity runs that produce the uncertainty, or if there's no
35 characterization of uncertainty, and we can take into account the
36 severity of the retrospective pattern in our diagnostics, and we
37 actually have quite a few more diagnostics than we had when this
38 rule was first established, and then is there any use of
39 environmental covariates?

40
41 Again, the OFL is the yield at MFMT, and the ABC, according to the
42 current ABC Control Rule, is the yield at the P^* percentile from
43 the projection of MFMT, or if it's an F rebuild, and so those of
44 you that have been on the SSC for a while know that recent practice
45 is commonly the Restrepo et al. guidance, which is a 75 percent
46 FMSY, rather than following the P^* percentile approach, and that,
47 again, as I stated before, the SSC has provided justification
48 explaining that there is not enough uncertainty accounted for in

1 the P* percentile.

2

3 Our proposal for this Tier 1, any modifications that we would make
4 at this point, would be to reduce the fishing mortality as stock
5 size declines, and I will explain all of these points as we go
6 along, to impose a B_{CRIT} value to reduce the F to zero at some level
7 of depletion, and I will show visuals of this in a moment, and
8 it's just usually helpful to provide the SSC with what our explicit
9 recommendations are first, and then to explain those as we go
10 through, and so I wanted to provide those here for you. This B_{CRIT}
11 would prevent stocks from reaching a level below which reproductive
12 limitations become too severe.

13

14 Next, we would divorce P* and sigma, which is big part of this
15 presentation. P* is a risk determination, which is the prerogative
16 of the council, but we argue that the SSC should focus on
17 characterizing scientific uncertainty through this sigma
18 parameter. Then impose a tiered system where, as data quality and
19 quantity declines, sigma increases, resulting in larger buffers
20 between OFL and ABC for lower-tier stocks, stocks that have poorer,
21 or lesser, data quality or quantities. Okay, and so let's go
22 through those recommendations step-by-step.

23

24 Here's some visuals for you and some general guidance, as we move
25 through these different slides. The ABC Control Rule should
26 consider reducing fishing mortality, which is the MFMT, as stock
27 size declines. Previously, MSST was based on natural mortality,
28 and the rebuilding plans were required when the stock size dropped
29 below one minus the natural mortality times the SSB MSY.

30

31 As you can probably infer here, when M gets larger, the closer to
32 SSB MSY at 50 percent, which is what we're following now, and so
33 those are faster-living fish, or faster-growing fish, shorter-
34 lived fishes, that you can potentially have more risk of an
35 overfished status, because you get closer to SSB MSY at 50 percent.

36

37 Showing that here, as you go along, biomass is on the X-axis, and
38 the fishing mortality is on the Y-axis. The entire red shaded
39 region is an overfished status, and so the distance between the
40 red dashed vertical line and the black dotted vertical line is
41 very small when it's a longer-lived fish, and so you really don't
42 have much space between the SSB MSY and MSST, after which the stock
43 is deemed overfished.

44

45 When the MSST is dropped to 50 percent SSB MSY, which it often is,
46 and I think we have one stock, that we've assessed recently, that's
47 75 percent of SSB MSY, but, as MSST drops towards that 50 percent,
48 you can see the space between those gets larger, and the space of

1 that red shaded area becomes smaller, which increases the slope of
2 the line between zero and the fishing mortality at MFMT, which
3 means that there's less time to act, and less time to conduct
4 management that's less severe.

5
6 The stock is in more dire straits when overfished status is
7 proclaimed, basically, and you have to start imposing much stricter
8 quota regulations.

9
10 To reduce the likelihood of long and/or harsh rebuilding plans,
11 the SSC could consider reducing F when SSB is less than SSB MSY.
12 The SSC could also impost a B_{CRIT} , and so you see, on the X-axis
13 there, that the B_{CRIT} was set to something besides zero, and it was
14 moved up to say 100 metric tons, to reduce F to zero at some level
15 of depletion.

16
17 That way, it's not -- We're not necessarily allowing the stock to
18 get so low that it's not able to recover by the time that action
19 can take place, and so the slope of the two -- I don't know what
20 color that is, ecru maybe, but the two dashed white lines, and one
21 is much steeper than the other, and one allows for much more time
22 to act, and the steepness of the line is basically determined by
23 where B_{CRIT} is set, as well as MSST. Are there any questions about
24 this so far? That's three different descriptions of what happens
25 with an MSST determination and B_{CRIT} , that I thought was important
26 to go over.

27
28 **VICE CHAIRMAN NANCE:** Any questions from the SSC members? It
29 doesn't look like we have any questions, Katie. Thank you.

30
31 **DR. SIEGFRIED:** Okay. this is that narrow P^* range that I wanted
32 to go over with you, and so the determination of ABC should be
33 based, when possible, on the probability that a catch equal to the
34 stock's ABC would result in overfishing, which is the P^* value.

35
36 The probability of overfishing cannot exceed 50 percent, which is
37 that brown dot at the top of that distribution, and should be a
38 lower value than the -- Basically, when the catch increases, you
39 don't go over that hump and pass the overfishing limit, and so the
40 problem here is that the width of our distribution function, that
41 is derived from the stock assessments currently, is an
42 underestimate of the true scientific uncertainty.

43
44 We have played with creating more uncertainty here, as far as
45 picking which parameters are reflected in this distribution and
46 all, and that's actually something that some of Nathan's work goes
47 into, but the current state is these distributions tend to be very
48 narrow, and, often, the ABC is set -- Before we went to the Restrepo

1 P*, it could be as low as 6 or 8 percent, and so it was really
2 close to OFL, when the ABC was set, and so the buffer is too
3 narrow, in general.

4
5 The calculation of ABC from the distribution function of the
6 overfishing limit requires quantifying uncertainty, and so we try
7 to estimate variance of the PDF as part of the assessment, but it
8 often results in too small buffers, and we tried to estimate
9 variance external to the assessment, and this is something that
10 was called into question a few years ago, and that's what's the
11 Ralston analysis request from the council came from.

12
13 If the assessment itself isn't giving us enough buffer around OFL,
14 then let's try to figure out what an external estimate of variance
15 would be, and whether that's more appropriate than using P*, and
16 so are there other assessments that have a more realistic
17 distribution of uncertainty around OFL? Is there a way to compute
18 a different distribution, or a different variance, from
19 comparisons of estimates from multiple past assessments, and
20 that's the Ralston method, or could we utilize more uncertainty
21 from the assessment itself, and so we haven't had a lot of luck
22 from borrowing from another assessment in our region.

23
24 There is a Monte Carlo bootstrap technique that's used in the South
25 Atlantic, and it actually -- I actually came from the South
26 Atlantic, as an analyst, when I moved over to doing work in the
27 Gulf, and I investigated that for our assessments in the Gulf, and
28 we actually have much more data in the Gulf, and the assessment
29 run times were so long that running 4,000 models to get that MCB
30 analysis was just not possible. It took too long, and it took too
31 much computing resources, and so as it's done in the South Atlantic
32 just isn't going to work for us in the Gulf, and so we wanted to
33 come up with other ways to do that.

34
35 First, we're doing the comparison of recent assessments of similar
36 type in the Gulf, which I presented on this a little over a year
37 ago, and then, eventually, Nathan's work will come up with
38 utilizing more uncertainty from the assessment itself.

39
40 To give those of you that are new, or to give those of you that
41 forgot, a refresher, the Ralston method is a meta-analysis of
42 assessment uncertainty, and so what he did, what he and the others
43 did, was examine the uncertainty of multiple assessments, on
44 similar stocks, and then across stocks, by calculating the logscale
45 deviations from the mean biomass from all of those historical
46 assessments, and so seventeen total stocks.

47
48 What he came up with was an aggregate distribution of log

1 deviations pooled over those stocks, and then the fit of a normal
2 distribution to those deviations provided that distribution that
3 we were looking for, with a sigma of 0.36.

4
5 I'm sorry, and I overlapped my picture with the words, but it's
6 just still the meta-analysis of assessment uncertainty, and, also,
7 what was shown here is a potential for allowing for more
8 uncertainty in reducing the probability of overfishing when the
9 amount of data, or data quality, is reduced, and so Tier 1 and
10 Tier 2 versus Tier 2.

11
12 The Tier 1 stocks are the data-rich stocks, Tier 2 are the data-
13 moderate, and the Tier 3 are data-poor, and the amount of
14 uncertainty in each of those distributions increases, which makes
15 the slope also increase, and it allows for a lower probability of
16 overfishing, based on data availability.

17
18 The council request that came, when we first -- Well, not we, but
19 when Shannon first presented this work, was that we conduct a
20 Southeast-specific Ralston analysis for our data-rich stocks. We
21 were also to take a look at the Restrepo study and then the
22 Privitera-Johnson and Punt study, which suggests using
23 probability-based harvest controls would incorporate scientific
24 uncertainty and risk tolerance when setting catch limits, in a
25 little bit better way than Ralston potentially, and so we started
26 out this with this analysis a little over a year ago, and let me
27 go over with you the developments, or, well, what happened with
28 that and then the developments since then.

29
30 The assessments that we used for that analysis were cobia, greater
31 amberjack, gray snapper, red grouper, vermilion snapper, and red
32 snapper. We had these seven species, or sorry. There were six
33 species, with thirteen different assessments, and some of them
34 were using SSB in weight, and one used eggs per recruit, and two
35 used fecundity.

36
37 Now, when we tried to -- We left that presentation saying, okay,
38 let's finish this out, because that was sort of a progress report,
39 and we hadn't quite finished looking at all of our assessments,
40 our Tier 1 assessments, and the last one to take a look at was
41 king mackerel.

42
43 When I went back and looked at king mackerel, we don't have enough
44 subsequent similar assessments for king mackerel in order to do
45 this analysis, and either the structure has changed, or there's
46 been change back in time of the mixing zone, or there's been
47 different assumptions about the structure of the model, and even
48 which version of SS it's been in, and so that was -- That created

1 difficulty in applying the Ralston analysis to king mackerel, and
2 so this is what we have for the Southeast, to provide the results
3 for that council request.

4
5 **MR. RINDONE:** Katie, can you go back one slide, please? It says
6 seven species, across thirteen assessments, and three were
7 measured with -- Or three measured SSB in weight, one in eggs per
8 recruit, and two in eggs.

9
10 **DR. SIEGFRIED:** It should be six species. Sorry.

11
12 **MR. RINDONE:** I was taking notes, and I missed that. Sorry.

13
14 **DR. SIEGFRIED:** What we came up with last time, and the
15 presentation is in the archived material, if you want to go through
16 all the details, and we could pull it up if we needed to as well,
17 and the estimates using the full residuals to calculate our CV,
18 which is in weight only, which is important for which method of
19 Ralston you use, and, if I use the full time series, back to the
20 first assessment availability, it was -- The sigma would be 0.41.
21 If I bring it more towards modern times, where we have what we
22 think are better data, it's 0.39, and so there is very little
23 difference between those two, and they're also very consistent
24 with Ralston itself, which is 0.36.

25
26 Privitera and Punt is actually 0.41, I believe, and so it's all
27 within the same ballpark. It seems to be around 0.4 is what the
28 variance is being estimated from our Southeast-specific Ralston
29 analysis.

30
31 The other part of the council request was to look at the Privitera-
32 Johnson and Punt method, and something I mentioned last time we
33 did this, and I did work with Kristen to go through this, and so
34 what I learned is that that approach will account for more
35 uncertainty than the historical biomass approach. However, we
36 thought it would only -- Oh my goodness. There's a whole bunch of
37 errors on this slide, and I apologize.

38
39 We thought that that approach would require slight modifications
40 in our code, because of things like allocations in our projections.
41 However, when I went through all of those SS codes with -- You
42 know, under her guidance, and our SS report files just don't
43 contain information necessary to conduct that analysis, and we
44 would have to revisit each assessment, which right now is just not
45 feasible.

46
47 It could be feasible, if we hired a post-doc, or if we took an
48 assessment off the schedule, and those are very different types of

1 things, and one is completely revamping our schedule, which we
2 showed you yesterday is not a great idea, and then the hiring a
3 post-doc takes time and money, and so we do have another way
4 forward, which is what I would like to propose today.

5
6 We would recommend taking a look at harvest control rules, using
7 this SS-MSE framework that Cassidy and team are developing. What
8 we could do is use that to determine the effectiveness of the
9 different levels of uncertainty on our management advice, and then
10 look at the management outcome, and I would argue -- So we know
11 that P^* is less than -- The uncertainty in P^* is less than the
12 uncertainty in Restrepo, which is the 75 percent FMSY, is less
13 than Ralston, which imposes around a 0.4 sigma, which is a little
14 less than Privitera and Punt, which is greater than 0.4, and so we
15 could actually test these different levels of uncertainty on our
16 harvest control rules, using this SS-MSE framework.

17
18 Rather than using the time to calculate the exact number from the
19 Privitera and Punt method, we would like to use the capacity
20 building in SS-MSE to test these harvest control rules, but it
21 seems like a better use of time, and it doesn't seem that important
22 how much different Ralston and Privitera and Punt are, and it seems
23 more important to see what that level of uncertainty does to our
24 management advice in subsequent population sizes. Are there
25 questions about this proposal?

26
27 **VICE CHAIRMAN NANCE:** Here's where we want to have -- We've talked
28 a long time about the Restrepo method, and we've used it, if
29 someone prefers would staying with that method, and we've looked
30 at the Ralston, and we asked the Southeast Fisheries Science Center
31 -- We felt uncomfortable using west coast species, and just using
32 that number that they came up with, and so we asked that they use
33 Gulf species, and it appears that analysis, as Katie pointed out,
34 is very similar to what Ralston got with the west coast species,
35 and so we have those numbers, and so I guess we want to key-in
36 here and -- Will, please.

37
38 **DR. PATTERSON:** I just wanted to add one bit of extra information.
39 In our earlier discussions about the Restrepo et al. approach, it
40 wasn't just about buffer, but also the idea that Restrepo has --
41 They've developed targets, based on life history simulations
42 across a range of species, where we had similar results that, if
43 you fish at 75 percent of FMSY, and call that your OY, your FOY,
44 then the long-term yield is going to be 90 to 95 percent of yield
45 at FMSY, but a stock biomass that is 1.3 times greater than biomass
46 at MSY, and this was across a range of species.

47
48 There is variance in those estimates, but it wasn't just about

1 buffer, but the idea that you have a true target that you're trying
2 to achieve. Now, that's not what is the spirit, or even the law,
3 of Magnuson, the reauthorized Magnuson Act, but that was part of
4 that discussion, and I just wanted to put that in there.

5
6 **VICE CHAIRMAN NANCE:** Thank you, Will, for that reminder. Luiz,
7 please.

8
9 **DR. BARBIERI:** To Will's point, which I agree, and so this could
10 be -- I mean, for us to consider options on the table, right, that
11 eventually we will discuss with the council, this would be one
12 option, right, and so one option would be to go with something is
13 more in line with Restrepo et al., and this, you know, would lead
14 to more of a management advice based on OY, or approximate to OY,
15 but this is really a policy decision, and it's a decision for the
16 council to make, right, and so this is an option that we could
17 present to them as Option 1, and is that what you're thinking
18 about, Will?

19
20 **DR. PATTERSON:** No, and I'm not thinking about any recommendations
21 at this point, but I just wanted to add that little bit of extra
22 context to the discussion.

23
24 **DR. BARBIERI:** Well, in this case, I am, yes, and I just wanted to
25 make sure that I understood what you said correctly, Will, in terms
26 of, you know, the interpretation of the actual -- When we act on
27 the Restrepo et al. value that we use, that that would, you know,
28 fundamentally -- Fundamentally, it leads us to that OY management
29 advice, which I don't disagree with, and so I think that this would
30 be one option that I would like to remain on the table for us to
31 discuss with the policymakers, and if I may just ask --

32
33 **VICE CHAIRMAN NANCE:** Absolutely.

34
35 **DR. BARBIERI:** Katie, for this slide that you have there, I'm
36 thinking -- You know, the question that we had before, I remember
37 correctly, was that, if we go with the Ralston approach, or the PJ
38 and Punt approach, either one, we would -- You know, considering
39 what we just mentioned, about how similar those values would be,
40 in terms of the sigma, and that, if we go with the Ralston approach,
41 for example, just for the simplicity of it, we're just trying to
42 get an idea of what that value, meaningful value, of sigma would
43 be, and I think we are there, from, you know, the analysis that
44 the center conducted, and you presented in the previous slides.

45
46 Can you explain to me what we would gain from, you know, proceeding
47 with this MSE approach, and, I mean, what additional information
48 would we be getting, or direction, right, that could be informing

1 our decision going forward?

2
3 **DR. SIEGFRIED:** Sure, and thank you both for those comments, and
4 then for the question, Luiz. I think that what we would get here
5 is not just comparing P^* versus Restrepo versus Ralston versus
6 Privitera and Punt. I think we would have the ability to truly
7 test the full harvest control rule proposal, and so one part is
8 the sigma min, which is the first blue bullet here, and that's
9 just that sigma min value.

10
11 The other part we could test is the B_{CRIT} value, the minimum level
12 of depletion where fishing would still be allowed, and we could
13 also test things like the effects of proxies and the effect of
14 setting MSST where it is, whether it's the one minus M or it's
15 some arbitrary value, like 50 percent.

16
17 We don't yet know the combination of the effect of all of those
18 different decisions, right, and it seems like the SSC has taken
19 the Restrepo approach lately, but that's also been in conjunction
20 with different assumptions about FMSY proxies, and we don't really
21 know the effect on management long-term of those sorts of
22 assumptions and decisions, and so not only could we test the sigma
23 min, but we could also look farther downstream and see what the
24 effects would be on management of these different decisions, which,
25 if we just chose one of these methods based on literature, all
26 we're doing is deciding on a reasonable level of uncertainty around
27 OFL and nothing else, and so that's what I think it would add.

28
29 **DR. BARBIERI:** Thank you for that, Katie, because I think that
30 clarifies, for me, you know, there's other things, of course, that
31 are a part of this, right, of this discussion, that we will be
32 able to evaluate in conjunction with the sigma min, and so, yes,
33 I get it. Thank you.

34
35 **VICE CHAIRMAN NANCE:** Thank you. Any other questions? What I'm
36 seeing is we have used P^* in the past, and we're using Restrepo.
37 Ralston would give us a value that we would simply use, but, if we
38 use the MSE approach, right now, and I think we need to have Katie
39 go through it, so we're seeing what they're proposing, and I guess
40 I will ask this question later, but I was just wondering if it
41 would have to be run on every species, or would it be run -- I see
42 Nathan shaking his head, or nodding, and so every time we would
43 have to run this, for each species, and is that true, Katie?

44
45 **DR. SIEGFRIED:** Yes, and it would either be on groupings of species
46 or it would be case-specific, right, and so some of what I've seen
47 in other regions is potentially saying, okay, if the stock needs
48 to be rebuilt, what's the best approach, and if the stock is -- So

1 I actually go through this just a little bit. Maybe we could
2 proceed, and then, if I don't answer your question --

3
4 **VICE CHAIRMAN NANCE:** Yes, and I'm sorry. I was getting a little
5 ahead, and so let's go ahead and go through that presentation, and
6 then we can -- I think that would help in our discussion. Thank
7 you.

8
9 **DR. SIEGFRIED:** Sure, and there's not a ton left. It's actually
10 -- I was hoping for more discussion than me talking, and so there's
11 a lot here, but the main things that you need to pay attention to
12 are in the orange text boxes, really, and I already sort of went
13 through some of this in the previous slide, and this is just the
14 nitty-gritty of it, and so the ABC needs to be some sort of
15 decremented OFL, right, and so the sigma min could be specified
16 using the Ralston approach or some other minimum acceptable
17 uncertainty.

18
19 Then, also, the B_{CRIT} is the other value we could test, which would
20 -- Like I said, it's just the minimum level of depletion at which
21 fishing would be allowed, and so this is -- The scalar here would
22 just reduce MFMT as B declines, and so those are the two things
23 that we would test first in this framework. We wouldn't want to
24 go to this massive factorial design, right, and we would want to
25 just test those two things first.

26
27 This is -- There is an actually an Excel spreadsheet, and you all
28 -- At least the non-new folks have seen this before, but there's
29 a spreadsheet, if you would like to play around with it, that
30 allows you to see a demonstration of this proposed ABC Control
31 Rule, where a P^* is set, or a sigma min is set, and it shows the
32 change in the B over BMSY and the ratio of ABC to OFL, depending
33 on those two different assumptions, and this right here is set
34 based on Ralston. You can actually play with that tool, just with
35 those individuals, and -- It looks like GC has a question, before
36 I proceed.

37
38 **VICE CHAIRMAN NANCE:** Mara, please.

39
40 **MS. MARA LEVY:** Thank you for letting me jump in. I was interested
41 in this idea of the B_{CRIT} concept and how the Science Center
42 envisions it working, you know, given the need to have a rebuilding
43 plan once you're overfished. I mean, would you ever anticipate
44 getting to that level, and, if we did, it seems like there would
45 be something wrong, or is the idea to just change the slope of the
46 line with that level? Thanks.

47
48 **DR. SIEGFRIED:** Sure, and so I hope Shannon jumps in if I misspeak,

1 but what I understood is that the slope of the ramp is really the
2 concern. If the slope is too steep, or if it takes too long to
3 rebuild, those are reasons to potentially change the B_{CRIT} value,
4 but there wasn't -- I don't think that there was anything besides
5 that, and I hope -- We definitely hope we don't get down to the
6 B_{CRIT} value, but there are some species that could potentially have
7 a more difficult time rebuilding, if the biomass gets too.

8
9 **VICE CHAIRMAN NANCE:** That's my impression too, is that you're
10 sloping down to a target, and not that you're ever going to get
11 there, but you're sloping, and so, instead of zero, you're using
12 some other value. Luiz.

13
14 **DR. BARBIERI:** Thank you, Mr. Chairman. Katie, just to make sure
15 that I understand this correctly, if we go with the blue line
16 slope, and I can see the advantages, you know, the practical
17 advantages of that, that you already pointed out, but, in this
18 case, we are actually redefining, right, MSST to be equal to BMSY,
19 meaning anytime that we fall below BMSY, we trigger a rebuilding
20 plan, and am I understanding this correctly?

21
22 **DR. SIEGFRIED:** Only if the -- Well, those are the two options.
23 The MSST one is not assuming that it's the same as BMSY, and so
24 you could test the distance between MSST and BMSY, or the SSB MSY,
25 and B_{CRIT} is actually something that's not an essential change, but
26 the distance between SSB and MSST is probably a much bigger issue.

27
28 **VICE CHAIRMAN NANCE:** Luiz has a follow-up, but, Shannon, I'm going
29 to let you in.

30
31 **DR. SHANNON CASS-CALAY:** Thanks, and that's an excellent question,
32 Luiz, and it's something, you know, that we've actually discussed
33 before as well, and so, yes, the blue line, where you start that
34 decrement on fishing pressure, at the equals BMSY, it does
35 essentially act as a de facto rebuilding plan, and, in some of the
36 demonstration work that I did, it actually -- The slope of that
37 line, as drawn, is more aggressive than many of our rebuilding
38 plans, and so it actually rebuilds the stock quite quickly.

39
40 We had talked about different hinges we could use, you know, to
41 reduce that slope, until you get to the MSST, and then make it
42 steeper, but, you know, I really want to state, and have this SSC
43 understand, that, if we apply something like 75 percent of FMSY,
44 that also has a slope, and, you know, if we were to draw that out,
45 right, it may not be as aggressive as the blue line that you see
46 here, but it is not fishing at FMSY until the stock gets to 50
47 percent of BMSY, right, the orange line.

48

1 It's something that also acts as a larger buffer, and essentially
2 as a de facto rebuilding plan, and so, actually, you know, I think
3 -- I don't want to steal Katie's thunder, because I know she's
4 going to get to it, but the point I was trying to make is that, if
5 you actually were to plot out how using 75 percent of FMSY looks
6 graphically, it might be something between the blue line and the
7 orange, and, actually, I think it's appropriate to -- The other
8 point that I wanted to make is the orange line is what concerns us
9 the most, right, because, when we considered our ABC Control Rule
10 in 2010, our MSST was equal to one minus M times BMSY, and, in
11 many cases, the M is a very small value, and so it was much closer
12 to one, much closer to BMSY.

13
14 Focusing on the P*, in that context, didn't disturb as much,
15 because we were applying a small buffer, but we were starting a
16 rebuilding plan at a much higher level of BMSY, closer to one,
17 right, on this graph, and what has concerned us is that, if you
18 apply the control rule now, with the MSST at 50 percent of BMSY,
19 and you use a very small buffer, such as, you know, P*, applied to
20 the sigma min that comes out of a stock assessment, you know, then
21 you have a very small buffer, and you don't apply it until the
22 stock gets to very low levels, and so that's what actually concerns
23 us the most, is the orange line.

24
25 Recently, this SSC has been more likely to set ABC at the value
26 that comes from fishing at 75 percent of FMSY, rather than using
27 the control rule explicitly, and I will stop, because I know Katie
28 now is going to discuss some of those concepts, also.

29
30 **VICE CHAIRMAN NANCE:** I'm going to also have Luiz and then Will
31 and then Ralph.

32
33 **DR. BARBIERI:** Thank you for that, Shannon, because that helps a
34 lot, and, you know, I don't want to disrupt the presentation, but,
35 you know, Katie was mentioning that she was hoping for some
36 conversation here, and, as these things pop into my mind, right,
37 I can't resist but to make some points there for us to put to the
38 side, perhaps to discuss as we look into this, as discussion
39 points, and so I understand the practical benefit, right, of going
40 -- You know, considering, as an option, the blue line, and having
41 that slope fundamentally changing MSST to be equal to BMSY, and,
42 fundamentally, practically, that's what would happen.

43
44 My concern there would be, you know, for us to discuss, right, two
45 points. One is that the council has explicitly, right, set a level
46 of MSST, right, and that is in the rules right now, right, and
47 it's part of one of the regulatory amendments, and so we would be
48 proposing a change to that value, one, and two is, right now, if

1 we have to, you know, reduce F, right, but not necessarily start
2 a rebuilding plan -- I'm thinking that we would be triggering
3 rebuilding plans much more often now, if we use the blue line, and
4 I wonder about the, you know, the national guidelines requirements
5 for all the procedures that we have to go through to start a
6 rebuilding plan.

7
8 I mean, you may remember, way back when, the idea to not use, you
9 know, the natural-mortality-based value for MSST was really not to
10 be triggering rebuilding plans more often than would be necessary,
11 whenever we had just kind of natural fluctuations in stock size
12 that were causing the stock to fall below BMSY, and so that buffer
13 there was a little larger, and we would not trigger a rebuilding
14 plan, and so I'm just thinking, Shannon and Katie, just thinking
15 about, you know, if we go with this thought process here, which
16 theoretically I agree with, what would be the sort of regulatory,
17 or management, based sort of concerns that we would have to deal
18 with.

19
20 **VICE CHAIRMAN NANCE:** John, to that point?

21
22 **DR. FROESCHKE:** Yes, and I guess I was trying to think about that,
23 but, to me, my initial thoughts is it would be actually a little
24 bit different than that, because if, for example, if you left MSST
25 at 0.5, and you got a stock assessment that came in at 0.75, to
26 me, that doesn't -- This would suggest that you would lower catch,
27 but it doesn't suggest necessarily, to me, that you would be
28 required to initiate a rebuilding plan.

29
30 The thing that I guess I was seeing this is, if you were below B
31 over BMSY, and you did lower catch, even though you weren't
32 overfished, it would be more likely to keep you out of rebuilding
33 plans, and so I guess I was anticipating that this would actually
34 lead to fewer rebuilding plans and not more.

35
36 The only other thing I will say, since I'm talking, and I kind of
37 talked to Katie, but, in reality, the other thing that I thought,
38 the way that the rebuilding plans are scheduled, is the blue line,
39 and maybe even the orange line, really, if we got a B over BMSY of
40 say 0.49, really those lines should go straight down, because the
41 rebuilding plan says that, if you can rebuild in less than ten
42 years, you're supposed to close the fishery.

43
44 We often don't do that, because they are lower than that, but it
45 would be sort of an alternate scenario. If you get a seven-year
46 rebuilding plan, really, you're supposed to close it, and so that
47 wouldn't be reflected in that line.

48

1 **VICE CHAIRMAN NANCE:** Go ahead, Luiz.
2
3 **DR. BARBIERI:** John, thank you for that, because that helps, and
4 so a quick follow-up here, to make sure that -- Because I may be
5 misunderstanding this, right, and so when, if we use the blue line,
6 when would we declare, formally, according to statute and national
7 guidelines, a stock to be required to have a rebuilding plan? When
8 would we declare a stock to be overfished?
9
10 **DR. FROESCHKE:** So two examples. Red grouper, when we did that
11 one, the biomass was well below MSY, but it was just above MSST,
12 and that was not a rebuilding plan. Gag was not that much
13 different, but it was below MSST, and we did a rebuilding plan.
14
15 **DR. BARBIERI:** Right, and so I'm thinking where would be MSST in
16 the blue line?
17
18 **DR. FROESCHKE:** MSST, unless the council were to change it, in my
19 view, would continue to be at 0.5, or wherever it was established,
20 but there's nothing in there that says that catches can't be
21 reduced, even if it's above MSST, and, I mean, I guess, my
22 understanding, the way we've done them recently, so long as the
23 stock is below MSY, our yield streams and stuff are always ramping
24 up, because we're initially cutting harvest to allow the stock to
25 grow back to MSY, regardless of whether it's overfished or it
26 isn't.
27
28 **DR. BARBIERI:** Right, and so, if I understand correctly, what
29 you're saying is that we would then continue having a rebuilding
30 plan, and so it would be a hybrid between the blue, right, and the
31 orange lines, because you maintain the MSST, right, at half of
32 BMSY, to trigger a rebuilding plan, but that goes contrary to what
33 they described, right, would be the benefits of the blue line, in
34 terms of not waiting to get to that level of depletion before you
35 kick in a rebuilding plan.
36
37 **MR. RINDONE:** I think the difference here is more that, if you're
38 managing to MSST, then the difference between the ABC and the OFL
39 decreases much more quickly as you approach 50 percent of BMSY,
40 right, and so we're not having to worry -- Like John said, we're
41 not having to worry about the rebuilding plan, from an amendment
42 standpoint, at all, unless we -- Unless the biomass drops below 50
43 percent, or 75 percent, for some other species, and so we're still
44 trying to rebuild towards BMSY, regardless, whether there's a
45 rebuilding plan in place or not, just by a function of the buffer,
46 and so I think Shannon had talked about, you know, some different
47 techniques that they could use for -- I think she described it as
48 hinging, and, Shannon, feel free to just jump in, that, once

1 biomass reaches MSST, so that we can eventually get to BMSY.
2
3 Then there are other things that we can look at for that also,
4 with like a phase-in of catch decreases over time, and that's
5 something else that we have guidance documents on, and so I don't
6 see this as necessarily having to do any more rebuilding plans,
7 but we could see, you know, more significant buffers between the
8 ABC and the OFL, depending on the target that's chosen.
9
10 **VICE CHAIRMAN NANCE:** Shannon.
11
12 **DR. SIEGFRIED:** Just really quick, before Shannon --
13
14 **VICE CHAIRMAN NANCE:** Sorry.
15
16 **DR. SIEGFRIED:** That's okay. We can become Katon, and Shanie, or
17 whatever words you put together.
18
19 **VICE CHAIRMAN NANCE:** Perfect.
20
21 **DR. SIEGFRIED:** Really quick, the thing I wanted to say is that
22 none of this is stealing my thunder. I was hoping that there would
23 be a lot of discussion here, and I don't have a lot more slides,
24 and so please don't feel like you're -- I heard Luiz say that he
25 didn't want to interrupt, but you're not interrupting, and please
26 continue to discuss, but it sounds like there's two separate things
27 that we need to keep track of while we're deciding which analyses,
28 if any, need to be done.
29
30 One of the things is the council's interest to not induce a
31 rebuilding plan any more than necessary, which is completely
32 reasonable, and then our concern, and the SSC's concern, that, if
33 the MSST is set low, like 0.5 of SSB MSY, that the uncertainty
34 needs to be large enough to reflect reality, and so it seems like
35 those two things -- That we can find a decent middle ground, and
36 I don't know if SS-MSE is necessary for that, if there's not any
37 discussion, or argument, about levels of uncertainty, and that's
38 more about testing, you know, what happens with management later
39 on down the road, if you assumed different levels of uncertainty.
40
41 It may not need that level of investigation, but I would love more
42 conversation on those two sort of competing interests, not wanting
43 to trigger a rebuilding plan too often and then making sure we get
44 realistic levels of scientific uncertainty. Go ahead, Shannon.
45
46 **VICE CHAIRMAN NANCE:** Thank you, Katie. Will, please.
47
48 **DR. PATTERSON:** So lots of discussion, but this is back to much

1 earlier points that Shannon was making about the slopes of the two
2 lines that we see here, the blue and the orange, and, when she was
3 talking about this, it kind of made me think more about the
4 Restrepo approach, and I think, you know, probably the Restrepo
5 slope would be somewhere in between, like Shannon was indicating,
6 but another thing to think about, and I hadn't really considered
7 this previously, is that it wouldn't be -- The orange line wouldn't
8 be where it is for Restrepo.

9
10 It would be closer to 1.0, because, if the long-term yield, right,
11 is 98 percent, if ABC is 98 percent, 95 to 98 percent, of the yield
12 at OFL, or the OFL, right, and that is the yield, then ABC and OFL
13 would be very close, if the stock were built -- You know, the
14 spawning stock biomass accumulated to the point that it was at 1.3
15 BMSY.

16
17 That creates a whole other issue, in that, if you have that little
18 buffer, and management can't constrain the fishery, or there is
19 uncertainty in landings, et cetera, you're going to be overfishing,
20 just by random chance, quite a bit. That's something that I hadn't
21 really considered before.

22
23 **VICE CHAIRMAN NANCE:** Thank you, Will. Ralph, please.

24
25 **MR. TOWNSEND:** This is a question, and so in preparing -- This is
26 not my area. I'm an economist, and so I read several of the
27 articles, and then I read the process we're in, and this recent
28 discussion sort of emphasizes the question I had, which is, from
29 the council's point of view, from the council process, the ABC and
30 rebuilding are two different processes.

31
32 The modeling that was done for Restrepo and the other ones
33 integrate those into a single process, right, and their process
34 has the rebuilding in it, and so the process we're modeling, that
35 we're running under, is not actually the one that the literature
36 is modeling.

37
38 Our process involves this trigger that occurs at the rebuilding
39 stage, and that any modeling we do, it seems to me, needs to model
40 our process and not the theoretical processes that Restrepo and -
41 - So I guess it's really a question, and am I understanding the
42 issue of the ABC, versus the rebuilding strategy, and how that
43 relates to the theoretical literature that we're looking to for
44 guidance, and so that's really a question.

45
46 **DR. BARBIERI:** Well, it's confusing, Ralph, and I agree. I mean,
47 I can tell you that, I mean, I'm confused right now, because there
48 is no way for us to completely decouple here, in my view,

1 considering, right, some of the requirements are statutory, right,
2 and national guidelines requirements to place some of these sort
3 of milestones, right, these different levels, where you trigger
4 different actions, right, and those are determined.

5
6 Decoupling those things becomes difficult, and this is why I'm
7 confused about how the blue line might actually work, if we keep
8 an MSST that is equal to half of BMSY, right, because I can't
9 understand. I just can't understand how the two -- If somebody
10 here any thoughts on this, by all means jump in, or Katie and
11 Shannon, but I just don't know how we could integrate the two,
12 right, and not either -- Because, between one and 0.5, we either
13 follow the track that is blue or we follow the track that's orange,
14 I mean, if we're talking about having a rebuilding plan.

15
16 Right now, we have, you know, really two triggers, right, and one
17 is overfishing, and the other one is overfished, and the two are
18 regulatorily prescriptive, right, and so I'm finding it difficult
19 to wrap my brain around how this would work, the blue line,
20 maintaining the integrity of the orange line. Katie and Shannon,
21 do you understand my confusion here?

22
23 **DR. SIEGFRIED:** I think Shannon was planning to speak to that.
24 There she is.

25
26 **VICE CHAIRMAN NANCE:** Shannon, please, to that point.

27
28 **DR. CASS-CALAY:** Thank you. This is exactly the conversation that
29 I think is so important to have. There is really no need to
30 reconsider the MSST value that is on the books. The concern is
31 that, you know, that, when we initially conceived of this ABC
32 Control Rule in 2010, you know, we had set a control rule that
33 allows us to fish for a stock that is not overfished, and it allows
34 us to fish essentially at FMSY, with a small buffer, and the
35 concern was that small buffer doesn't fully represent the
36 scientific uncertainty.

37
38 One thing that we could, and that's kind of the purpose of the
39 blue line, really, is to create an ABC Control Rule that includes
40 a de facto rebuild ramp, right, and so the blue line, for example
41 here, will begin to rebuild a stock whenever it is below BMSY, and
42 we should, theoretically, with this ramp, never get to the
43 situation where a stock declines to as low as 50 percent MSST, 50
44 percent of BMSY.

45
46 The reason you get to these very low levels are numerous, but one
47 could be that you continue to fish, essentially at FMSY, with a
48 small buffer, and you're not fully accounting for the scientific

1 uncertainty, and so the stock -- Essentially, you are overfishing.
2
3 You're right that what we're doing is we need to set the simulation
4 work together, to determine whether 75 percent of FMSY, for
5 example, from the Restrepo guidance, or a ramp like this, functions
6 to ensure the stock rebuilds, earlier, right, and we don't see the
7 need to ever trigger an overfished condition, where are below MSST,
8 and that, if we did, for example -- You know, essentially, we're
9 already fishing at a level that will allow the stock to rebuild,
10 so that the shock, you know, to the fishing community, would be
11 less, because we don't go from, for example, the orange line,
12 overfishing at a very high rate at 51 percent of BMSY, and then we
13 happen to fall below 50 percent, and suddenly we have to create a
14 rebuilding plan that might be quite a large reduction in fishing
15 effort.

16
17 I think the answer, Luiz, in my mind, is that there needs to be
18 some simulation work done, you know, to examine potential ramps,
19 right, and to determine whether we can create one that will
20 typically rebuild Gulf stocks and won't very frequently trigger
21 the need for a rebuilding plan at all, but I see no reason why we
22 can't set MSST at 50 percent, and I think what would happen then,
23 if we were to see a value below that, is we just would need to do
24 a test at that point, to ensure that, you know, we are fishing at
25 F rebuild or less, right, and so we could readjust here, if needed,
26 to make sure that we can rebuild in ten years, but, you know,
27 ideally, we wouldn't see that value at all.

28
29 It would trigger this overfished condition much less often, if we
30 set up the rule correctly, and, you know, again, I don't know that
31 I -- I will just say that I think that Katie had intended to say
32 this, and so, again, stealing Katie's thunder, but, most recently,
33 the SSC has typically set ABC at 75 percent of FMSY, and that may
34 well be all you need to do. That may well be a value that we can
35 defend, using the simulation work. Have I clarified anything or
36 just further complicated it for you, Luiz?

37
38 **DR. BARBIERI:** Just to that point, Mr. Chairman.

39
40 **VICE CHAIRMAN NANCE:** You've clarified a little, but Luiz, please.

41
42 **DR. BARBIERI:** Yes, and you clarified that perfectly, Shannon. I
43 mean, this is exactly the explanation that I needed to here. You
44 know, I think I've got my brain wrapped around the term "rebuilding
45 the stock", and so, when you say "rebuilding the stock", right, I
46 think about a rebuilding plan, right, but what you're saying is
47 you are reducing fishing mortality, in the blue line, right,
48 through an ABC Control Rule, that would allow the stock to either

1 stay at that level, or go a little bit higher, right, towards BMSY,
2 before triggering an actual rebuilding plan.

3
4 **DR. CASS-CALAY:** Exactly.

5
6 **DR. BARBIERI:** I was getting confused by -- You know, when you
7 said rebuild the stock, I got confused. Thank you for that,
8 Shannon. That was super helpful.

9
10 **VICE CHAIRMAN NANCE:** Yes, because I think the more appropriate -
11 - It's just that we're reducing catch, along either the orange
12 line, the blue line, or, if we're using 75 percent of FMSY, a black
13 line in between those, and we're just reducing the catch at those
14 levels. Harry.

15
16 **MR. BLANCHET:** I'm struggling with this, because I hate to throw
17 yet another line onto the board, but I will anyway. When the MSST
18 change happened, I was disappointed that the concept of one minus
19 M seems to have disappeared from the lexicon entirely, and
20 unjustifiably. To me, what the change in the MSST -- It did not
21 really change the logic behind having some buffer between when you
22 would start decrementing your Fs and your estimate of BMSY.

23
24 I would be very interested in seeing some analysis, and it may
25 make no difference at all, if we're talking about tilefish, or
26 some of our more long-lived reef fishes, but it does make a
27 difference for things like Spanish mackerel, or yellowtail
28 snapper, or some of those other species, where very noisy biomass
29 signals -- I guess I'm talking about another hinge point, sort of
30 like where our old one minus M would be but maybe reconsidering
31 whether one minus M is the appropriate hinge point for some of
32 these long-lived species, because what happens is it's almost, in
33 between one assessment and another, and it's not a change in the
34 status of the stock, but it's a change in our perception of the
35 status of the stock, because we have changed a length-weight
36 relationship, or we have changed a method of estimating
37 recreational harvest, or we have changed an age-at-maturity, and
38 so a lot of things go into it, and not just a change in the absolute
39 estimate of the stock status.

40
41 I guess the short answer is I really would like to see some
42 simulations, but I would like to see some simulations that don't
43 necessarily hinge at BMSY, but at some biologically-based hinge
44 below that level that accounts for the natural variation in
45 biomass. Thank you.

46
47 **VICE CHAIRMAN NANCE:** Thank you, Harry. John, please.

1 **DR. FROESCHKE:** Well, if I understood his comment, I mean, in
2 practice, we used to do the one minus M, but, for many species, if
3 M was 0.15, or 0.12, or 0.10, for some of these longer-lived
4 species, we would be doing a lot more rebuilding plans, and that's
5 what would happen, is -- When your buffer is so small, you do get
6 these natural variations, and then you're in rebuilding status,
7 despite that.

8
9 I mean, if it's a concern about absolute biomass, the B and not
10 the ratio, there are other levers, for example the SPR proxy. If
11 you want more fish in the water, you could achieve that through
12 that method, and the problem that we have, operationally, with the
13 rebuilding plans, is, if you come in below that, now we have to
14 determine a time, a specific time, which we're not good about doing
15 that.

16
17 I mean, if the biomass is just above MSST, we will reduce catch,
18 and will attempt to grow the stock back to MSY, and it's just not
19 a time certain, and so it gives the process more flexibility and
20 doesn't require a level of specificity that we just don't have,
21 but that was the rationale for lowering the MSST to as low as it
22 could for most of these stocks, was exactly that. It was to give
23 the stock as much room to oscillate through normal processes, that
24 may not be a fishing issue, and to provide that flexibility to the
25 SSC and the council.

26
27 **MR. RINDONE:** Specific to that, I mean, we've done that now with
28 scamp and with gag, and so, for similar yet different reasons,
29 and, you know, explicitly for scamp, it was just general
30 uncertainty about the stock, combined with the hermaphroditism, and,
31 then, with gag, it was explicitly about the hermaphroditism and gag's
32 vulnerability to red tide.

33
34 You know, we can't really predict when the next red tide will be,
35 or how bad it will be, but we know that gag, and, coming up, red
36 grouper, do a sometimes rather poor job of getting out of the way
37 of it, and so --

38
39 **MR. BLANCHET:** Mr. Chairman, to John's point?

40
41 **VICE CHAIRMAN NANCE:** Yes, please, Harry.

42
43 **MR. BLANCHET:** Yes, and I was not intending to deal with the
44 minimum stock size threshold at all. I was looking at different
45 methods of decrementing F between BMSY and whatever that stock
46 threshold is, and I just -- The concept of having an adjustment,
47 or an allowance, for the natural variation around the MSY, based
48 on the biology of the stock, independent of the regulatory

1 framework, was what I was looking at, and so we are providing
2 biologically-based advice to the council that accounts for those
3 variations, and it does not necessarily require declining Fs, just
4 because it's below BMSY, but it does respond to declining -- By
5 recommending a decline in F, somewhere below where we would
6 normally expect that stock to vary, independent of whatever the
7 regulatory description of MSST is. Thank you.

8
9 **VICE CHAIRMAN NANCE:** Thank you, Harry. Okay. Katie, let's go
10 ahead and finish those last two slides.

11
12 **DR. SIEGFRIED:** Okay, and I do have a question about what Harry
13 just said, because it seems like -- I don't know if the SSC wants
14 to discuss it more, but it seemed like he was proposing simulation
15 work that would set an ABC Control Rule that would be like a pseudo
16 MSST, almost, where the goal of the control rule would be to never
17 even get to the MSST, which should be the goal of the control rule,
18 but it would be setting up a pseudo MSST, by assuming the one minus
19 M, or any other biological factors, and is that what other people
20 understood, and, if so, is that -- Because that's different than
21 the sigma analysis, or the B_{CRIT} analysis, and I'm not entirely sure
22 how we would incorporate that, besides setting an MSST that was
23 different than what's on the books.

24
25 **VICE CHAIRMAN NANCE:** Harry, did you want to take that?

26
27 **MR. BLANCHET:** So I was not at all intending to get into the MSST,
28 other than that is a serious stop sign on the regulatory framework.
29 Yes, I definitely want to avoid MSST. I think that's in all of
30 our best interests.

31
32 The -- What I was trying to get at is that we may not need to be
33 adjusting F at levels that are very near to -- When our biomass is
34 very near to BMSY, which is what you do if you're using the blue
35 line, but, if you have -- But, if you have some buffer, and I hate
36 to keep using that word in so many different contexts, but, if you
37 have some metric for a stock, say 5 percent, 10 percent, of BMSY,
38 that you expect the biomass to be varying within, just naturally,
39 then we shouldn't be messing with F within that -- Within that
40 range.

41
42 So this is independent of the regulatory framework, and this is
43 dealing with what I think we're supposed to be dealing with, which
44 is the biological aspects of trying to maintain a stock where it's
45 producing the maximum sustainable yield, and we could talk about
46 optimizing that yield in other ways, but, for maximum sustainable
47 yield, the response curve in F does not need to be locked so
48 tightly to the mean value. We should have some adjustment for

1 that, and that's all.

2

3 I think that it's something that is not that different, and it's
4 basically putting another hinge point, at something like 90 percent
5 of BMSY, or, in the case of tilefish, 95 percent of BMSY, and going
6 from there, and it's not dealing with MSST at all, other than this
7 is something -- Other than that is something to avoid. Does that
8 help?

9

10 **DR. SIEGFRIED:** Yes, and I'm sorry, and I'm probably thinking about
11 it -- Like what the curves would look like, and what the
12 simulations would look like, and, when you first mentioned it, it
13 sounded like you were looking for a non-linear ramp.

14

15 **MR. BLANCHET:** No.

16

17 **DR. SIEGFRIED:** Okay.

18

19 **VICE CHAIRMAN NANCE:** Okay. Thank you. Ralph, please.

20

21 **MR. TOWNSEND:** It seems, to me, that this recent discussion raises
22 the point about what question we're answering, and that is are we
23 answering the question of what is the ideal control rule, or are
24 we answering the question of, given the goals of the council, and
25 given the legislative framework, the decisions that are already
26 made, here's the right rule, or here is the best strategy, and
27 those are two different questions, and it strikes me that we have
28 to decide which one we want to answer, as a -- I mean, we can
29 answer a theoretical question that says what's the best rule, and
30 relitigate all of that, and I don't think that's really what we
31 want to do.

32

33 The second one though is here's our advice to the council, given
34 your goals, the best way to proceed, but that implies that we know
35 the council's goals, and I've heard one here stated. For example,
36 one of our goals is to minimize the probability of invoking an
37 overfishing rule, and there's also, however, some sort of implicit
38 rules, some sort of implicit goals, about not changing fishing too
39 often, and too radically, and it seems, to me, that there needs to
40 be -- I know we're not going to ask the council to write down
41 here's all your goals, but, on the other hand, we do need to think
42 about, in the modeling exercise, what are the goals, or the
43 criteria, against which the outcomes will be evaluated.

44

45 It's clear to me, from this discussion, that one of them is the
46 probability of invoking an overfishing rule, but there are other
47 rules implicit about changes in the rate of fishing, and that sort
48 of thing, that I think one of the issues is different people have

1 different evaluations of what that rule is, and, to some extent,
2 we've got to figure out a way to quantify that, so that we can --
3 The first thing we can say to the council is, given this picture
4 of rules, this is the one that is -- This is the probability that
5 you're going to get into an overfishing condition, but there really
6 are other criteria that we need to understand, and I have not been
7 -- I mean, I get the idea that we don't want to change too much
8 too fast.

9
10 I think that's kind of what it is, but I think we need to think
11 about something that's actually a little more specific than that,
12 if we want -- Because running management simulations, when we don't
13 know what our criteria are -- I mean, essentially, what we get is
14 the situation where we can say, well, given my objectives, I like
15 that outcome, and Andrew can give a different answer, given his
16 implicit objectives, and that's not going to really solve the
17 question.

18
19 It seems, to me, that we need to have some more specificity about
20 what are the objectives of the rule, and the other piece is whether
21 our goal here is to help the council reach its objectives, which
22 may not agree with, or is our goal to reach what we think is the
23 best scientific result.

24
25 **VICE CHAIRMAN NANCE:** Ryan, to that point.

26
27 **MR. RINDONE:** So I can provide some direction about the council's
28 goals, because the council has stated this several times,
29 especially recently, and with respect to the gag rebuilding plan,
30 which is to not close a fishery if at all possible to not close
31 it.

32
33 There is obvious reasons for that, from a social and an economic
34 standpoint, about, you know, eliminating access to a resource, but
35 there's also a science side of it, in that there's a lot of fishery-
36 dependent sampling that occurs on the backs of harvest, and, if
37 the fishery is closed, then you no longer get age and length
38 samples from the recreational and commercial fleets, or any other
39 information about effort, and you lose the ability for a lot of
40 gonad sampling and things like that that occur, like academic and
41 state-sponsored research.

42
43 The council is sensitive to that as well, and so, even if a small
44 amount of harvest can be maintained, the council would prefer to
45 see even that small amount, just so that there's at least the
46 opportunity, one, for social and economic benefits, by access to
47 the resource, and, two, for the science side of it, so that we're
48 not denying ourselves that.

1
2 There are only a few real examples that the council has to point
3 to about, you know, what happens when a fishery closes, and none
4 of them are good, and so, essentially, they close, and the
5 council's experience is they don't ever reopen, and so they're
6 sensitive to that, and they certainly don't want to see that
7 happen, if it's avoidable.

8
9 **VICE CHAIRMAN NANCE:** Thank you, Ryan. Katie.

10
11 **DR. SIEGFRIED:** That's actually really helpful, because, earlier,
12 I mentioned, you know, that we would propose doing an SS-MSE
13 simulation to test some of these components of the ABC Control
14 Rule. You know, the first step of an MSE is to define the
15 management objectives, and so we would be able to not just test
16 those two things that I mentioned earlier, the uncertainty in
17 either B_{CRIT} or the value of MSST, but we would be able to identify
18 management objectives, which, in turn, would probably allow us to
19 say, okay, if management objectives are such, and MSST is set to
20 whatever value it's set to, then what would be the way we could
21 incorporate scientific uncertainty to provide the best management
22 advice.

23
24 Although I don't think an SS-MSE is that useful for just testing
25 which sigma value we should use, it's very useful to define the
26 problem and answer the questions that have been asked on the floor
27 today, and so if you could go to the next slide, please.

28
29 Again, that Excel spreadsheet is on the server for you to play
30 with, if you want to look at different variations of that ramp
31 that was shown on the previous slide, but we would, and this was
32 to the question that somebody posed earlier, do it for each
33 species, or how would we approach this first, and so it seems like
34 the best approach, to avoid overloading ourselves, is to take a
35 look at the way that the ABC Control Rule would function for a
36 species in three different categories, either above the BMSY, and
37 so a very well-off stock, something like vermilion, below BMSY,
38 but above MSST, like king mackerel or cobia, or below MSST, which
39 we have a few of those available, like greater amberjack and gag,
40 and so we would be able to test the performance of the control
41 rule for species that are in certain, you know, critical management
42 categories first.

43
44 That would be sort of how we would want to approach it initially,
45 as opposed to every single individual stock, and we talked a lot
46 about some of your feedback, and you've answered far more questions
47 than I have in this slide, and the one that I put on here, when I
48 was first formulating my thoughts on this, is is it even useful to

1 test the specific values of sigma min, when the uncertainty may be
2 as large as 45 percent, right, and so the Privitera and Punt is
3 going to give us a sigma value that is almost double from Restrepo,
4 which is what we're using now, and I appreciate Will's
5 clarification of the whole package of Restrepo, and it's not just
6 75 percent FMSY.

7
8 The original council request was to take a look at the uncertainty
9 alone, and it sounds like there is more interest in testing the
10 uncertainty, and I don't know if B_{CRIT} is of value the same way,
11 and looking at different levels of MSST is still up for discussion,
12 but also incorporating management objectives to do things like,
13 you know, make sure we never have to -- Well, as little as possible,
14 invoke something that is this massive call-to-arms, like a formal
15 rebuilding plan, and the goal of the ABC Control Rule really should
16 be to avoid that, and not at all costs, because that's what the
17 rebuilding plan is, but, where possible, avoid that, and so how
18 much uncertainty do we need to incorporate in order to accomplish
19 that?

20
21 How far between that orange and blue do need to be, and, you know,
22 incorporating management objectives there will allow us to
23 determine which of the tradeoffs we should examine, whether it's
24 an MSST determination, whether it's the proxy determination,
25 whether it's purely the uncertainty, and that will allow us to
26 formulate a better MSE structure and move on to Step 2 and 3 and
27 4.

28
29 We also should establish timelines for this work. As many of you
30 have stated, this has been going on for a really long time, and
31 then make sure to detail the intended application.

32
33 Now, to be clear, we're pretty pleased with the direction that
34 this has gone so far. Like Shannon mentioned, you know, if MSST
35 is set to 50 percent, and the SSC is recommending a 75 percent
36 FMSY for the ABC, that's already incorporating quite a bit more
37 uncertainty than used to occur with P*, and so that's been really
38 positive, in our recent experience, and so, right now, we're not
39 complaining, and we're not as concerned as we were when P* was
40 first brought on and utilized, in the way that Shannon described,
41 where we were worried that we were just not giving ourselves enough
42 room for uncertainty before a rebuilding plan was invoked.

43
44 It would be nice to have a discussion of, you know, timelines for
45 the work, and how important is this, what types of applications do
46 you all see, and do you see creating a control rule that's
47 different from what you've been using recently with the Restrepo,
48 and do you see the need for the formal structure, and then do you

1 agree that moving forward with something like the SS-MSE framework,
2 sort of a moderate level, like what Cassidy showed yesterday, of
3 involvement, rather than a full multiple-workshop MSE, and I think
4 that we can accomplish it with the moderate level, but there
5 definitely needs to be some definition of our council's management
6 objectives, and then hopefully we can have more discussion about
7 these topics now, but I think that's my last slide.

8
9 **VICE CHAIRMAN NANCE:** Okay. Perfect. As we think, I'm going to
10 take a break, and when we come back -- We'll reconvene at 10:15,
11 and we'll start our discussion.

12 (Whereupon, a brief recess was taken.)

13
14
15 **VICE CHAIRMAN NANCE:** Let's start gathering back. I know there's
16 a lot of discussions going on, but let's go ahead, and we can
17 discuss it in public. Okay. Let's go ahead, and we'll begin with
18 Harry.

19
20 **MR. BLANCHET:** Thank you, Mr. Chairman. I wanted -- Just for
21 history's sake, I wanted to go back to when we first created this
22 spreadsheet. Remember the origin of this was something that, I
23 think, in his words, Joe Powers says he threw it together one night
24 during one of our meetings, and he was never very comfortable with
25 it. He always thought of it as a starting point for discussion,
26 and I don't think that he expected this to be as long-lasting as
27 it has been.

28
29 The other part of that is, when we were having these discussions,
30 we were looking at stock assessments with much wider ranges of
31 outcomes than what we currently get with the Stock Synthesis, and
32 a lot of these were ASAP models, or other models, and just there
33 was -- So the width of that uncertainty from the existing
34 assessment, that we were looking at in the late 2000s, was much
35 broader than what we have seen since then.

36
37 That was part of the reason, I believe, that the council then
38 constrained what we could use as a minimum P* value. The use of
39 0.3 as a minimum P* then restricted what we have available to us
40 in terms of using that spreadsheet, and so it was not just a single
41 action, but a concatenation of several different actions, that
42 ended up with us having this very narrow range of -- Or this very
43 small change in what would come up with for a P*, but I just wanted
44 to put out there in context, and it was worth revisiting, and
45 certainly the primary author that that it should be revisited from
46 the beginning, and so that's all. Thank you.

47
48 **VICE CHAIRMAN NANCE:** Thank you, Harry. It seems like we're at a

1 point where we have a couple of things on the table. We can, as
2 a body, continue to use, and just publicly say that we're going to
3 continue to use, 75 percent, using the FMSY, which is the Restrepo
4 method, the Ralston method, which is around 0.4, or have the center
5 look at some alternatives that we can look at at a later date, but
6 I think we need to move forward on one of those, so we can kind of
7 be able to outline how we're going to be able to proceed, and so
8 I would like to hear from the SSC on those alternatives and where
9 we would like to go with those. Luiz, please.

10

11 **DR. BARBIERI:** I was just going to make a few comments here, right,
12 to get our conversation -- You know, responding to your call for
13 action there, Mr. Chairman. You know, if we look at, you know,
14 Slide 20, and the two ramps, right, and we say, okay -- In my view,
15 it would be nice to get the MSE that the center is conducting,
16 right, and see those results, because they're going to be
17 informative about a variety of issues for us, and it will help us
18 have a better holistic view of this issue, undoubtedly, in my view.

19

20 No analysis is perfect, but this is going to give us a lot of very
21 good information that I think will be helpful, and so I would like
22 to propose is that perhaps we have our cake and we eat it too
23 right, and so we ask -- I mean, we support the center's proposed
24 work here to conduct the SS-MSE, but, at the same time, in the
25 meantime, since we're going to have to move forward, right, we
26 tell the council that we propose continuing using the Restrepo
27 approach, until we can get those results and evaluate what's there,
28 to have, you know, better informed decision-making ability.

29

30 I think that -- You know, this is why I'm looking at that ramp
31 there, and, if I understood correctly, or I heard correctly what
32 you said, Katie, the blue line, you know, give or take, could be
33 interpreted -- You know, we don't know exactly what that slope
34 would be, but it could be interpreted as a version of, you know,
35 going with the Restrepo approach, where, you know, we would propose
36 an ABC that reduces fishing mortality to a level that allows the
37 stock to either maintain or grow biomass back towards BMSY, so we
38 correct course before we get to a rebuilding plan, and, when we
39 get those results, we can reevaluate where we are and make a
40 decision on whether we would like to go with something more complex
41 or whether we, you know, proceed as such.

42

43 I just feel that, when we look at the whole package, right, and
44 so, yesterday, we had the presentations, right, and Katie, and
45 Shannon I guess, gave us the presentation yesterday about the new
46 stock assessment process, you know, the revisions to that process,
47 and we saw the amount of workload that is integrated in that
48 presentation, and the idea to, you know, try to integrate some

1 simpler approaches, right, so we can increase throughput.

2
3 We know that we have a lot of things, a lot of moving parts, and
4 so, to me, going with a simpler approach, you know, and we set ABC
5 equal to the yield at 75 percent of FMSY, until we can see what
6 comes out of the analysis, in my view would be a good option
7 forward.

8
9 **VICE CHAIRMAN NANCE:** Thank you, Luiz. Will, please.

10
11 **DR. PATTERSON:** I don't know what the breakdown is, but I don't
12 think that we always use explicitly the Restrepo et al. approach.
13 I think usually we set it at 75 percent -- The ABC at 75 percent
14 of OFL, right, and sometimes we do the F ABC is F -- Is 75 percent
15 of FMSY, which is the Restrepo approach. Just, you know, it's
16 Restrepo like, I think, what our operating procedure has been, but
17 it's not explicitly Restrepo.

18
19 Secondly, you know, we've asked -- We've requested the council to
20 ask the Science Center for various analyses to support us making
21 changes to the ABC Control Rule for quite a few years, and I think
22 the center has responded to those, and has tried to do analyses,
23 and, you know, address what comes from us through the council, and
24 sometimes it has been possible, and I think this is a sincere
25 presentation and effort to say, okay, what we think is possible,
26 and likely to be valuable, as this approach, and so I support it.

27
28 I would like to see the results of the analysis, just so that we
29 have something in front of us that we can hang our hats on, and I
30 think the second-best thing would be to utilize literature, and
31 previous analyses, especially ones that are broad across the range
32 of life histories, but I can understand why, you know, that's not
33 explicitly applicable to Gulf stocks, and Gulf fisheries, and why
34 people would be uncomfortable with that, and so I support this
35 recommendation.

36
37 **VICE CHAIRMAN NANCE:** Thank you. Steven, please.

38
39 **DR. SCYPHERS:** Thank you, Mr. Chair. I, similarly, was going to
40 support Luiz's proposal, in terms of moving forward, but with the
41 understanding of, after our discussion yesterday about workloads,
42 that we not impose too much of a lift on the Science Center with
43 respect to interrupting kind of the assessment calendar.

44
45 I think it's good that the sort of 75 percent approach is, for
46 now, kind of useful, and then, like to Will's point, I was also
47 thinking about the sort of breakdown of what we've used in the
48 past, and sort of what that portfolio has looked like, and I wonder

1 if some other sort of simple analysis, that just looked at -- You
2 know, across species life histories, et cetera, what -- Obviously
3 this is going to vary, depending on what the status of the stock
4 was when the policy was put in place, but, you know, to look at
5 what control rules were used that were successful, right, at either
6 maintaining the health of a stock or allowing it to recover without
7 requiring draconian rebuilding, versus -- So, you know, in other
8 words, across the SEDARs and such that we've done across the
9 species, what -- You know, kind of envision like a table, in your
10 head, of, you know, the assessment species, and maybe a few key
11 life history components, and then stock status, and then, you know,
12 how long it took to recover, if it needed, and then what approach
13 was used.

14
15 I wonder if anything useful would come out of that, in terms of
16 saying, oh yeah, look, when we've used this approach in the past,
17 we've been able to avoid draconian cuts, and, when we've used that
18 approach, we have not.

19
20 Obviously, there is a lot of nonlinear complexity in there, based
21 on, again, species life history and where the status of the stock
22 was for that species at the time that management was put in place,
23 but just some other thoughts, and to sort of support what Will and
24 Luiz -- Their comments. Thanks.

25
26 **VICE CHAIRMAN NANCE:** Thank you. Is there any SSC member opposed
27 to having the Science Center look at this methodology, as outlined
28 here by Katie? I think I would like to have -- On her last slide,
29 it would be useful to test -- There's a range of values, and I
30 think it would be certainly appropriate for us to maybe constrain
31 that range, so they're not using everything, and, also, I'm not
32 sure -- Maybe B_{CRIT} , to propose a value, or a range, for it, because
33 that also has implications on the slope. Ryan, please.

34
35 **MR. RINDONE:** Well, I guess, when thinking about how you guys would
36 consider B_{CRIT} , you know, it's probably going to be different for
37 different species, and, you know, there's going to be some things
38 that are obviously going to factor into that. You know, we have
39 regional differences for some of our stocks, and the reproductive
40 capacity for those stocks in different regions are sometimes
41 dissimilar, and so I think that could get rather complicated.

42
43 If you instead assign it based on, you know, like species
44 groupings, maybe you can generalize it a little bit, and kind of
45 like encapsulate some of that. Otherwise, noise, you know, by
46 saying have, you know, one for -- I'm making something up, but one
47 for jacks, and one for shallow-water grouper, and one for deepwater
48 grouper, you know, acknowledging some similarities in life

1 histories, such as, you know, age at which 50 percent of the stock
2 is reproductively mature, and max age and things like that.

3
4 Obviously, in shallow-water grouper, you would treat it a little
5 bit differently than deepwater grouper, and I'm just thinking about
6 like the yellowedge assessment, where, you know, some of us anyway
7 learned that yellowedge can live a long time, and something to
8 think about there.

9
10 I think, also, just optically, you know, when we're getting stock
11 assessments, and we're looking at these values that we get for
12 B_{CRIT} , and we know that like, if it gets below that point, that
13 like, wow, we are really in trouble, and that's the point at which,
14 you know, F would be set to zero.

15
16 It kind of serves as like a -- In the minds of management anyway,
17 it's like I really need to do what I can to avoid this, and so,
18 obviously, you don't want to set it arbitrarily too high, you know,
19 if $MSST$ is 0.5, and B_{CRIT} is 0.45, and it doesn't really -- It kind
20 of negates the intended purpose of both of them, but you obviously
21 don't want it to be -- I think, just looking at what was on the
22 graph, and I don't think Katie intended this, but it looked like
23 it was at like 0.1, and it was like, wow, that's low, and so maybe
24 batching it by species grouping, and similar life histories, or
25 something like that, and, you know, that might be a path forward
26 there, if you wanted to use that.

27
28 **VICE CHAIRMAN NANCE:** I do think that using life history
29 information to set a range for B_{CRIT} would be important. I don't
30 want to have it where we're sitting here, every time we have a
31 different species, and trying to figure that out, but maybe have
32 some life history information where we're comfortable with a B_{CRIT}
33 at a certain range.

34
35 As far as the others, I mean, we have a range from I will say zero
36 to 45 percent, and do we want to cut that down to -- You know, we
37 have P^* , and we have the Restrepo, and we have Ralston, and Ralston
38 seems to be around 0.4, and do we want to give the center a range?
39 Luiz, please.

40
41 **DR. BARBIERI:** Well, the short answer is no. I mean, I would love
42 to weigh-in, and I appreciate the fact that Katie, you know,
43 brought this up in her presentation, and is requesting some
44 feedback from the SSC about this, but it's difficult to -- I mean,
45 in my view, it's difficult for us to make a recommendation until
46 we see a little more detail about this and the amount of work.

47
48 I mean, Katie, I'm sure you're listening, and I hope you

1 understand, and, I mean, the idea was not to overburden the center,
2 right, with doing more analysis than necessary, and so, you know,
3 perhaps you can bracket the values there to what you feel would be
4 reasonable, and I think that having something that tests the impact
5 of just using P*, because this is what we had on the table for a
6 while, and, eventually, when we discuss, right, the outcome of
7 this, it would be good to have that comparison to the initial
8 approach that we used, and then compare to these other ones of
9 Restrepo, or perhaps we don't call it Restrepo, and we just call
10 it ABC as the yield at 75 percent of FMSY, right, to Will's point
11 about Restrepo is a lot more than that, and I understand that.

12
13 Then Ralston, that's pretty straightforward, right, and it's 0.4
14 sigma min, and then there would be several values of sigma min
15 there that are going to be used as a range, right, within the
16 Restrepo framework, and, to tell the truth, I have not reread the
17 Privitera-Johnson and Punt paper in a while, and I don't remember
18 all the details, and so, if they want to come back, when they have
19 just a little better structure, to ask us for more input, and I
20 would be more than glad and appreciate that, but I don't really
21 have any way to propose anything that I can properly justify at
22 this point.

23
24 **VICE CHAIRMAN NANCE:** Katie, let me ask a quick question. On one
25 slide, we have to take a look at the ABC Control Rule functions
26 for recently-assessed stocks, which are -- One is above BMSY, and
27 below BMSY, but above MSST, and the other one is below BMSY and
28 below MSST, and so, by looking at those three different scenarios,
29 does that constrain the others, as far as looking at 75 percent
30 and those types of things, and 0.4 and those types of things, that
31 were on this last slide?

32
33 **DR. SIEGFRIED:** So what I was looking for wasn't necessarily a
34 range. I was looking for SSC discussion about whether that level
35 of uncertainty is something that could be acceptable for providing
36 management advice, and sort of the idea that we're going down this
37 path of identifying uncertainty in this way, just that general
38 acceptance from the SSC, and that it could be quite large. We
39 don't necessarily need the parameterization at this point.

40
41 The slide that you're talking about, Jim, it's useful to hear that
42 it would be helpful to look at above BMSY, below BMSY, and below
43 MSST, as general categories, but, as we go through, we are going
44 to have to come back and let the SSC know how it's going, because
45 we're going to have to set management objectives and then determine
46 our, you know, matrix of options at that time.

47
48 It would be premature to set those at this point, and I really

1 like what I've heard, that we have a way to provide you with ABC
2 advice now, potentially using what we've used for uncertainty in
3 the past few years, and then get the SSC's support to conduct this
4 sort of moderate-work-level MSE to address this question sort of
5 once and for all, right, and it's been going on for quite a long
6 time, and this seems like the best way to get at all of the
7 different points. I hope that that answers your question, and I
8 certainly don't expect you all to provide ranges, and species, or
9 any of that at this point.

10
11 **VICE CHAIRMAN NANCE:** Okay. Perfect. I just wanted to make sure
12 that we were providing as much information as we could, so that
13 you're not floundering, and not that you ever flounder, but you're
14 trying to figure out what we're asking, and I appreciate those
15 comments. Steven, please.

16
17 **DR. SCYPHERS:** Thank you, Mr. Chair. Katie, or Shannon, I just
18 had a question regarding the B critical value, and isn't that
19 something that could be -- That's able to be estimated in each
20 stock assessment, and like can't -- Isn't there -- Aren't we able
21 to have essentially an empirical value, per assessment, per
22 species, for that B critical place, so to speak?

23
24 **DR. SIEGFRIED:** I'm trying to think of how that would be -- I mean,
25 it's still a percentage issue, and we've calculated acceptable
26 levels of depletion, and it's not necessarily a -- Well, some of
27 it is a biological value, and some of it's a how long will it take
28 management to act component, and so it would probably be a
29 combination of factors that would be best determined by an
30 iterative simulation.

31
32 I don't -- The short answer is I don't think it's a number that we
33 can get out of the assessment, because it's not just a species-
34 by-species determination. It's just we're arguing it, because it
35 could be just a good practice to have, that sort of last-ditch
36 B_{CRIT} value thrown in there. I know what Ryan was saying earlier,
37 that, you know, the level we had in there was quite low, but, the
38 higher you make it, the steeper your ramp is between MSST and the
39 B_{CRIT} , and so it is a tradeoff in management as well.

40
41 **VICE CHAIRMAN NANCE:** There's a balance from going from zero to
42 one, and I think it gives us a little more slope, as we're reducing
43 catch, and that's its main function, I think.

44
45 **DR. SIEGFRIED:** It's not just, you know, the depensation of a
46 species.

47
48 **VICE CHAIRMAN NANCE:** Thank you.

1
2 **DR. SCYPHERS:** That makes sense, yes. I mean, I figured you could
3 sort of find, you know, the point where a stock is spiraling down,
4 so to speak, you know, where recruitment is not keeping up, but I
5 follow. Thanks.

6
7 **VICE CHAIRMAN NANCE:** Ralph, please.

8
9 **MR. TOWNSEND:** So, as I think about this, I'm saying what are we
10 asking the analysis to give us, and I'm new to this, but it seems,
11 to me, that we're not asking the analysis just to give us lots of
12 outcomes. We want the analysis to tell us how well these different
13 rules promote the objectives of the council, and so, for example,
14 an obvious objective of the council is rebuilding, and so the
15 percentage of the time that rebuilding occurs.

16
17 There is, and I don't know how to quantify it, but there's also,
18 it seems to me, a council objective of not changing things too
19 often, and they want some sense of stability, and it seems, to me,
20 that we want some measure of that out of this analysis, and, in
21 particular, what the analysis is probably going to tell us is the
22 tradeoff between those two goals, and communicate to the council
23 how bad, or not bad, that tradeoff is, and that is, if you insist
24 on not changing things very often, then do you run a much larger
25 risk of a stock getting to rebuilding, and it seems, to me, that,
26 while that perhaps is -- In our thinking about the ABC, which is
27 the SSC's role, that our goal is not to set the biologically-
28 perfect ABC, but the goal is to set the ABC that is most consistent
29 with the objectives of the council, within the constraints of the
30 -- So we might be saying, to the council, we actually are going to
31 adopt a rule that involves more frequent changes, because we think
32 that substantially reduces the probability of rebuilding
33 strategies.

34
35 Having a sense -- I don't know what other objectives are in there,
36 and I know it's hard to quantify this I don't like change thing,
37 but it does seem, to me, that is -- I don't know, and maybe there
38 are other objectives as well, but those two objectives of
39 stability, versus avoiding rebuilding plans, understanding what
40 that tradeoff is, and how that tradeoff is affected by different
41 rules, I think is the information we want from this process.
42 That's just my intuitive sense of where we're at, and, now, people
43 can correct me if that's not correct, but I'm thinking about how
44 do we provide the people who are doing the analysis with what are
45 our objectives, what are we trying to measure.

46
47 **VICE CHAIRMAN NANCE:** Ryan, please.

1 **MR. RINDONE:** Thank you. When we're evaluating, or when you guys
2 are evaluating, where you're going to ABC, it's -- According to
3 the act anyway, it's considerate of physical, biological,
4 ecological, economic, and social factors, and so, you know, there
5 are things outside -- You know, like you mentioned, outside of
6 just the biology to be considerate of.

7
8 The act does kind of lean heavily on the biological side, and,
9 obviously, the economic and social -- Or the social benefits go to
10 zero if the biology is ignored, and so then all of it ultimately
11 will fail, and, like I had mentioned, as far as the council's
12 goals, I have mentioned that they really don't want to close
13 anything, if they don't ever have to.

14
15 Consistency is talked about frequently. However, it's not talked
16 about universally, and so, for some species, the council is much
17 more willing to frequently change catch limits, whereas, you know,
18 with others, a set-it-and-forget-it approach is sometimes seen as
19 plenty acceptable.

20
21 In the past, like for yellowtail snapper, and that one had been on
22 the books for quite some time, and we've had other stocks that
23 have had the same catch limits on the books for a number of years,
24 simply because they were lower-priority stocks, and sorry, Spanish
25 mackerel, but then there's other stocks that we change catch limits
26 on quite frequently, and that seems to be more so when they are
27 high-value targets, and they're rebuilding, like red snapper, red
28 grouper, and, in the past, greater amberjack, gray triggerfish
29 when we've had the opportunity, and those are all stocks that are
30 key to -- They're important to fishermen, and they're almost
31 meeting-by-meeting discussion topics for the council.

32
33 I think that, when the summary is given to the council, that's
34 certainly a question that the SSC could propose, is, you know, as
35 far as overarching goals, beyond just the responsibility to prevent
36 overfishing from occurring, and to rebuild stocks that are in an
37 overfished condition, and beyond the desire not to close a fishery
38 if at all possible, what are a couple of umbrella goals, like
39 stability, and, if you can get those out of the council, which I
40 think you can, then that gives you guys a better idea, moving
41 forward, of how to build the control rule to not only satisfy the
42 requirements of Magnuson, but also the council's objectives.

43
44 **VICE CHAIRMAN NANCE:** Thank you, Ryan. Luiz, please.

45
46 **DR. BARBIERI:** Thank you, Mr. Chairman. First of all, Katie, thank
47 you for that clarification on the feedback that you would expect
48 from the SSC. That helps me, and, you know, also looking forward

1 to, you know, what we would ask and how we are going to react to
2 what you bring back to us, and so that's helpful.

3
4 Then, not to stop discussion here by any means, and, I mean, the
5 idea is to stimulate additional discussion, but I sent a draft
6 motion, Jess, that I hope can be put on the board for us. If there
7 is a second to this motion, I think we can continue discussion.

8
9 **VICE CHAIRMAN NANCE:** Okay. We have a motion by Dr. Barbieri.
10 **The SSC recommends that the Southeast Fisheries Science Center**
11 **proceed with the MSE analysis proposed to assess the impact of**
12 **different levels of uncertainty on different ABC control rules.**
13 **Until the results of those analyses are reviewed by the SSC, the**
14 **committee would set the ABC as the yield at 75 percent of FMSY.**
15 Do we have a second for that motion? Will seconds. I guess my
16 only issue with this one is does this lock us into always having
17 to use 75 percent of FMSY?

18
19 **DR. BARBIERI:** I don't know, and I think that's a point for
20 discussion, right, on whatever the -- I think that the idea here
21 would be to simplify things on the way forward, so that we don't
22 have to always be discussing it, and, I mean, let's look at how
23 often we used -- You know, we apply the ABC Control Rule over the
24 next couple of years, because we had concerns that we felt were
25 not being addressed, and so I still think that we have -- This is
26 basically -- I mean, we have the option to use the ABC Control
27 Rule, because that's the rule that is in place right now, and it's,
28 you know, a regulatory amendment as our ABC Control Rule.

29
30 This would be something just to clarify that, in my view, we would
31 be satisfied going this way, to simplify things, to reduce
32 unnecessary workload for the center and for us, and to avoid us
33 having to make -- Which at times felt sort of arbitrary, and I was
34 trying to look for a different term than that, right, but arbitrary
35 decisions on when to use it and when not to use it. **By the way,**
36 **as a way of correction, 75 percent of MSY or its proxy, at the end**
37 **there.** Sorry.

38
39 **VICE CHAIRMAN NANCE:** Will.

40
41 **MR. ADRIANCE:** Luiz actually added what I was going to suggest.

42
43 **VICE CHAIRMAN NANCE:** Thank you, Jason.

44
45 **DR. PATTERSON:** I think one way potentially to clarify this is we
46 could add, after "proxy", "has been its recent practice", or, since
47 we already have the ABC Control Rule that's been approved up the
48 chain, and this has been our recent practice, we could remove that

1 entire second sentence and carry on as we have been, without having
2 to declare it here, which may -- You know, there may be some alarm
3 bells, and I don't know, but it's not -- Our intent is the same,
4 whether we have that second sentence or not.

5
6 **VICE CHAIRMAN NANCE:** Luiz, are you comfortable with that change?

7
8 **DR. BARBIERI:** Yes, and I'm not uncomfortable with it at this
9 point. I mean, I was just trying to be, you know, more explicit
10 to the council about what we intend to do and then avoid, right,
11 as I have noticed in the past, us trying to make decisions on when,
12 and we don't seem to have very clearly-defined criteria, of when
13 to use it and when not to use it. Folks, please disagree or --
14 That's up for discussion.

15
16 **VICE CHAIRMAN NANCE:** Nathan. I'm going to have Nathan.

17
18 **DR. VAUGHN:** It's not necessarily new discussion, but just a little
19 clarification from discussion I had with Jim last night, and for
20 new people, and so, the way this is written, it's yield at 75
21 percent of FMSY, and so we're using 75 percent of that F, which
22 means, in the long-term, we're at about 90 percent of the yield of
23 OFL, rather than 75 percent, as opposed to 75 percent of the yield
24 at FMSY, which would be just a straight 75 percent.

25
26 That's, I believe, currently what we're doing, is using that 75
27 percent of the F, and we're just making sure that everyone is on
28 the same page and we get that -- That terminology can flip around
29 sometimes, on what we achieve versus intend to achieve.

30
31 **VICE CHAIRMAN NANCE:** Yes.

32
33 **DR. BARBIERI:** Thank you for that, Nathan, because it's exactly
34 that clarification, and I was trying to go in line with what Will
35 had proposed before, right, and so the idea there is that, in the
36 long-term, we would be at that 90 percent level, and so we are not
37 trying to reduce, right, yield in a way that would be
38 counterproductive to the fishery, and it's really try to try and
39 bring things up to a level that we feel would be better.

40
41 **VICE CHAIRMAN NANCE:** Ryan.

42
43 **MR. RINDONE:** So this is to Luiz's comment about basically having
44 well-defined criteria for making -- Either using the ABC Control
45 Rule or not, and I feel like, based on the history in this room,
46 for the last five years, you have very well-established criteria
47 for using a method alternative to the current Tier 1 in our ABC
48 Control Rule.

1
2 When something is not really appropriate for Tier 2 or 3, and it
3 would be appropriate for Tier 1, and you guys instead decide to do
4 the yield at 75 percent of FMSY, and you have established that,
5 about why you're doing that, pretty well, because of the situation
6 with the insufficient characterization of uncertainty, and there
7 were buffers, and I think that is well established, and so I don't
8 think you should feel uncomfortable about that.

9
10 **DR. BARBIERI:** I mean, having heard that, I don't disagree with
11 Will, and, Will, if you want to just completely delete that last
12 sentence there, and I'm okay with that.

13
14 **VICE CHAIRMAN NANCE:** Okay. Perfect. I think that won't lock us
15 into something, but our pattern is that's what we use, and I just
16 don't want to be locked-in, and that's all.

17
18 **DR. BARBIERI:** Just in response to that, I was being very
19 deliberate there, right, and so I believe, myself, that that will
20 be a good way forward.

21
22 **VICE CHAIRMAN NANCE:** Yes, absolutely.

23
24 **DR. BARBIERI:** But, of course, this is going to be a motion that's
25 going to be for the SSC to review and approve, right, and so I
26 want everybody to be comfortable with this, but I believe that
27 would be the best way to go in the long run, and it would simplify
28 things, and so I wanted to be deliberate, and I'm comfortable not
29 going as far, if the committee is not comfortable with that.

30
31 **VICE CHAIRMAN NANCE:** Okay. Perfect. That was just me and not -
32 - I'm not speaking for the whole committee. That's just me and
33 myself. John and then --

34
35 **MR. MARESKA:** I've got a different question, and I agree with
36 removing that last sentence, but I'm confused about the different
37 levels of uncertainty on different ABC control rules, and so I
38 thought this was going to be specific to Tier 1, and so I'm not
39 sure what you mean by "different ABC control rules".

40
41 **MR. RINDONE:** So were you referring to that to, you know, targeting
42 either MSST, or BMSY, or some, you know, curvilinear attenuated
43 slope, or what is it that --

44
45 **DR. BARBIERI:** Well, and I might need to lean on Katie on this,
46 right, and I thought that this would be looking at different
47 control rules, right, and, I mean, in terms of the slope for Tier
48 1, of course, of our ABC Control Rule, right, and it would be

1 looking at those different -- If that's not correct, then, by all
2 means, I think we need to change that.

3
4 **VICE CHAIRMAN NANCE:** I think the ones -- I think the ones that
5 are on the slide.

6
7 **MR. RINDONE:** Maybe modify it to "related to different targets for
8 the ABC Control Rule under Tier 1", or something like that, just
9 to be a little bit more explicit for the Science Center. I mean,
10 I think it's -- I think they understand, but just so that it's in
11 writing.

12
13 **DR. BARBIERI:** Am I going too far, and I would like to ask Katie
14 if she could -- Because, I mean, they brought in an idea that they
15 proposed, right, and we're requesting them to follow-up, and I
16 don't want to paraphrase what they are proposing, right, according
17 to my interpretation.

18
19 **VICE CHAIRMAN NANCE:** The way the slide is captured, it says how
20 ABC control rule functions for different recently-assessed stocks,
21 and so that's -- Anyway.

22
23 **DR. BARBIERI:** Right, and, Katie, would you mind weighing-in and
24 clarifying what analysis the center is proposing, so we can be
25 more explicit in our motion?

26
27 **DR. SIEGFRIED:** Sure, and would you mind going back to the
28 language? I was just thinking something when -- Okay, and so
29 proceed with the MSE analysis proposed -- What we're proposing is
30 to assess the management impacts of different configurations of
31 control rules for Tier 1.

32
33 We did state, on one of the slides, that we do think there should
34 be a tiered approach, based on the tier, but we're not there
35 testing that yet, and so we're really proposing to assess the
36 management impacts of different configurations of ABC control
37 rules for Tier 1 stocks.

38
39 **DR. BARBIERI:** So different ABC control rules for Tier 1 stocks.

40
41 **DR. SIEGFRIED:** Yes, and Cassidy can weigh-in if I'm using MSE
42 language a little bit off, and I'm still getting the parlance
43 correct, but that's how I interpret it. That will allow us to
44 test multiple things that we've proposed to you, and that you have
45 let us know are objectives of the SSC for management uncertainty,
46 but it also allows us to reach out to managers, to assess their
47 objectives.

48

1 **DR. BARBIERI:** By the way, for the record, Katie, Cassidy is back
2 there nodding positively, and so she agrees with this. She gives
3 it a thumbs-up.
4
5 **DR. SIEGFRIED:** Oh good.
6
7 **VICE CHAIRMAN NANCE:** She's always smiling though.
8
9 **DR. BARBIERI:** Yes.
10
11 **DR. SIEGFRIED:** MSEs are hard, and we're all still learning, and
12 Cassidy is just ahead.
13
14 **VICE CHAIRMAN NANCE:** Will, are you okay with that, those changes?
15 Thank you. Paul.
16
17 **DR. MICKLE:** Sorry, and I missed parts of this, and I apologize,
18 but, Cassidy, could I ask you a question, on the record, about how
19 quantitatively laborious will this be, and how many stocks -- Like
20 was it six that we were going to investigate, or three? Would you
21 mind just giving us a methodological load of your timelines? Will
22 this take -- Just a little bit of perspective, because we're so
23 new to this MSE and SS-based inquiry, and we all think it's really
24 easy, and please don't mislead us.
25
26 **DR. PETERSON:** Thanks for the opportunity to talk about how not
27 easy it is. Like we talked about yesterday a little bit, we're
28 still building capacity, and so we still need to build in a buffer
29 of time to make sure that all of our target species are functioning
30 within SS-MSE, and so that's number one.
31
32 Number two, we have a small working group that is working on MSEs
33 in the Gulf right now, and we're devoting all of our time right
34 now to the MRIP-FES MSE, and so we don't have the capacity to work
35 on multiple MSEs simultaneously just yet, and so this is something
36 that will probably need to follow the FES MSE, and then we're going
37 to need to build in additional time to make sure the operating
38 models are reflective of the uncertainty that we observe in our
39 true assessments, and in our true stocks, to make sure that we're
40 appropriately characterizing the uncertainty around our OFL
41 estimates, and then the process of building and parameterizing a
42 bunch of different ABC control rules, and testing them within the
43 MSE, for each species, will take probably several months, and so
44 this is something that we're going to think about in a longer-term
45 multiple -- Probably closer to maybe two years or more timeframe.
46 Thanks.
47
48 **VICE CHAIRMAN NANCE:** Paul.

1
2 **DR. MICKLE:** Okay. I'm pretty sure we're coming up on a decade of
3 ABC discussions, if I'm not mistaken, and so I'll leave that there.
4 Then, if you remember, a couple of years ago, when we were talking
5 about mobile allocations, allocations in certain sectors were
6 moving, and there was a new methodology that this group, I guess,
7 looked at, and we peer-reviewed, if you all remember that, but my
8 question is, is this MSE -- It is rampant through the literature,
9 and are other councils -- You're in the world of this, and so how
10 prevalent is it?

11
12 Are we only the folks diving into this, or we're the last ones?
13 Can you give a little perspective of this, so that we can have
14 confidence, as scientists, that it's in the literature, and it's
15 got roots, and not grassroots, but roots, and that we can lean on
16 some of these things, and get excited about it, as we see some
17 outputs come out.

18
19 **DR. PETERSON:** Great question. You're definitely not the first
20 council, and we're definitely not the first region, to be looking
21 at MSEs. MSEs are really, really prevalent in some other
22 countries. They've been used for decades and decades.

23
24 They're relatively newer in the United States. All of the other
25 science centers, and all the regions, have an MSE person, just
26 like I am for the Southeast, and they've been working on -- All
27 the different councils have embarked on MSEs, and there's some
28 good examples in the Mid-Atlantic and New England that are
29 comparable to us.

30
31 The Caribbean Council is just starting to look at MSEs, and so
32 maybe they're a little behind us, and maybe the Pacific Islands is
33 relatively newer, but they're also looking at MSEs as well, and so
34 everyone is looking at MSEs, and it's -- We're working
35 collaboratively with the rest of the national MSE working group to
36 develop guidelines and ensuring that the MSE practices in the U.S.
37 are consistent with Magnuson-Stevens.

38
39 **VICE CHAIRMAN NANCE:** Thank you. Carrie, please.

40
41 **EXECUTIVE DIRECTOR SIMMONS:** Thank you, Mr. Chair. Cassidy, could
42 you just remind us, on the MRIP-FES simulation, was that the desk
43 MSE the council asked for, or is that ongoing work behind the
44 scenes for multiple species?

45
46 **DR. PETERSON:** Yes, and so we have been -- We didn't have Spanish
47 mackerel in mind as our case study species for this until
48 relatively recently, and so we have been working on multiple

1 species, making sure that we have the capacity to run MSEs on, I
2 mean, hopefully, one day, all of the Gulf stocks. That's what I'm
3 referring to, and we're thinking probably around six-ish months to
4 having some results for that. Did that answer your question?
5

6 **EXECUTIVE DIRECTOR SIMMONS:** Yes, and just a follow-up. I guess,
7 as we move towards the management strategy evaluation process, I
8 don't know that the council, and maybe John and Ryan can correct
9 me, has really -- They've received a presentation, I think, from
10 Dr. Walter, but I don't know that the council really understands
11 how much they need to be involved, and at what level, for the
12 management objectives, and that's just something that I want to
13 put out there for our staff to kind of think about and work on
14 with you all, but I don't know that that's real crystal clear to
15 anybody right now, and I think it's kind of coming out with the
16 control rule discussion, about what are the council's objectives,
17 but it's not really clear, other than the letter we just wrote
18 about Spanish, you know, what we want to address with this desk
19 MSE. I think we have some work to do there, and so I will just
20 mention that.
21

22 **VICE CHAIRMAN NANCE:** Ryan, to that point, please.
23

24 **MR. RINDONE:** I think we could probably benefit from providing
25 some more input regarding the Spanish MSE. With this one, I
26 definitely see this as being almost more stakeholder-engaged, with
27 the council being the stakeholder, and its SSC, in the development
28 of these analyses, before they come to the SSC for review,
29 especially if we're talking an eighteen to twenty-four-month body
30 of work, and it would be nice to do that once.
31

32 I think that, you know, when you guys are having your conversations
33 about workload, and planning this stuff, I would definitely
34 encourage that to be a considered component of it, is regular
35 interaction here at the SSC, and with the council, so that they
36 have an understanding, because, ultimately, we're going to have to
37 draft an amendment, and they're going to have to approve it, to
38 put this thing in place, and they may be more reticent to do that
39 if they don't understand it, obviously.
40

41 **VICE CHAIRMAN NANCE:** Thank you, Ryan. Katie, please.
42

43 **DR. SIEGFRIED:** Thank you, Mr. Chair. I agree, and I think
44 communication this early is key, just to set up those control rules
45 in such a way that they can meet management objectives, or that
46 management objectives can be tested. That will have to be an
47 initial step.
48

1 I think that -- The thing that I really wanted to say is that this
2 Spanish -- The response to the Spanish mackerel desk MSE request
3 would have taken a lot longer if we hadn't already started the
4 process, and so I don't -- I just wanted to make sure that six
5 months was not thought of as the way to move forward for timelines
6 for desk MSEs.

7
8 We're trying to build the capacity, in the Gulf, in order to be
9 able to provide that timeline, but the reason that timeline is
10 possible is because Cassidy and the group started back in November,
11 and we started because we saw a need to figure out what to do if
12 our recreational data were potentially biased, and we knew that
13 this was going to be an issue, and didn't exactly know how it was
14 going to affect what we provided for the SSC and what you all
15 provided to the council. Just so you know, that work started well
16 in advance, and just the species specification is what came after
17 the council request.

18
19 Now, there were discussions with council staff, and there were
20 several mentions, from Clay and John, about this percent approach
21 before, but it was not illustrated, and that's what this MSE needs
22 to do, and so I hope that's helpful.

23
24 **VICE CHAIRMAN NANCE:** It is. Thank you. Nathan, please.

25
26 **DR. VAUGHN:** Thanks. I was just going to add, on top of that,
27 that part of the difficulty for this, and sort of a change for our
28 region, versus a lot of other MSEs, is, a lot of the time, these
29 are planned around simple harvest control rules that are on that
30 backend, and so, if you're got an index that you're tracking, and
31 you're scaling up and down, and it's quick to implement, and it's
32 fast for the model to do that sort of testing.

33
34 For things like this, moving into testing ABC control rules,
35 they're going to have to be built on top of all the complexities
36 that we have in our current projections and our stock assessments,
37 and so, at the moment, we're still working to build that layer of
38 software and stuff that we've shown before for our assessments
39 into that MSE loop, and so there's a lot of complexity there going
40 on in exactly how we specify this, and extract the values from the
41 assessment that we're going to use, if you want to get useful
42 answers on how that ABC works, rather than a more relative OFL,
43 and whether that's tracking to the true point, and so this just
44 needs a lot of reality that is not currently within the MSE
45 framework.

46
47 **VICE CHAIRMAN NANCE:** Thank you. Any other discussion on this
48 motion? I do think this motion brings us forward, and it proposes

1 a path that we can move forward on, and I think it's a good one.

2

3 **The motion reads: The SSC recommends that the Southeast Fisheries**
4 **Science Center proceed with the MSE analyses proposed to assess**
5 **the management impacts of different ABC control rules for Tier 1**
6 **stocks. Is there any opposition to this motion? Seeing none, and**
7 **hearing none, the motion passes without opposition.**

8

9 Any other discussion, from the SSC, on this issue that we've talked
10 about? Okay. Katie and Shannon, we appreciate that presentation.
11 I think it got us a lot further ahead than we have been in the
12 past, and I think it brought some good things out, some good
13 discussions, and so we'll look forward to that, I guess, in a
14 future meeting, and I do think having that -- While we don't have
15 it in implicitly stated in here, we have been using a way, and I
16 think we will continue to use that until we have established a new
17 ABC control rule. Okay. Luiz, please.

18

19 **DR. BARBIERI:** Just one quick question for staff, right, all of
20 you, and, I mean, does this meet, you know, what you thought that
21 we were going to achieve today, as far as going forward with the
22 ABC control rule discussion?

23

24 **MR. RINDONE:** I think so. I mean, you guys -- Like I said, I had
25 asked you guys to try and get a compass heading about, you know,
26 where we're going here, and so the underpinnings of a
27 methodological approach were discussed, and the Science Center's
28 proposal is something that you guys are wanting to see more about,
29 and, ultimately, we'll send a full-blown request to them to put
30 that on their calendars.

31

32 In the meantime, you know, like you discussed, you can keep doing
33 what you're doing, and the agency has seemed comfortable to defend,
34 you know, the decisions that were made with respect to what we've
35 been doing for now thirteen species, or thirteen instances of
36 updating catch limits anyway, and so I think that, you know, this
37 is a step forward. It's not a leap, but it's a step.

38

39 **VICE CHAIRMAN NANCE:** I do think a positive step forward, and,
40 when you really think about it, all those methodologies we're
41 looking at are very similar in how they're run, and so I do think
42 that we're moving forward in that regard, and I appreciate the
43 discussion. I think it was a good one. We're going to go ahead
44 and start on Nathan's presentation, and we'll, obviously, stop
45 partway through.

46

47 **MR. RINDONE:** Mr. Chair, we are short one Dr. Vaughn. There he
48 is.

1
2 **VICE CHAIRMAN NANCE:** I know. Nathan, I said let's go ahead and
3 start with your -- Obviously, we're not going to capture all of it
4 before lunch, but what we'll do is we'll start on it, and, when
5 lunch comes, we'll stop, at a good stopping point, and then we'll
6 continue that discussion after. Ryan, would you please go through
7 the scope of work for this discussion, please?
8

9 **RESTORE PROJECT UPDATE: PROJECTIONS MODEL REVIEW**

10
11 **MR. RINDONE:** Sure. Dr. Nathan Vaughn will review targeted
12 research of his team's RESTORE project, which aims to create new
13 modeling technologies to better project the effects of known
14 variables on future catch limits. He and his team's work has
15 recently focused on incorporating the effects of episodic
16 mortality from red tide and its effects on red grouper and gag
17 catch projections. Some of you returning SSC members are familiar
18 with this.

19
20 He will also describe simulation work related to improving the
21 interim analysis process, which the council has been using with
22 increased frequency to monitor stock health in between stock
23 assessments, and also to update catch advice, when appropriate,
24 and Nathan will then describe different proposals for quantifying
25 MSYs by fleet and region and the handling of discards and
26 projections.

27
28 In particular, you guys should focus your attention on feedback
29 related to key decision points for moving forward, based on
30 Nathan's initial results, and your preferences for participation
31 in receiving future updates, and how best to integrate these
32 products into future stock assessment advice, and, lastly, you
33 should provide feedback to Dr. Vaughn on any other research
34 priorities to consider over the remainder of the five-year funding
35 period, and he has requested a minimum of eight questions directed
36 to him per SSC member.

37
38 **DR. VAUGHN:** That is very accurate. If you're not asking
39 questions, I might ask you questions, but thank you for having me
40 and giving me a chance to talk about this with everyone today.
41 Like Ryan said, we're talking about the work that we've started on
42 under the FFO-2023-RESTORE Actionable Science grant.

43
44 It's pretty broad suite of things that we're going to tackle over
45 the next five years, with the general goal of helping improve stock
46 assessment, and the management advice that's coming out of it in
47 the Gulf, and so I want to thank RESTORE, our funding, and we've
48 got four more, or a little over four more years, or five years, of

1 funding for the current project, and we were previously funded on
2 a planning grant, to figure out what we wanted to do during this
3 five years.

4
5 Luiz and Ryan are in the room with us, as part of the project team,
6 and then also Katie is online, and Skyler Sagarese is online, and
7 John Walter, and Nick Farmer at SERO, and I also want to thank all
8 the other collaborators, and so this is very much designed to be
9 collaborative science, and actionable science, and so there's been
10 a lot of work during the planning phase, and ongoing with most of
11 the other members of the Southeast Science Center, both in the
12 Gulf and at the South Atlantic Branch, and the Caribbean Branch,
13 and HMS with sharks.

14
15 As Cassidy said in her slides on MSE, we're also working, as part
16 of that project, to improve management capacity, to help answer
17 these questions that we have.

18
19 Like Ryan said at the beginning, the primary goals for today are
20 to be a discussion, and so feel free to butt-in at any moment, and
21 I think this will work a lot better if people are asking questions
22 as they pop into your head on slides, and I will just keep talking
23 forever, if you don't slow me down, and so that's really -- Like
24 jump right in, and don't hold anything back, because we're going
25 to move through a lot of different topics, and so it's not going
26 to be easy to answer them at the end.

27
28 The goal is to introduce you to the overall project, let you see
29 some of the initial results we have, and these are all very
30 preliminary, or hypothetical, and then discuss some of the
31 implications that we're seeing as important decision points that
32 are going to come out of this work, and so what are the sort of
33 decisions that you're going to have to make, when we finally have
34 finalized answers, and get your impressions on how you would like
35 future updates, and how frequently would you like our feedback,
36 and how would you like the process, optimally, to proceed with
37 integrating these things in a stock assessment, and how would you
38 like to provide feedback along the way.

39
40 I would like to get discussion with everyone on how we see these
41 future priorities evolving, and so, like I said, the project is
42 fairly flexible, and we have a lot of things that we want to
43 achieve, but there's also room to shift and adjust, as we have
44 already with the MSE work, to meet immediate needs of the SSC and
45 the council, if requested.

46
47 Like I said, we've got five years of funding, and the goal of this
48 RESTORE project is really actionable science, and so the goal is

1 not to publish papers, and that is a goal, but the goal is to get
2 things into management and to make direct impacts on decision-
3 making, and so that's our goal, is to really interact with you and
4 make sure these things are as usable, both immediately and in the
5 long-term, as possible. Like I said, our goal is to generally
6 improve the decision-making process and the values that are coming
7 from the Science Center to the SSC and your ability to review and
8 understand those outputs that are coming and the reason that you're
9 seeing them, and that's sort of later in the project.

10

11 We're going to focus on three core areas over the next five years,
12 and that's realism and accuracy in projections, and that's what
13 we're focusing on primarily at the moment, sort of the low-hanging
14 fruit, and some projections, as I will talk about, are a lot of
15 assumptions, and so how can we make better assumptions, moving
16 forward, and then management advice throughput, and that's the
17 interim assessments that we're looking at, and how can we get
18 advice that is robust and fast, and then model interpretability.

19

20 A lot of the issues that we're going to have with getting these
21 products out, and the discussions we have about MSE and how these
22 things work, is understanding what's going on within the stock
23 assessment models. A lot of the timeline there in building the
24 models is the sort of painstaking work of building them and making
25 them work, and so, if we can understand why they're different, and
26 why we're seeing the patterns we're seeing, that could help speed
27 up the process, and also help you understand the results better
28 and the causes of those results.

29

30 The first section is on the accuracy and projections, and, like I
31 said, a lot of the things we talk about are those assumptions.
32 There is a lot of implicit assumptions. When we talk about scaling
33 back to simpler models, a lot of the time, that concerns me,
34 because it basically moves things to implicit assumptions that
35 you're not seeing.

36

37 They're somewhere in the math, and they're there, but they're just
38 not being explicitly made, versus a complex model with a lot of
39 fixed parameters, where it may be hard to fix those parameters,
40 but they're there, and they're implicit, or explicit, and then,
41 similarly, the projections, which is what we're going to focus on
42 more, is a lot of these things are completely unknown, and so we
43 need to make a ton of assumptions about where the fishery is going
44 to go, what are going to be the dynamics of the fishing fleets,
45 how is their selectivity changing, and how is their relative
46 participation changing.

47

48 How is the stock going to change in the future, for recruitment

1 rates, natural mortality, growth changes, all sorts of climate
2 effects, and then, also, ecosystem and environmental things, like
3 episodic mortality, which I will talk about today, and potentially
4 other changes, which will be brought into that, and so what do we
5 do when we're predicting forward into the future, which is, for
6 us, and I'll talk about it a little bit in a minute, a hundred
7 years of simulations, and so that's a lot of assumptions you need
8 to make, to decide where we're going to be a hundred years from
9 now, even in an average sense.

10

11 The key topics that I will go over today, and our first sort of
12 low-hanging fruit, or most important topics that we've seen, are
13 episodic mortality from red tide, and previous members of the SSC
14 will know that we've done work with the Science Center, led by
15 Skyler and Lisa, for red grouper and gag, to look at incorporating
16 red tide impacts into both the historic stock assessment model and
17 also, more recently, into those short-term OFL estimates, and so,
18 if a red tide happened in the last two years, between the stock
19 assessment ending and management, we've tried to incorporate that
20 into the setting, into what we're giving you for OFLs, but there
21 hasn't been any work, up to this point, into incorporating an
22 average red tide, or an expected red tide, into the long-term
23 benchmarks.

24

25 By default, that generally goes down to zero, and so I'll talk
26 about our efforts to look into that and then selectivity-dependent
27 MSY. We talk a lot about what is OFL, and we set an OFL, but there
28 is a lot of assumptions, again, that go into that.

29

30 For a lot of our species, and this is part of the complexity that
31 I was talking about with MSE integration, is, if we're fixing --
32 If we have fixed allocations between different fleets by
33 management, or different sectors, recreational and commercial, we
34 fix them in the projections now, and it takes a lot to make sure
35 we're keeping the right F each year, and the correct allocations
36 between those fleets, and that will change. As that allocation
37 changes, it will change your OFL and your MSY, and so we're going
38 to look at whether you can do a better job of extracting that away,
39 because there's a lot of overhead.

40

41 Then projections of discards, and, again, I think this is going to
42 tie back a lot to the presentation that we got yesterday, on gag
43 and the potential closed season discards, but, at the moment, we're
44 tied to discards and landings are tied together in the model, and
45 so I'll talk more about that and how we can more realistically
46 manage that in projections.

47

48 Then, in the future, coming from you and the Science and the

1 council, any additional questions that we need, and things that
2 come up that are not being accounted for in the model, or things
3 that we'll try to tackle under this framework, moving forward.
4 Like I said, red tide mortality --

5
6 **MR. MARESKA:** Sorry, Nathan, and I just had a question, and so it
7 sounds like most of this is going to be based on SS.

8
9 **DR. VAUGHN:** Yes.

10
11 **MR. MARESKA:** Okay, and so, as we move into the future, and some
12 of these species that we're assessing with SS -- If we move to a
13 more simpler model, this won't address those issues?

14
15 **DR. VAUGHN:** So these are sort of -- At the moment, this is SS,
16 and the work that I will be doing is to be able to incorporate
17 these, and, as I will show you, like a lot of it is how do we this,
18 and get it into the model, and so these concepts that would, in a
19 lot of senses, need to be incorporated into another simpler
20 approach, and we still should be accounting for these things, and
21 that's where it gets tricky, is what is moving down to a simpler
22 model?

23
24 Is it, now that we're talking about these explicit decision points
25 we're making, and assumptions we're making -- Do simpler models -
26 - Are they able to account for that? Are they making reasonable
27 built-in assumptions as to how these things change, and so that is
28 why we've tended to move towards more complex models, rather than
29 back to simpler ones, is, the more that we see the influence of
30 these kind of factors, the more we understand why those simple
31 models were failing in the past, and why you were getting very
32 different answers year-to-year, as things changed that they just
33 don't see.

34
35 If you have a model that is one unified fleet, that's very hard
36 for that to understand why the selectivity is bouncing around each
37 year, if it's just because of shifting allocations or achieved
38 landings between fleets, and so, yes, this is all based on SS, but
39 we'll see why it's problematic sometimes to move back to those
40 simple assumptions. Ryan.

41
42 **MR. RINDONE:** I think something that will be important, when we're
43 having those discussions, is teasing apart the differences between
44 there being something biological that wasn't fully understood at
45 the time, related to a simpler model versus the management bias,
46 that may have not been fully accounted for.

47
48 As a lot of you guys are aware, you know, when we're moving through

1 these stock assessments, consideration of management bias is
2 almost a constant, because, anytime we make any changes to anything
3 regulatory, it has effects on selectivity, et cetera, and so it
4 would be useful to identify instances where something -- A
5 management change not being successful, was that directly related
6 to the way in which the management change was done, or was it
7 related to a paucity of data related to something important, and
8 so, in that way, we can improve that.

9
10 **DR. VAUGHN:** Thanks. This initial part is what have we done for
11 red tide, and, like I said, for red grouper in this example, we've
12 previously focused on historic modeling of the red tide events,
13 and so you can see there that there is two events that we've done
14 where previous red tides have been incorporated, and so, at the
15 moment, we turn on the ability for the model to estimate mortality
16 in those years where Dave Chagaris' work has suggested that there
17 is a large amount of red tide that has occurred, and so we then
18 let the model figure out how much it thinks has occurred.

19
20 Then, also, similarly, we've done -- When we don't have that
21 ability to estimate things in the future, in that period between
22 the model end data and management action, we've provided decision
23 tables for possible scenarios of where the population could be
24 going under that red tide, but the important thing is that, like
25 I said, those -- In the plot to the left, that equilibrium point
26 that everyone travels out to, it's rolling back to an assumption
27 that there is no more red tide that is going to occur.

28
29 That red tide event in 2020, which I don't know that that actually
30 occurred, but, in the model, like that's the last time the red
31 tide happens, and then the stock goes wherever the model thinks
32 that it would go under a release from that red tide, which is
33 likely not a reasonable assumption.

34
35 This is a little bit of background on why this is important, and
36 how this factors into what we're doing, and, like I said, we have
37 issues with allocations, and specifying them between fleets, and
38 lots of different things that are going on, and so what we do to
39 identify those benchmarks is run a hundred-year simulation of the
40 fishery, under a bunch of fixed assumptions, and so that may be
41 relative F, and fishing effort between the fleets remains the same,
42 and, when we've got allocations, we then adjust those -- The Fs up
43 and down until you meet those relative catch fractions from the
44 yield each year.

45
46 The selectivity of all those fleets generally remains static, the
47 tension, and all these things are assumed to be fixed at usually
48 where they were in the last three years in the model, the average

1 of those, and similar things with bycatch fleets and shrimp and
2 things like that, that are hard to specify into the future.

3
4 Red tide mortality, like I said, is close to zero, and so we have
5 that hundred-year projection rolling out to somewhere that may not
6 be achieved, in reality, and we're usually targeting that SPR 30
7 percent proxy, or 40 percent, depending on the species, as our
8 proxy for MSY.

9
10 We have very limited information on where red tide is going to go,
11 and the problem has been how do you predict it, and the feedback
12 has been that we can't predict it. Trying to pull it from climate
13 models, trying to pull it from lots of different sources, has been
14 relatively unsuccessful in identifying actual events, and when
15 they're going to occur, and the magnitude of which they're going
16 to occur, but we do have a history of what has happened, and we
17 were interested in can we just look at incorporating that average
18 impact through time, and how will that work, and how will that
19 turn out in a final sense.

20
21 Looking at just red grouper, we have two red tide events estimated
22 from the last stock assessment, and you can look at different year
23 ranges of averaging, to figure out what the average was, and so,
24 for these simulations, we went with 0.03, as sort of an average
25 annual rate that we're seeing from our long-term averaging of the
26 observed data from the model.

27
28 How do we get to this? Like what do we test, at the moment, to
29 say like what are the impacts of this, and what can we expect to
30 happen, and so, like I said, we're doing hundred-year projections,
31 under static conditions, and so what we did was we ran simulations
32 with a bunch of baseline levels, and so zero through 0.1, every
33 year, and so this is how much those baseline levels, red tide
34 levels, how much is happening every single year, and that brown
35 line down the bottom of the figure is just constant, and so run
36 your stock assessment projection the way we currently would, but
37 with this sort of built-in variable level of mortality.

38
39 Then, to see how that performed, that will provide us a long
40 timeline of effort removals each year, and we then roll back and
41 say, instead of putting that average level in, we put in a
42 simulated scenario of random red tide events, and, in this case,
43 they add up to a certain value, and so we tried three different
44 levels, 0.01, on average, summed across all those years, 0.03, on
45 average, summed across all those years, which is roughly what we
46 saw from the historic, and then 0.06, which is larger than the
47 historic level, and so three different scenarios of how big those
48 mechanisms could be.

1
2 Then we run random simulations where you're drawing them in, and
3 we sort of put in some fixed assumptions, at the moment, of the
4 largest event in any given year is going to be no more than four-
5 times the size of the smallest event, and there's a random interval
6 between when they occur.

7
8 That then rolls out to something like this, and this is just one
9 single run of -- This is spawning stock biomass over SSB zero, and
10 so that black line at 0.03 is what we were intending to get to,
11 and so this is the target that we've set, and the assumption would
12 be that you would get out to there at equilibrium on a flat line,
13 and so you see four different scenario runs there, with differing
14 initial Ms, and so these are slightly different on that slide, and
15 we've got two different rounds of simulation runs that I've pulled
16 this from.

17
18 **MR. MARESKA:** So these red tide scenarios, these are applied to
19 the entire stock, because, in most cases, those red tide events
20 were spatial in nature, and they weren't across the entire stock.

21
22 **DR. VAUGHN:** So, in this case, the stock has one area, and so there
23 is just one stock, and so that fraction -- It happens in a very
24 small area, yes, but that's why it's 0.03, and it's probably, you
25 know, all the fish died in that small area, and that's what the
26 model is estimating what the removals were, and so that's what
27 was, at an entire stock level, the fraction removed. 0.03 is,
28 obviously, very small, but it's very large when you have that
29 small, refined area.

30
31 Also, an assumption of this for red grouper, from the previous
32 assessments, this is assuming a flat mortality across all ages,
33 and there is no age-specific selectivity to red tide, or
34 variability in that mortality rate, and that is what's been
35 accepted in the previous assessment, and that is different in gag,
36 where there is more information from Dave's models on age-specific
37 vulnerability to the red tide, and so those are things that can
38 change.

39
40 The goal of this was to look at, in general, what's going to happen
41 when we don't account for this, but, yes, there's a lot going on,
42 and so it is important to sort of like dig through those details.

43
44 In this scenario, we've got four runs, and these were the outcomes
45 of four different fishing mortality rate projections, and so that
46 bottom line is -- The solid black line is our target, where we
47 want to get to, and then that bottom run is what we would get
48 currently, and so that's what we get under our current stock

1 assessment process in that.

2
3 Because we're not incorporating any red tide in the future,
4 whenever a red tide event occurs, we drop down below our target,
5 and, in this case, we get dangerously close, in one year there, to
6 the MSST threshold, even though we are fishing, in this case, at
7 the true OFL under -- This is all OFL.

8
9 We don't have the complexity of ABCs and discounting on that, but,
10 in this case, even when we're fishing at the OFL, there is no
11 recruitment deviations in here, and that drop is purely from a
12 large red tide event, and a couple before that, and so you'll see
13 that, no matter what you do, you're only ever going to get back to
14 that target under a long period of no red tide. Then, with
15 increasing levels of red tide incorporated, when you get to about
16 that 0.03, which is what was the true long-term average, you end
17 up with a model that, on average, does achieve what you're trying
18 to get to. You will be sometimes lower, when the red tides occur,
19 and at equilibrium with a long period of no red tide, and you're
20 ending up at close to -- It's like 0.38.

21
22 **DR. PATTERSON:** Since fishing can't occur at OFL, given the control
23 rule, why not run it assuming that there's a buffer, and that's
24 where the fishery is going to operate?

25
26 **DR. VAUGHN:** The reason I stayed away from that is, in theory,
27 that would work if you're assuming that that OFL is correct, and
28 this is assuming we're in a real world where there is no scientific
29 uncertainty, and so that OFL that we're putting into the model is,
30 other than this red tide impact, the real OFL.

31
32 That at least -- The initial assumption is that ABC is supposed to
33 account for a lot of things where our model is potentially wrong,
34 or management is not being enacted accurately, and, in this case,
35 we're fishing at the correct F, and we're fishing -- We're
36 achieving all those goals, and so we're not incorporating other
37 sources of uncertainty error.

38
39 **DR. PATTERSON:** But we just had a discussion that, oftentimes, in
40 our scenario here, when a PDF is produced on OFL, we say, well, we
41 don't believe that it captures scientific uncertainty, and so the
42 ABC is set as a fraction of F, you know, FMSY, and not actually -
43 - It doesn't actually, you know, explicitly use the variance in
44 the estimate to produce a measure of uncertainty, but there is
45 still a buffer, but it's just not explicit.

46
47 **DR. VAUGHN:** Exactly, and what I'm saying is that, in this one
48 scenario, other than the red tide effect, where we have no other

1 uncertainty, and so we have a situation where we do know exactly
2 what's going on, and so, with no uncertainty, we wouldn't need to
3 buffer to ABC, and we would be fishing at OFL, if red tide didn't
4 occur.

5
6 The assumption is, if you showed this with a discount already to
7 ABC, it would say, oh, we're a little bit better than on target,
8 but that's only in a perfect world, where nothing else was causing
9 ABC to be needed, and you know what I mean? Like we would be using
10 ABC to account for one single impact, which is red tide, when it's
11 really supposed to account for implementation, and other errors in
12 the model, and variation in recruitment, and there's lots of things
13 that you could put on here that would add larger deviations that
14 we've removed, and this like a fixed world. It's just red tide.

15
16 **DR. PATTERSON:** I get that. I understand what you're saying.

17
18 **DR. VAUGHN:** And I understand what you're saying.

19
20 **DR. PATTERSON:** But the thing is like if you're -- This projection
21 is showing how often, and even if you can hit OFL perfectly, right,
22 and you're still going to -- The stock is going to be driven down
23 below the threshold, the spawning stock biomass threshold, because
24 you have this extra source of episodic mortality, but, really, the
25 stock should be above that, to some degree, if you're not fishing
26 at OFL.

27
28 **DR. VAUGHN:** Yes, if your OFL is correct, and there are other
29 reasons, and so that's sort of getting away -- This is saying we're
30 not going to need another buffer, and this would be, if ABC is
31 being used as a buffer against red tide, then, yes, it's one of
32 those curves, and like those different curves that assume sort of
33 mortality and discount M, and they're just like an ABC, to some
34 degree, or, and we'll get to it, but like an SPR target, and like
35 they're all changing proxies, you could say, that are accounting
36 for that uncertainty in what we're trying to get to, as opposed to
37 -- So, yes, we're not trying to account for that on top of -- We're
38 not just saying account for nothing.

39
40 **DR. BARBIERI:** Can I just add a little thing here? Also the fact
41 that, you know -- I mean, basically, we assume that we know OFL,
42 or, I mean, we know MSY, right, and so OFL is known, and that the
43 buffer is correct.

44
45 **DR. VAUGHN:** Yes, exactly, and that's what I mean, is all of those
46 are --

47
48 **DR. BARBIERI:** So the buffer is correct, but, over time, we

1 actually have changed our opinion about that, and so we explicit
2 recognize that the buffers that we were using before were not
3 really appropriate, right, and so that --

4
5 **DR. VAUGHN:** I guess, to a degree, you could look at this and say
6 this is a more explicit accounting of what is potentially the
7 impact of one specific source of uncertainty, which is red tide,
8 on your model, and how much should you add into that buffer you're
9 using, based on this one specific cause, and do we believe that
10 the current buffers we're using are enough to account for that, or
11 are they already being used up on other things that we're worried
12 about, and so it's just, yes, looking at what would need in a
13 perfect world, where everything was known, and it was just this
14 environmental impact, and how much buffer would we need, if you
15 want to look at it that way.

16
17 Then the second run is -- This is, I guess, a good takeaway, and
18 this is landings, and you will see, immediately there in 2020,
19 which I should have a line there or something, plotting where that
20 comes in, but there is a large difference, obviously with varying
21 different Fs in those landings, but, very quickly, within three or
22 four, or less than five, years, everything that is set at a level
23 above where you need it to be, that 0.3, and so the zero and the
24 0.1 scenarios, you don't get any real benefit from those landings
25 later on. You end up depleting the stock below your target, and,
26 even though you're fishing at a higher F, you're getting lower
27 landings that tend to line up. Obviously, if you overshoot it,
28 you do end up with a fair reduction in your long-term landings.
29 Did you have a question?

30
31 **MR. ADRIANCE:** Thanks. I was looking at this, and there seemed to
32 be two different regimes in there, and is that because you're going
33 through the lifespan of red grouper, and you're hitting those age
34 classes -- You're getting out of the assessment, and now you're
35 purely theoretical, or what's driving that difference between
36 about 2047 forward and previously, where it seems to shift, in
37 just the projections?

38
39 **DR. VAUGHN:** I think that is just -- That's an aspect of this one
40 simulation, where I believe there was a number of small red tide
41 events there, early in the time series, that are sort of bouncing
42 it down, and then a big one -- You had a long period there, from
43 2047 through 2068 or something, where there wasn't a red tide, and
44 so you're seeing that rebuilding back to where we originally
45 thought, you know, you would actually achieve that target, and,
46 like we saw in the previous slide, you get back to your actual
47 goals. It's been so long without a red tide, and so all of that
48 is just bumps in the red tides, and then all that stacking together

1 there, or if you overfish, whereas, if you are below the target,
2 you're not gaining a large benefit from that.

3
4 This is just some results from like an average run of our 500
5 simulations, and so, if you stack all of those together, you'll
6 see you've got basically constant F, in all these different
7 scenarios, based purely on what your baseline assumption was of
8 red tide in the projections, what sort of scenario you're in when
9 you're getting that fraction removed, and that's because we're
10 running these assumptions -- These projections with assumptions of
11 like you're fishing at an F rate and not a catch level.

12
13 There is just some coloring there to try get the ones that are
14 close to that summed average, and so the reds are somewhat over,
15 and the blues are below the target mortality rate.

16
17 It's a similar thing with the SSB ratio, and you see you end up
18 with a very high rate if you set your target too high, but you
19 come close to achieving it with the green line. There is some
20 issues with how we calculate that average, and we're using a sum
21 of Ms over time, to get to an average of 0.3 over all the years,
22 and we probably need to use something more like a sum of the
23 proportions, or a geometric mean standard averaging, to get an
24 answer that actually brings that green line down to the target, in
25 all scenarios, and we just don't have a good, perfect
26 quantification of that comparison, and so don't pay too much
27 attention to which one is green, but the point is there is one
28 that achieves that target, on average, like the line that gets to
29 0.3.

30
31 Then, similarly, with landings, like we saw before, most of the
32 ones that are too high all just tend to stack up with similar long-
33 term landings, and it's just a really short-term where you're
34 seeing the benefit, and we've talked about it before, for people
35 who were already on the SSC, but these look a lot like the things
36 we see in our projections, where you get that ski slope very large
37 estimate, that very quickly ramps down, because it constantly
38 thinks that you can ramp-down this population, but then we end up
39 not achieving those landings. They're not -- They're difficult
40 for the fishermen to catch, because effort is so high, and they
41 end up getting red tides, and other effects, that bring us down,
42 and so we don't see the rebuilding that we would expect under those
43 scenarios. Some of the decision points that I wanted to talk
44 through, and assumptions in this, is -- Yes.

45
46 **DR. PATTERSON:** Sorry.

47
48 **DR. VAUGHN:** No. All the merrier.

1
2 **DR. PATTERSON:** So, if I understand this right, you're saying that,
3 if you manage for this episodic mortality, eventually you can
4 stabilize future landings, accounting for --

5
6 **DR. VAUGHN:** These are averages. This is 500 runs you're
7 averaging, and so this is the discussion of -- This is what you're
8 really seeing, and this is fishing at F though. There are caveats
9 here of like this is not what you would optimally achieve. If you
10 were doing an interim assessment every year, and you knew in
11 advance what the population biomass would be, and you could fish
12 at that F, this is what you would get.

13
14 Obviously, we don't achieve that. There is lags. How to build
15 that into this -- The reason we don't have it here is it's very
16 complex to say how exactly do you do that, and we have somewhat
17 variable methods on when you do assessments, and how we average
18 and implement these things. I didn't have a clean answer on how
19 to do that. It's going to be very sort of assumption-driven, and
20 it's not going to change the key message, which is, if you don't
21 account for that red tide, your Fs are larger than they probably
22 should be, on average, and it's going to be more difficult with
23 constant catch, or variable catch, timing.

24
25 **DR. PATTERSON:** So, with the constant catch, the thing that I would
26 be curious about is so, if you build that into it, to account for
27 what you are telling it is going to be the variability in red
28 tides, and so your catch is going to be lower to account for that,
29 but, as the stock -- You know, maybe you have a ten-year period
30 where you don't have a red tide, and the biomass is accumulating,
31 and so not only do you have issues on the management side, because
32 the fishermen aren't pleased with rebuilding the stock, but they're
33 having to manage to this buffer, but then you have also discard
34 issues, and so you're going to be having a lot of harvest that is
35 -- Not harvest, but you have a lot of dead -- You know, there's
36 going to be removals from the fishery that is not harvest, and so
37 like how --

38
39 **DR. VAUGHN:** Yes, if you're not -- If you're not letting your catch
40 ramp-up, and, in this case, and, to a degree, we would even with
41 a catch-based method, where running an assessment, or an interim,
42 relatively frequently, and so we're not going to perfectly achieve
43 this, but, if you looked at -- I think we're at two years between
44 management advice, in theory, based on that new schedule from
45 earlier, and so, if you looked at that, it's not a huge impact.
46 There is some discrepancy between this, in reality, but we would,
47 in theory, step our way along those curves, and move up and down,
48 versus just like a flat catch.

1
2 One of the big things that -- I don't think this is really a
3 question for how to set it up, more than sort of an acknowledgement
4 and something that I think is worth talking about, is how red tide
5 is specified in these models and the implications for that for
6 decision-making and management, and this is the real takeaway, and
7 we'll have more results at a later date, but, at the moment, we're
8 setting red tide up as a fleet.

9
10 It's a bycatch fleet, essentially, that is unmanaged, and it comes
11 in and causes trouble every now and then, and so, when you put
12 that into projections, you're assuming that that is depleting the
13 stock similarly to a fishery, and so your unfished spawning biomass
14 is a world without red tide, and your fished biomass is a world
15 with red tide, and I will talk about this again with discards.

16
17 If you go into a situation where we've had such red tide every
18 year, you could get to a case where red tide is higher than that
19 sustainable OFL, or ABC, value, in which case we get into this
20 zero catch available scenario.

21
22 It's just something that we -- It's similar to, like I said, this
23 discard bycatch fleet, and so we just need to be explicit about
24 that and like know that that's a big assumption here, and that's
25 how it's being handled.

26
27 The alternative, which is not the way it's handled in the fishery
28 right now, and not the way that I think is a good way to move,
29 personally, but is to switch this. If you incorporate it as
30 natural mortality, and, in the current red grouper assessment,
31 there was talks to do that as a predator fleet, which makes it
32 another aspect of natural mortality, and, if it was natural
33 mortality, it would decrement the unfished spawning stock biomass
34 through time, and so you would always be maintaining catch, but,
35 if red tide got really high, you would end up with a scenario where
36 you could just fish that stock down, the red tide stock down, to
37 zero, because you're always going to be saying you're going down
38 to 30 percent of this red tide event.

39
40 If red tide moved that far, in the future, due to climate change
41 or whatever impacts there are, it doesn't seem like the principle
42 of your SPR ratios and fractions is maintained. That is,
43 obviously, not going to be an evolutionarily-sustainable level of
44 stock depletion for us to fish to, and so I'm not sure that this
45 is really a decision point, but, if people want to have discussions
46 on that, and that is a very like important explicit assumption
47 that's being baked into this, and it would be baked into it if it
48 was implemented in management, and so I just wanted everyone to be

1 aware that it has large implications for the outcome and the
2 results. That's why you're seeing that reduction in catch, more
3 so than if it was built into the population.

4
5 Like I said, it's really difficult to estimate that, and we used
6 some simple averaging of what the red tide would be for future
7 assumptions, and, if it's going to get used for management, it's
8 going to rest on you, or a decision that you tell us to make, or
9 a process, for how to determine what that red tide would be.

10
11 It can be very consequential, but we don't have a lot to go on.
12 You know, red grouper is two events over ten years, and they're
13 large, but they're unpredictable, and so how we set that level,
14 and how we come up with a precautionary solution, is definitely
15 something that we're going to need to discuss with the SSC, and
16 it's an important point for when we get to implementing this.

17
18 For how to implement this, sort of Will touched on it, with the
19 optics of what we're doing, and what we're decrementing, and
20 whether we're achieving those benchmarks, and we can do it the way
21 I've done it to do these projections, and like building in that
22 sort of buffer and explicitly saying we're assuming there's a 0.3
23 percent mortality rate, and we can build that into our projection
24 software for doing this, or, like I said before on that previous
25 slide, under any different one of those scenarios, in a non-red-
26 tide state, you're going to come out to some different SPR proxy,
27 and it was 38 for the 0.3, and it will vary by species, but we
28 could do these simulations one time for the stock, under different
29 assumptions of red tide, and then calculate those equivalent SPR
30 proxies as more easy to interpret.

31
32 Instead of a having a 30 proxy in a benchmark for red tide, we
33 could say, well, we're going to use 40 for this species, or 38,
34 because that's a red-tide-adjusted OFL proxy, and I don't know
35 what people think is easiest to digest, and easiest to explain to
36 the council, and explain to the stakeholders, and how to
37 incorporate that, but there's multiple ways we could go on how to
38 deal with this.

39
40 **VICE CHAIRMAN NANCE:** As soon as you're good, we're going to stop
41 here.

42
43 **DR. VAUGHN:** This one slide, I think, is before I jump to -- Yes,
44 this is the last one on red tide.

45
46 **VICE CHAIRMAN NANCE:** Okay. Do that one, and then we'll stop.

47
48 **DR. VAUGHN:** Yes, and I've talked about these mostly already, and,

1 like I said, limitations are this is a constant F projection,
2 assuming things are basically known in the population, and we
3 obviously can't -- It's a constant F, but I don't know that we
4 would get substantially different results, and then we're
5 conflating two different kinds of things within that analysis,
6 both the raw impact of red tide and also the ability to manage and
7 maintain fixed catches, rather than OFL, and so it's just -- I
8 left it out, because it's an additional complexity that would be
9 harder to parameterize and justify, in all cases.

10
11 Obviously, like I said also, we need to work on exactly how to
12 calculate the ratio. The way we've set it up at the moment, and
13 what we're seeing, is kind of an equivalent baseline to random
14 events, and that summing comparison is not accurate, at the moment.
15 Otherwise, they would come out to about the same place, and this
16 is being done for red grouper, that I showed some of the results,
17 and we're also working on it for gag, but, if the SSC has any ideas
18 for other species that you think are important, or you're thinking
19 about incorporating red tide into, or requesting red tide from the
20 assessments in the future, then we could add that into the
21 analysis, while we're working on it, but that's all I've got at
22 the moment for red tide, and then we'll move on after lunch.

23
24 **VICE CHAIRMAN NANCE:** Perfect. We'll go ahead and break for lunch,
25 and we'll come back at 12:30, and I appreciate that discussion.

26
27 (Whereupon, the meeting recessed for lunch on August 1, 2024.)

28
29 - - -

30
31 AUGUST 1, 2024

32
33 THURSDAY AFTERNOON SESSION

34
35 - - -

36
37 The Meeting of the Gulf of Mexico Fishery Management Council
38 Standing Scientific and Statistical Committees reconvened at the
39 Gulf Council Office in Tampa, Florida on Thursday afternoon, August
40 1, 2024, and was called to order by Vice Chairman Jim Nance.

41
42 **VICE CHAIRMAN NANCE:** Okay. We'll go ahead and restart. I
43 appreciate all those -- Nathan, I think we're on Slide 19, and so,
44 whenever you're set, we'll go ahead.

45
46 **DR. VAUGHN:** Just a rollback, and I don't know if I skipped over
47 it there, but sort of a discussion for us to have on that red tide
48 is red grouper is coming up, and it's being run right now, and

1 it's going to be coming through you guys for management advice
2 later in the year.

3
4 Is this something that we should be looking to discuss, and
5 potentially incorporate, for that assessment? As I said, like
6 this is -- These are all assumptions that are otherwise in there,
7 and so you're not in necessarily a better place, and it's not sort
8 of new research for a radically new approach, but it is just do we
9 stop using zero as our assumption, and do we want to consider
10 something else, and this is up to you guys, but it is a decision
11 that probably you would need to think on, and potentially discuss
12 before, for us to have something along the lines of when we get to
13 the next thing, or when you're going to want to get to that. Luiz.

14
15 **DR. BARBIERI:** A quick question, and thank you for this, Nathan,
16 but a quick question. There is a -- For the red grouper assessment,
17 there is a red tide working group.

18
19 **DR. VAUGHN:** Yes, and that's been primarily -- We haven't
20 introduced this stuff, because it's been primarily how they're
21 incorporating it into the stock assessment, and so it's been
22 working on that end with Dave and the estimates, and so this is
23 sort of a new additional thing, and so should we funnel it through
24 that? Does that work for you guys, to funnel it up through the
25 assessment working group? We're just sort of getting your feedback
26 on whether you want something new on your plate when this rolls
27 around in October, or whenever that happens. Think on it.

28
29 **DR. BARBIERI:** Well, yes, and, if I may --

30
31 **VICE CHAIRMAN NANCE:** Go ahead, Luiz.

32
33 **DR. BARBIERI:** Because, Nathan, it's no longer Skyler, right, who
34 is the lead analyst.

35
36 **DR. VAUGHN:** No, it's Francesca.

37
38 **DR. BARBIERI:** Yes, it's Francesca, but Francesca has been, I
39 think, involved in that working group as well, the red tide working
40 group, right, and so I think that the best way, right, to connect
41 the dots here between these two efforts would be to connect with
42 them, and, of course, Katie will serve as the mediator there,
43 right, the connecting mortar in between the bricks, right, to make
44 sure that everything is moving forward as planned, but I'm thinking
45 that, if this is an improvement here that can be, you know, off
46 the shelf kind of sort of integrated into this next assessment,
47 why not, and it's just to know how far they've gone already.

48

1 **DR. VAUGHN:** So this isn't going to affect what they've done
2 already, and like it's not -- This isn't impacting the model
3 estimation, and this is all going to be projections down the road,
4 and so, you know, Francesca knows what's more or less going on
5 with this, and, obviously, Skyler is involved in running a lot of
6 this with me, and so, yes, it's not going to be a surprise, or a
7 difficulty, doing it, if that's the choice, but it just depends on
8 whether you are interested in that and then making that adjustment
9 to the assessment in that sort of timeframe, and that sort of gets
10 back to the bigger picture of how would you like these things to
11 be integrated and sort of the timelines for following that, but,
12 yes, I can work with, obviously, Francesca and Katie and Skyler,
13 and we can work through the assessment working group for red tide,
14 as a starting point.

15
16 So something completely different, and so, as most of you know, or
17 not the new people, but the existing SSC members, we have a lot of
18 discussions, a lot of the time, on allocations. It's a hot-button
19 topic, and it's important.

20
21 A lot of stuff I've done in the past is building the code that
22 achieves these allocations, and projections, but we've also had
23 discussions about whether or not those are attainable, and we set
24 management-based quotas between recreational and commercial that
25 affect things, but those aren't necessarily achieved in practice,
26 and so how does that impact the actual achievement of OFL, and how
27 should we handle these things, and so, towards that end, and this
28 is other work I've done with ICCAT, is looking at can we get -- It
29 also adds a lot of workload, and so you're used to asking a lot of
30 back and forth between you, the council, the Science Center, saying
31 do we want 59.5 percent, or do we want 57.3 percent, and like,
32 every time, it requires a rerun of those analyses. It's a constant
33 redoing of the projections with a different fixed fraction.

34
35 To get away from that, we started looking at what can you do to
36 quantify this, so you're close to expectations of what will happen,
37 agnostic of what the actual allocation fraction is, and so work I
38 did with ICCAT is looking at what if we just shift those fractions
39 and do simulations for each fleet independently, and so they have
40 huge numbers of fleets, and I think it's like fifteen or something,
41 in this example that I'm going to show you, but what if you run a
42 model where you sequentially do your projections with every fleet
43 set to F equals zero, other than one target fleet for which you're
44 trying to calculate its specific MSY at, in this case, an SPR 30
45 percent proxy for OFL.

46
47 Again, these simulations are done with OFL, and so, like we
48 discussed before, this is looking at what's the impact of this

1 decision outside of the context of buffers from ABCs and the like.
2 Then you compare this to what would happen under status quo, and
3 so a lot of these examples will be with a constant F fraction.

4
5 This is -- These are raw landings, and so, if you use the recent
6 average OFLs, and this is something similar with less fleets,
7 obviously, and what you would see coming out of an assessment for
8 anything in the Gulf, and we've got catches allocated amongst
9 fleets, and we're just looking at, if those fractions stay the
10 same, like figuring out what the OFL is, and we would do multiple
11 simulations, where you would shift effort between these, and you
12 would just see three or four different examples.

13
14 In this case, what's important, and the purpose of this simulation,
15 was these look like you've got a handful, a half-dozen fleets,
16 that are all having a somewhat similar impact, a little bit and a
17 little bit low, but there's like six main fleets that look like
18 they're influencing the stock and taking similar landings
19 fractions.

20
21 If you run this, like I said, turning each one on sequentially and
22 figuring out what their sustainable yield is, you end up with very
23 different -- So this is more extreme than we're likely to see in
24 our fisheries in the Gulf, and, over on the left there, you've got
25 a FAD fleet, which is a purse seine that are aggregating small
26 individuals, and they're targeting mainly skipjack tuna, and
27 they're picking up small bigeye with them along the way, and so
28 they're catching really small juveniles, and then, over on the
29 right, you've got longline fleets that are targeting just the
30 largest, most valuable individuals, and so, obviously, that's why
31 you're seeing this very large difference in sustainable yield.

32
33 That's important though when you get now to looking at who is
34 actually impacting the removals of spawning biomass, and like what
35 fraction of their sustainable yield are each of these fleets taking
36 in the base assumption, and then you see this answer that almost
37 all of the impact, like half the total removals, effective
38 removals, are coming from this one FAD fleet, and then you've got
39 them much more evenly spread amongst the other fleets, once you
40 account for their selectivity.

41
42 This lets you do that simulation, and now, from that, you can get
43 to basically an exchange rate between these fleets, is what we
44 have for them, in that you can say, well, if I take a pound away
45 from the FAD fleet, how would my MSY change if I shifted to another
46 one, and, in this case, like a pound for that FAD fleet -- If you
47 take a pound off of their quota, you can add almost five pounds to
48 one of those longline fleets, and so it lets you more explicitly

1 look at how things will change, and you can just sum those up to
2 one.

3
4 These are equilibrium analyses, and so these are looking at long-
5 term OFL. There are more nuances when you get into the short-
6 term, and these are benchmark sort of calculations, as opposed to
7 short-term OFLs, where you have more impact of variable population
8 structure, and so your landed selectivity is slightly different
9 than your long-term equilibrium landings by age, and so that --
10 Before I get into length-based things, like that's sort of the
11 consideration, is the thought is that this could simplify that
12 decision-making.

13
14 You could get out OFLs for each individual fleet, and then the
15 council could make their allocation decisions somewhat independent
16 of the assessment. They can say we're going to split it up however
17 we like, and they know that they can only get to one. They can
18 take some fraction of each fleet's MSY, as they dish it out, rather
19 than a fixed target that, if they change allocations, needs to
20 change, or they may not realize that it needs to change, as has
21 happened in the past sometimes in other regions.

22
23 It also could be used to better evaluate, and jump in with
24 questions, if I lose anyone at all, and this is definitely better
25 with not losing you along the way.

26
27 It could enable a better way of looking at like historic
28 overfishing, and so, if we're not achieving those allocation
29 fractions in practice, you could go back and say, well, what did
30 we actually achieve?

31
32 Were we overfishing, because more of the landings came from a
33 different fleet, and that's probably more important if you have
34 variation in selectivity within sectors, and so, at the moment, we
35 might manage to recreational and commercial, but, if you had two
36 commercial, or two recreational, fleets that had very different
37 selectivity, there is no regulation managing what fraction they
38 end up taking, and so, if it all ends up shifting to a low -- Like
39 a small individual targeting fleet, or a large individual targeting
40 fleet, you may achieve way less landings than you could have,
41 because we didn't accurately account for that selectivity that was
42 released at the end of the fishery, and so it could help better
43 understand that and understand whether we were overfishing or not
44 in the past.

45
46 Like I said, this is just for MSY at the moment, and not short-
47 term OFLs, due to that selectivity impact, and that is a primary
48 reason why I think it would be interesting to expand this to look

1 at age/size-specific MSY.

2
3 Rather than go with just fleets, which is useful, in a sense, that
4 you're not changing that, and, if you changed it to saying what if
5 you just catch five-year-old fish, or six-year-old fish, and do
6 each age independently, you could back-calculate that into what
7 were the selectivities of the different fisheries, and that would
8 be even more stable, I believe, and we're not there yet on running
9 these simulations, but it should be more stable to that changing
10 structure, and so you could see that moving through.

11
12 If you had a strong recruitment pulse that's moving through, you
13 could maximally utilize that and say, look, the fishery is actually
14 targeting this big pocket of small individuals, and so we need to
15 fish a little bit less, and more landings are coming from small
16 fish, and so the OFL should be down. If more landings are coming
17 from large fish, at the end of that tail, then we could fish
18 harder, because we're more sustainable, and so it gives you just
19 more flexibility to accurately capture this, and it has been fairly
20 large. Like, in that complex scenario, there can be large
21 differences in OFL, and what is sustainable, based on size and
22 selectivity.

23
24 Obviously, it's a lot more to digest, when you're reviewing this,
25 and I'm not sure of the complexities of how you present that to
26 the council, or how you write that into legislation, that there is
27 a total sustainable amount for each fleet, and it's not until you
28 actually achieve that that we can determine whether you overfished
29 or not, versus just a proportional F, and I totally understand
30 that that's probably just going to make everyone's heads hurt, and
31 especially the council and stakeholders, not knowing exactly what
32 that number is, a hard number, beforehand, but it is a potential
33 that can get us to a more sustainable area and maybe avoid some of
34 these issues that we see with like the ski-slope OFLs, and, also,
35 a lot of the time, you see a dip in those early --

36
37 You know, five years, and ten years, in, the population might
38 actually decrease, and then pop back up again, as different cohorts
39 come through and you move into that actual equilibrium composition
40 that the model sees, and so we may be estimating what is
41 sustainable at a long-term size structure of the population, and
42 that may or may not be sustainable now, or optimal, in the recent
43 years, and so that OFL, what is it each year, is a complex problem.

44
45 **EXECUTIVE DIRECTOR SIMMONS:** Thank you. This is very interesting.
46 In the bigeye fishery, what kind of monitoring program do they
47 have in place to make sure the different fleets potentially, or
48 gears, are staying within the OFLs? Is that 100 percent coverage,

1 or is that self-reported, or is that, you know, 100 percent
2 observer coverage?

3
4 **DR. VAUGHN:** It's super variable, and I can't talk specifically to
5 all those technicalities of different fleets, and that is, you
6 know, obviously, large numbers of countries. They don't have the
7 actual ability to manage specifically to each of these fleets
8 either, and so there is -- These are aggregated there, but there
9 is country-specific quotas that they end up providing, and so it's
10 not -- Managing to that kind of thing, for ICCAT, would not be
11 achievable.

12
13 The reason for doing that original analysis was to look at the
14 potential consequences of if they could shift effort away from
15 that FAD fishery, which is growing each year and dramatically
16 reducing the sustainable yields for other fisheries that target
17 larger fish, and so it was more of that like sort of big-picture
18 review, which is why it was just looking at equilibrium and wasn't
19 focused too much on the fine answer, and it was supposed to be a
20 big-picture look at like what are the impacts of this, and like
21 what is really important, and I think we could get things like for
22 discards.

23
24 Like how much of an impact are our discards having, and that may
25 be small pounds, but are they way more important, in the sense of
26 like total removals, and could we get a lot of pounds if we could
27 stop catching them, with descender devices, or stop their
28 mortality, those sorts of questions.

29
30 **EXECUTIVE DIRECTOR SIMMONS:** Just to make that work in the
31 Southeast, I'm just thinking about how long it takes us to get the
32 landings in, you know, the data we're using for projections, and
33 to really try to monitor based on those different OFLs would be
34 very difficult, based on our current system, to make that work.

35
36 **DR. VAUGHN:** So, yes, and I don't know how well we could live-time
37 adjust to those, but it would allow you to look back, and, when
38 you're calculating whether you overfished or not, you would now
39 have a better answer to that, and, to whatever degree we can
40 separate those landings out in real-time, it would help, but, yes,
41 most of that is, obviously, very difficult to do live as we go,
42 and it's more for, yes, whether you're in an overfished status,
43 whether you were overfishing in the stock assessment, and you get
44 a more realistic answer on that, but it accounts for the way things
45 played out, rather than the way we projected they would at the
46 time, is the thinking, if that helps.

47
48 **MR. MARESKA:** So the way you presented it is each fleet would

1 basically be its own stock assessment, and so you're basically --
2 Go ahead.

3
4 **DR. VAUGHN:** There's just the one stock assessment. It's just
5 running those projections, and so we ran however many fleets that
6 was, and, for us, there's, you know, six fleets in a fishery, and
7 you would run six different projections, and you would get six --
8 An OFL that comes out of each of them, and then, when we wanted -
9 - You could put out one OFL and say, look, this is what we're
10 targeting as OFL, based on what we think is going to happen with
11 allocations, and then, in practice, when we get to the end, and
12 we're determining whether you did overfish, we're going to look at
13 the actual achieved fractions between fleets that panned out.

14
15 **MR. MARESKA:** Okay, and so the OFL for each fleet -- Is that
16 additive?

17
18 **DR. VAUGHN:** Yes, within their scale, and whatever fraction. You
19 can get to roughly one total unit of OFL, and so, if everyone takes
20 half of their OFL, you got to that fraction of like one, and like
21 everyone has got a -- If everyone took just their OFL, or however
22 it works out, and like it needs to sum to that.

23
24 They're just in those different units, and so, if you give them
25 one, they get one unit total. If you give a thousand pounds to
26 one, and it's 10 percent of the OFL, that takes away 10 percent of
27 the total OFL that you can then allocate to other people to get
28 that total of one OFL unit subtracted over everybody, if that makes
29 sense. That's what that exchange rate is trying to look at, is
30 you get sort of like how much you can take from one to get to a
31 total value.

32
33 **MR. MARESKA:** So it seems like a way of allocating resources,
34 almost.

35
36 **DR. VAUGHN:** The goal here is just to get away from having to --
37 That like constant question-making on like what is this allocation
38 going to do, and what will the impact be if we do this upfront,
39 and then that separates the decision-making of how to allocate
40 between fleets and how to distribute these resources, and that
41 becomes like a political management issue for social scientists
42 and the council, and that can be made independent of the
43 assessment, and they don't need that constant back and forth.

44
45 You're like we know now what is important is what fractions are
46 you taking of different-sized fish to get to that OFL, and, at the
47 moment, that's all wrapped together with how we set up the fishery
48 and how we regulate it down the line.

1
2 **MR. MARESKA:** So the economic impact of each fishery, commercial
3 and recreational and different fleets, could also be assessed,
4 potentially.
5

6 **DR. VAUGHN:** So you would have -- If you had data on that, that
7 would enable us to provide like assessment output, and here's the
8 OFL for each fleet, and then someone who has a model of the economic
9 impact of each fishery, how much a pound landed in that fishery is
10 worth to the economy and the local system, and you could then model
11 that and say, okay, well, now I can decide how much I take from
12 each of these bins, but you know what sum you have to go to.
13

14 At the moment, if, you know, Steven is doing that on the side,
15 doing something that -- He doesn't have an answer as to what
16 exactly the OFL would be for whatever allocation fraction you want
17 to look between different fleets.
18

19 This one is just pretty quick, but more important I think after
20 yesterday's talk, and that's why I sort of brought this up, and
21 so, currently, the proportion -- The current proportion of OFL
22 fishing effort is tied to discards, and so, in the model, you've
23 got a retention function that is assuming that discards move up
24 and down with landings.
25

26 That is somewhat accounted for in red snapper, where you have a
27 closed-season fleet, but most of our fisheries have just single
28 fleets, and so they don't have explicit closed seasons and open
29 seasons.
30

31 You have retention functions that are saying what fraction of fish,
32 fish and discards, usually on the small individuals, and so that
33 is -- When we do projections, which is what all of this is about,
34 all those assumptions we make, we make that assumption that, if we
35 set the OFL very low, like we did recently for gag, that, if you
36 cut 90 percent of the landings, you're also cutting 90 percent of
37 the discards, is the way that that's modeled at the moment, the
38 way that's going through.
39

40 Obviously, given the vast diversity of priorities of different
41 stakeholders, and, as we saw, there's often a large amount of out-
42 of-season fishing, whether it's just bycatch from other fleets or
43 whether it is people intentionally catch-and-release fishing,
44 there's a lot of mortality, and a lot of reasons, why that
45 assumption is probably not the best.
46

47 That given approach is opening up potential problems for
48 litigation, and so there are people starting to ask that question

1 and say, well, are these rebuilding timelines reasonable, and is
2 this going to be achieved, and are you actually going to achieve
3 this dramatic reduction in discards that you're projected, and how
4 does that result -- How does that fall out for management, and for
5 the implications of achieving our rebuilding timelines, and there
6 are a lot of reasons why we do this.

7 ,
8 It does generally perform a lot better, for most of our models in
9 the Gulf, to use these retention functions, and so we have data
10 and structural limitations that make it difficult to go with
11 separate discard and retained landings fleets, as is done at times
12 in the South Atlantic, but we do have the capacity, and it's not
13 currently available, but our thought is that we do have the
14 capacity to adjust this asymptotic retention, and so, in this plot,
15 you see the blue, like the outer line, is what you've landed, or
16 not landed, but what you've intercepted, and so what gets pulled
17 out of the water, and then that green is what you retain as actual
18 harvest, and then that red are those dead discards, and so discard
19 mortality multiplied by that gap, the discarded fish.

20
21 If we could adjust, on the right-hand side there, that upper level,
22 you could bring everything up and down, with a parameter in SS for
23 these retention functions, called that asymptotic retention rate,
24 which could vary from zero to one, and so our thought is -- Our
25 thought is that, for projections, you could move forward and
26 possibly add in a fraction that says -- I was thinking, prior to
27 this, to keep F maybe at a recent average and say everything is
28 going to be based on how much we think fishermen can adjust their
29 effort, or are going to adjust their effort, either through an
30 inability to avoid fish or a desire to catch and release fish
31 nonetheless.

32
33 That sort of X multiplier on the recent F is going to be how much
34 you can move it up and down, due to reallocation of effort away
35 from the fishery, and, other than that, we would use this
36 asymptotic retention function to just move effort from landings to
37 discards, until we got to the OFL, and achieved that OFL, and so
38 there's work to be done to enable that sort of fitting to be done
39 in our projections, which is what we're looking to move to do, and
40 what I'm working on at the moment, but it would let us get to that
41 point.

42
43 It gets a little bit more complicated with what we saw yesterday,
44 where it's not necessarily that shift, and there is sort of a fixed
45 amount of effort out there, and so, using the same thing, we could
46 get to that same place and sort of model how you keep a constant
47 baseline amount of discards, but it could potentially have large
48 impacts.

1
2 Like I said, for red tide, and now for this, it could result in
3 these infinite rebuilding timelines, and inabilities to rebuild
4 period, and so what do we do when either red tide mortality,
5 discard mortality, any of these things are larger than what the
6 model is saying sustainable yields are, and that's sort of the
7 biggest question.

8
9 **VICE CHAIRMAN NANCE:** Does it have to do with more catchability
10 of, you know, the discards and that type of thing, as opposed to
11 effort?

12
13 **DR. VAUGHN:** I guess, when I say "effort", it's sort of like that
14 influence of mortality. Like, when we set OFL, we just move effort
15 up and down, until we achieve that OFL, and that's often not the
16 way that you actually achieve that OFL.

17
18 You know, in a closed season, if everyone stopped fishing outside
19 of it, is adjusting effort, but they're not, and they're just not
20 able to retain fish anymore, and so it's obviously not -- You
21 wouldn't want to assume that you just adjust retention, and people
22 keep fishing as hard as they can, but clearly there is a large
23 amount of effort, and it just becomes really problematic in cases
24 like gag recently, where there is a very large reduction in the
25 OFL, and, hence, the modeled effort, and so what are the
26 implications of this if we don't do that, and I think that's the
27 big question here, before we get hit with one of these assessments,
28 is what do you do if the way we -- If like the assumptions we make
29 end up with a scenario where there is no way to achieve sustainable
30 yield.

31
32 Like I've done analyses, in ICCAT stocks, where it's for sharks,
33 and they're being caught by longlines, and there's just no --
34 There's nothing you can do, and you're like this is all another
35 fishery, and it's unmanaged, and there's no way around that, and
36 I don't know how that fits into our framework, and it's just like
37 -- I think that's the main question we need, about how we account
38 for that.

39
40 Before, I had the question of how do we come up with the number,
41 and that was a real big unknown, and I'm really excited to see
42 that we have people starting to do analyses, and to get hard
43 numbers on that, and we can debate, or you can debate, about how
44 accurate those are, and what number you should use from that, but
45 we're starting to get something, as opposed to a big question-mark
46 of how much can people actually target a fish, or avoid a fish,
47 and so that's where we're at, and so that's ongoing, and it will
48 get rolled in probably the next time we get told we have to deal

1 with this in an assessment, but it's still in development.

2
3 **DR. FRAZER:** I know you've played with this a lot, Nathan, but so
4 like -- When I think about like, if you have a highly-selective
5 fishery, right, with high retention, and you kind of do that
6 proportional thing, and you're trying to optimize, you're going to
7 just lean towards a single fleet, and you will ultimately weed one
8 of them out, I think.

9
10 **DR. VAUGHN:** Are you talking about the fleet-specific things?

11
12 **DR. FRAZER:** Yes.

13
14 **DR. VAUGHN:** I am not -- Yes, that is usually what happens, and
15 I'm not saying that we should use this to like optimize who gets
16 the fish, and that is a consideration for the social justice and
17 the economics, outside of the management, but, yes, usually you
18 end up with -- Like there's always an answer as to which fleet
19 makes the most money, and you can't just throw it all --

20
21 We're never going to just throw it all into one fleet, but the
22 main goal for that, for you, would be to be able to get a better
23 handling on what is sustainable and what was the sustainability of
24 the outcomes that we achieved, rather than just the assumptions we
25 projected. It's trying to take as many of the assumptions out,
26 like disentangle them from the management advice we're providing,
27 which obviously makes the advice more complicated, but it could
28 make it less assumption later, and similarly with this stuff.

29
30 You know, it's getting some more of that reality in there, and
31 it's not necessarily always nice to deal with, but it's trying to
32 take some of those problems out and be more explicit about what's
33 going on and what we're really doing.

34
35 Switching gears, and so those are the primary things we're talking
36 about looking into at the moment for projections, and then now
37 this is looking at throughput and robustness.

38
39 As you've heard from Katie, and we just had a presentation
40 yesterday, it takes -- I mean, I had one to two years on there,
41 and we've got a timetable that says two years for an assessment,
42 and then there can also be multiple years of back and forward and
43 legislation before you get management enacted after that, and so
44 it's a long lag. It's a lot of work, and, obviously, that makes
45 it difficult.

46
47 There's not any real way around that at the moment, and we're
48 always going to be lagging on that, and so we're moving towards

1 these interim assessments, and ways to get faster updates, that
2 aren't a full stock assessment, and we need that, because like
3 I've shown on the red tide, we get a lot of things that are
4 happening along the way.

5
6 We've got episodic mortality from red tide, and we've got
7 recruitment variability, potentially, depending on how you're
8 managing, and changes in the selectivity, and which fleets are
9 operating, primarily, and all of these things could be changing us
10 along the way and diverging us from where we intend to be, which
11 is why we're looking at indices, to see where did the model move.

12
13 We've tried to look at like what were the goals here, and the
14 thinking is what are we trying to do? We're trying to maximize
15 our throughput, offer robust management advice, in a consistent
16 way, and so what is that maximizing? I think, you know, we've
17 seen slides yesterday on what is holding us up, but I think, if we
18 can get down to the place where data provisioning is the largest
19 hurdle, then we have succeeded in maximizing that throughput, at
20 least from the assessment side.

21
22 If we can make that analytical work to implement this marginal, on
23 top of the delay in data, then we're getting as robust to the
24 advice as we can.

25
26 What is robust? This is sort of the big question that drives how
27 you do these analyses, and, for me, I'm looking at like can our
28 results predict what we're going to see from future assessment
29 results, and we don't know what's actually happening out there,
30 but the best we can hope to do is that, if I say -- You know, if
31 we predict an OFL, and you account for the changes in the
32 environment in that time, that the next assessment predicts the
33 same OFL as what you thought, and like you are being consistent,
34 from time to time, and the interim comes as close to predicting
35 what you would get from a new stock assessment as it can.

36
37 Consistent means that we really want this to be consistent across
38 species. At the moment, the biggest thing that has slowed down
39 these interims is it requires a lot of discussion, between
40 different species, of which indices are good, is this index
41 working, is some of the average of the model -- Is the model well
42 predicting it, and we haven't put a lot of eggs into one basket,
43 because we don't have a quantified measure of what we should do,
44 or why we should do it, and it's just a lot of expert judgement
45 and then sort of like squint and hope that it looks like it's
46 giving you a reasonable answer, which is why we go around in
47 circles a lot, at these meetings, on disagreement of I don't think
48 that that looks good, or you don't think that looks good, and

1 you're putting a lot of eggs in that one index basket.

2

3 It's fairly easy to blow up one index and say, well, the model is
4 not going to follow it, and so how can we make this more streamlined
5 for single assessments.

6

7 To solve some of these problems, what we're trying to achieve,
8 with our assessment work, is, one, to be able to integrate multiple
9 data sources, and picking one index is always going to result in
10 that discussion question, and, if we can integrate as many of the
11 indices as possible, and recent landings, you're more likely to
12 match what that stock assessment is going to put out the next time,
13 and it's easy to say one index is not representative of where we're
14 going, but, if you can use all of them, that's what the model is
15 going to fit to in the next iteration, and so you're more likely
16 to be close to the mark.

17

18 Also, an ability to quantify uncertainty, and Will talked about it
19 earlier, in the questions for the MSE analyses, of what -- If
20 you've got an index that went up, and you just calculate that
21 ratio, it can result in a lot of jumping around, and it's hard to
22 say how certain are we in one given index, and so it's coming up
23 with a quantified means of calculating that and incorporating that
24 into our decision-making process.

25

26 Like I said, we want to get away from expert judgment and
27 individual species analyses to a standardized package that will
28 let you look at a given assessment and back-calculate how these
29 different indices should be used and what you should be doing with
30 your ratio, and then also produce those ratios down the track,
31 when you put in the new indices, and so we're trying to make this
32 as streamlined as possible, just like our projections, where we
33 know what those assumptions are, and they're already baked in, and
34 you can prove -- Like Cassidy said, you improve the recipe, rather
35 than you're improving the final output of any given one.

36

37 We can still review that output, but it's simpler if you have a
38 standard process that doesn't require multiple reviews for every
39 assessment, because we don't achieve those annual, or biannual,
40 updates, when you're constantly having to litigate that one
41 specific choice that was made for this species.

42

43 This is still in development, and so just a little background on
44 like where we're going, and sort of a rough idea about what we're
45 trying to achieve here, and so, like I said, trying to figure out
46 what it is you're trying to achieve, what is your target, what is
47 your truth that we're trying to estimate, and so all of this
48 interim stuff is based on retrospective hindcasting of peeling

1 back layers of the model, but we're going to set, as a target,
2 this back-calculated OFL that would expect to have received from
3 the most recently-accepted assessment, and so basically that sort
4 of swooping bit of the black line, at the very end there, after
5 the red disappears, is what you normally see in a projection.

6
7 You know, you've got that constant bit, but all that OFL is
8 basically what do we think the biomass is in that year, and what
9 fraction of the biomass are we allowed to take out, based on our
10 benchmark F removal fraction, and so we can go back through the
11 model, look at what catches were landed, look at what fraction of
12 the biomass they removed, and then readjust them to come up to the
13 fraction that we've set as a benchmark OFL target, and so, in this
14 case, you see that, for most of that time period -- The reason
15 you're trying to fish down the fishery there is they've been under
16 what is an estimated OFL, in almost every year, except for maybe
17 one blip year there, and I think this is scamp, from the last
18 assessment, and so we're setting a benchmark of where we're trying
19 to get to.

20
21 Then we can roll back through time and run these analyses, where
22 you peel up one year of data at a time, and, in this case, I've
23 got six years of peeled-back assessments where you estimate OFL,
24 and one is just one year of data removed, and what did the model
25 estimate as the OFL, and there's hindcast OFLs there that you can
26 see, and, in this case, you can see that you've got fairly decent
27 consensus between those models in the future projections, and
28 they're equilibrium landings, but you start to see some patterns,
29 if you look close.

30
31 I know the screen is far away, but you start to see some hind --
32 Like retrospective patterns there in what they're estimating for
33 the historic biomass. We basically look at calculating those
34 historic values and then also looking at what did the model, as a
35 starting point, estimate as an OFL, given that we know all the
36 indices, every index that's in the model already, because we're
37 run those years, and you could look at what would you have done if
38 you were using an interim from that point, and how much would you
39 have needed to adjust the OFL by, based on that index, to achieve
40 the target, that black OFL landings from the final model, and,
41 similarly, what would you have needed to do if you had updated the
42 OFL, and how biased was it to that final target OFL, like the truth
43 that we're talking about, and so how much are each of these things
44 accurately predicting the truth.

45
46 This is just showing it for the raw OFL estimate, and we don't
47 have all the code written to back-calculate those indices, and the
48 index adjustments, yet, and so this is just looking at OFL.

1
2 This is where there is questions, and, in this case, we do have,
3 for like a one-year lag, or a two-year lag, of the OFL estimate -
4 - We do have some fairly strong retrospective patterns that we're
5 seeing, in the sense that, as you go further back in time, and you
6 peel off more data, you're needing larger and larger corrections
7 to that OFL, and, basically, the model is -- Each time you add a
8 new year of data, it's estimating OFL, and it's, I believe, in
9 this case, a little bit higher than what the model would have done
10 with one less year of data.

11
12 In the equilibrium sense there, you've got, you know, six random
13 points that are fairly distributed, and so, in that case, you would
14 have -- You could now pull a distribution, a mean and a standard
15 deviation, of what that offset should be, in order to accurately
16 estimate an equilibrium OFL from that historic value, and you can
17 do a similar thing with the indices, once those are working, and
18 you're basically coming up with now a collection of points about
19 how accurate -- How much you should adjust your index method to
20 achieve the true OFL.

21
22 There is questions, and it's something that I would like feedback
23 on, and would be helpful, is how we should look at dealing with
24 these patterns. If you're seeing retrospective patterns, how would
25 it be helpful to deal with them, like if it's not just a straight-
26 up mean and standard deviation, and we're like, well, there's
27 something here that we're trying to correct for, and that could be
28 something that needs to be corrected for in the stock assessment
29 itself.

30
31 If you can show that each year of new data is going in there, and
32 the OFL is getting a little bit higher, maybe we're underestimating
33 what the OFL should be, because we know that, next year, we're
34 going to have thought that it should have been a little bit more
35 than what we originally said, or at least we have for the last six
36 years.

37
38 Like I said, the limitations, at the moment, are figuring out how
39 to deal with these retrospective patterns, and then, also, we're
40 limited to a fair number of years, and so those patterns also could
41 come down to the things we've talked about in this assessment in
42 particular, for scamp, that there is no fixed allocation fraction,
43 and so it's basically just run from the last three years.

44
45 We're going to need to look into understanding whether or not that
46 is due to just changing achieved allocations, which changes your
47 projection, which changes what was sustainable, and if that's all
48 just a feedback loop of each of these estimates of OFL is a

1 different target, and those sort of things is what I'm hoping we
2 can get away from with the fleet and size-specific, or age-
3 specific, MSYs, and that you don't have -- You may end up managing
4 with variability in that stuff, but you don't have that sort of
5 potential for biases to creep through that look like things are
6 changing, and it's just that we're actually estimating different
7 targets each year, and we don't realize it, because we're not
8 paying too much attention to what those achieved fractions are,
9 and we haven't explicitly looked at them, and so that's a future
10 thing that I'm going to look into for this, one case study.

11
12 Also, that like hindcasting, when it is relatively small, and we've
13 only got about twenty years of possibility, for most species, and
14 a lot of them are not going to be able to go back that far.

15
16 I limited it there to six years, because things started to get a
17 little wild when you go back beyond that point. They start
18 estimating -- You know, I think there's been enough data that you
19 lose indices, and different things that are informing the model,
20 and so you end up getting very different estimates, and that's its
21 own issue, but we're limited to that, and is that enough?

22
23 We've talked about MSE analyses, but the reason we've gone this
24 way is that that captures that real like achieved uncertainty, and
25 so it's capturing all that mess in the indices and data that an
26 MSE is very difficult to account for. We need to do a general
27 resampling of data from Stock Synthesis, for example, as it
28 currently stands, just resampling around the expected value. When
29 we have a lot of conflicting indices, they're often not a noise
30 around a trend, and they're like a solid trend that conflicts with
31 their expected trend, for some.

32
33 How we deal with that is a big question for the MSE analysis, but
34 this, at least, in a small sense, gets away from it, and maybe we
35 can use this information, and these sort of patterns that we're
36 seeing, to inform how we should do MSE analyses and how we should
37 incorporate those biases into it, moving forward, to better capture
38 our true uncertainty.

39
40 Like I said, this is also a lot of things, and this is just --
41 This is the same model, and so we talked earlier about sort of big
42 changes in the model from year-to-year, structural changes, and
43 this is not accounting for any of that, and so this is still a
44 limited viewpoint of like what the uncertainty is, and there's
45 still larger uncertainty about that that may occur, but, as Katie
46 mentioned, we don't have very many assessments that are even
47 remotely comparable, back through time, and there is no way to
48 automate individual decision-making for the entire assessment

1 process for, you know, lots of simulation runs, but this could get
2 us to an actual quantified mean and uncertainty on landings, on
3 OFL, like an interim adjustment that's coming from all the indices
4 that are available, even if they're not representative.

5
6 It's going to say, well, we're going to see that, and, if there's
7 a lot of uncertainty, there will just a big spread, and they won't
8 influence that a lot, but it will all be there, and so that should
9 get us as close as we can to what would come out of a new full
10 stock assessment, to some degree. This is, obviously, still in
11 development.

12
13 Our long-term other work that I'm going to do, and hopefully we
14 can get beyond sort of a hard-and-fast line, a lot of these things
15 with interim versus full assessment, and there's not a lot of
16 quantified information to back up when we should switch, when we
17 should do one, or when one is not performing well.

18
19 Cassidy mentioned some of the guidelines you can put in if the
20 population gets too far out of whack, where you don't think this
21 is representative anymore, but, by understanding what's going on
22 in the stock assessment, we're hoping to get to more of a continuum
23 of being able to update different parts of the assessment as we
24 go, based on what the data are telling us, and what the results
25 are telling us, rather than just based purely on the value of the
26 population or something else, and we want to say that we're going
27 to put effort into putting an assessment on that schedule, when
28 the data show that it needs a new update, but something substantial
29 has changed in the population, and it's no longer acting the way
30 the model expects.

31
32 If it's acting the way as expected, given everything we've seen in
33 landings, then there's no need to -- Maybe you just need to update
34 recruitment estimates, or just update some parameters, instead of
35 a completely new assessment, and this is, I think, my last slide.
36 If people have questions on the interim stuff or other things,
37 jump in, but this is sort of a big-picture review that kind of
38 wraps into everything and a lot of the problems that we have, why
39 things take a long time to build, and why we get changes year-to-
40 year and have these issues.

41
42 That is understanding what's going on in our stock assessments,
43 and it's very difficult to sort of quantify why anything is
44 happening and what is influenced. Like we can see, in that case,
45 like retrospectives, you can see that there's a trend, but we don't
46 have information on what's causing that trend, and why is it
47 changing, and you can sort of -- You have to keep digging, and so
48 what we're trying to look at is coming up with an approach to look

1 at the influence on specific parameter gradients from each data
2 source, and so, basically, what is each data source telling me
3 about all the different values within the stock assessment model
4 that define that, so we can quantify do we see conflicting trends
5 between different indices, that are saying two very different
6 things, which could happen if they were from small areas and
7 sampling different status stocks.

8
9 We can say are there trends in parameters that are happening
10 through time that -- We just see, one, that we've got a fixed
11 value, but see there's actually a trend, through time, in what the
12 model is trying to fit it to, and that's why, each year we add new
13 data, we get that retrospective pattern, and, if we could see that,
14 and know it, we could build that better into our projections and
15 our understanding of where things are going to go, and that could
16 help deal with partial data, and unavailable data, and things like
17 that, which is why we can't always update an assessment with every
18 piece of information, because we need all those things working
19 together to come up with that final answer.

20
21 If you leave one index out, it's going to let the model shift a
22 long way towards all the others, if there's conflict in the model,
23 and it also could help understand that model instability, and why
24 they flip and change, because the model is jumping to like a new
25 safe place, and so it will help inform that development.

26
27 The goal is that it could also help inform our view. If you can
28 see what's going on, and have like a real understanding of a
29 quantified way of looking at what is driving the model, and what's
30 going wrong, and where are these patterns, maybe we can help tie
31 them back to knowledge that is like stakeholder knowledge, or
32 ecosystem indicators, and things that we haven't been able to get
33 into these assessments yet, because we just don't know what is
34 driving them.

35
36 We can't test every single combination of an index on every single
37 parameter, but, if we could see those trends in each parameter,
38 then you could eyeball it and say, wait. If someone looks at the
39 model and says I see that, and I just did a survey, and this is,
40 you know, looking at freshwater runoff, and that's what is driving
41 this index, or this is sea surface temperature, and those plots
42 make perfect sense.

43
44 If we can get to that point, where it's a little bit easier to
45 build models, and it's easier to understand models, maybe we can
46 get to doing the ensemble approaches that Katie mentioned earlier,
47 and it's very slow, at the moment, and it's very hard to build
48 them, because they break.

1
2 You start throwing random pre-sampling of data, and random
3 parameter changes, for the fixed parameters, and the model just
4 won't converge anymore, and so you end up with biased results, in
5 strange ways, because you're throwing out all these models that
6 just didn't work and only sticking to like a small area that
7 happened to work from random chance, but, if we know what those
8 impacts are, then we could get a better understanding of how to
9 make the models robust and how to get answers that are robust
10 through time and to uncertainty. I think that's it.

11
12 This just, as we're going along, and this is pretty brief at the
13 moment, the webpage, and it's just our sort of general process,
14 but we put this up to track what's going on with the project, and
15 it's five years, and there's a lot going on, as you've seen, and
16 sort of moving in a lot of different directions at once, and we
17 want this to be transparent, and be able to get feedback, and keep
18 people up-to-date with what's going on, and so this is currently
19 stating that we've got a few like outlines and things that are
20 going to be done, but, as we start getting results, and as we start
21 getting outputs, this will be able to provide links to the results,
22 links to the GitHub repositories and the code that's doing the
23 analyses and any publications and things that come through, and so
24 we can keep people up-to-date and allow people to see what's going
25 on with the project as we're progressing.

26
27 Like I said, we're at the end now, but the goal here was feedback
28 and discussion on these things, and a lot of it was to say how is
29 the best way to present this to you, and is the website useful,
30 and, you know, how frequent of meetings are useful, and like what
31 sort of amount of progress is easiest to digest? Does it need to
32 be all finished, and with a final answer, or is that just going to
33 cause more trouble, that you're like, well, now I see an answer,
34 and I can't digest a lot of the things that came in along the way
35 with all the assumptions that we had to make, and so what works
36 best for you guys, because there is five years of discussion on
37 this, and trying to get as many things that will help you as
38 possible.

39
40 **VICE CHAIRMAN NANCE:** Well, I think you did an excellent job of
41 introducing what you're doing, and I know, in discussions last
42 night with you, it was nice to be able to see all of the different
43 things that you're working on to improve the assessments and the
44 outputs from those.

45
46 **DR. VAUGHN:** Yes, and I'm well aware that this is like a lot of
47 sprawling topics, in a very short number of slides, and so it's a
48 lot, but at least -- There's never enough hours in the day to go

1 through all of these things, with like a long description, but if
2 you can give an idea of what you want more input on, and more
3 background on, before we get closer to any applications.

4
5 **VICE CHAIRMAN NANCE:** From the SSC's standpoint, any other input
6 that you have to Nathan, or questions? Luiz, please.

7
8 **DR. BARBIERI:** Nathan, thank you for this great presentation, and
9 it's a huge amount of stuff, right, and, I mean, that was my
10 concern.

11
12 **DR. VAUGHN:** It got a little fire hydranty there.

13
14 **DR. BARBIERI:** Yes, and it's going to be like drinking from a
15 firehose kind of thing, and so sensory overload, right, a little
16 bit, but, I mean, this is a very good, basic, you know, step-by-
17 step, right, of all the components, and so now we've been exposed
18 to this.

19
20 What I would like to see -- I mean, given the relevance of this
21 work, right, and how it directly connects to our everyday kind of
22 like things that we do here, I would like to have you come over,
23 you know, maybe once a year, at the very minimum, to give us an
24 update, and I'm thinking about, with some of the old-timers on the
25 committee, like Arnaud Gruss, I guess, was the -- YEs, and how
26 they had a project, and I think that one was focused on ecosystem-
27 based fisheries management type of things, and he would come and
28 do these sort of consultation presentations with the SSC.

29
30 You know, give us a slice of this large pizza, right, that we can
31 digest in one sitting like this, or give us a full update on the
32 progress on these different components and then a little bit of -
33 - But I think that, that way, we can provide a bit more meaningful,
34 you know, feedback to you, that we can help contextualize.

35
36 Of course, for SEDAR 88 here, this one is easy to contextualize,
37 you know, and we can think about it more specifically, but the
38 other ones -- I would like to see you come back, you know, and
39 visit with the committee, and keep us updated, because I think,
40 like what you're saying here, some of these things may be almost
41 ready to be off-the-shelf, right, so we can start flying the
42 airplane as we build it kind of thing, right?

43
44 **DR. PATTERSON:** Thanks for the presentation. I agree with Luiz
45 that it's good to see the broad overview and sweep of things that
46 you're working on with your team, and I think you guys have worked
47 on several parallel tracks at once, and you're also, you know,
48 setting up the structure of your simulation models to accomplish

1 different goals.

2

3 I think, in the future, you know, coming back annually, as you
4 check things off your list, I think would be useful, and we can
5 definitely provide feedback, as things aren't fully completed, but
6 as you're at a point where you need some input. I don't think
7 we're going to be as valuable to you if we're flying multiple
8 airplanes at once, as you are doing, but instead, you know, picking
9 out pieces of this, like maybe the selectivity questions, or the
10 red tide deal, and say, okay, here's where we are, and we need
11 your feedback, and what do you think is going to be the most
12 valuable, and what do you think the council would be most receptive
13 to, and help them understand these processes, and their
14 implications, and I think that's probably going to be the most
15 useful for everybody.

16

17 **DR. VAUGHN:** Yes, and that was definitely the goal. For feedback,
18 you're going to need sort of focused time on here's a topic, and
19 not here's three slides, but at least the goal was to hear an
20 initial overview, when we're still at a very early stage on a lot
21 of these things, to get them into your thought pattern and think,
22 all right, this is something that we are actually planning to
23 address in the not-distant future, as opposed to -- Or at least,
24 you know, bring up there is the question, and we need to think
25 about it before we have something ready and we throw out an
26 assessment that can't be rebuilt, or can't be -- That doesn't have
27 sustainable yield, and how do we want to deal with that? How do
28 we present that, and how do we -- What are the methods, and like
29 what do we do?

30

31 If there is fleet selectivity things, can you shift this around,
32 and, as this stands, this isn't sustainable, and, if you shift
33 some of it onto a different fleet, maybe it is, and we can sort of
34 back around that, and that's not optimal for the fleets that are
35 -- You know, some of them, but any sort of questions like that,
36 and like how do we -- Just getting everyone's viewpoint on, or
37 thinking about it, that, as things come up, you can say, oh wait,
38 that probably fits in this box, and we should think about that
39 now, when it's popped in front of us with an assessment.

40

41 **VICE CHAIRMAN NANCE:** Ryan, please.

42

43 **MR. RINDONE:** Thank you. I mean, it would be my recommendation,
44 based on the scope of the project, and the number of different
45 things that are being worked on, and their obvious relevance to
46 what this committee especially spends a lot of time on, that we
47 try and carve out time twice a year, because I think an annual
48 update isn't going to be sufficient to provide the project team

1 with the input it needs.

2
3 Some of these things are going to develop faster than others, and
4 so, in order for the SSC to have the opportunity to provide input
5 to Dr. Vaughn, and to get progress reports on like how things are
6 going, at more reasonable intervals, I think twice a year, and so,
7 Nathan, if you wanted to, I guess, think about this from a planning
8 standpoint, we could try and carve out time for like the February
9 meeting and the July meeting, and that would just be kind of like
10 a pattern, where you would expect to have an hour or two at each
11 of those to update on where certain things are, ask input where
12 you need it, that sort of thing.

13
14 **DR. VAUGHN:** I mean, even with just a more in-depth overview of
15 each of those things, if they weren't ready, but just to sort of
16 walk through it at a pace that could be absorbed, would fill the
17 next two years.

18
19 **VICE CHAIRMAN NANCE:** Any other input from the SSC? Please, David.

20
21 **DR. GRIFFITH:** Thanks for that presentation. Since you're at an
22 early stage of this, you know, maybe you could think about
23 incorporating some more social-science-type information, things
24 that affect the size of the fleets, for example, I mean, because
25 the managers are constantly trying to say reduce the size of the
26 fleet.

27
28 With the IFQ program, that was kind of one of the goals, you know,
29 to get the fleet smaller, and I don't know if it actually happened,
30 but that was one of the goals, but there's also other kinds of
31 things that affect, you know, fishing effort, like the processing
32 sector, you know, might have a labor problem, things like that,
33 and so these kinds of issues come up, and, I mean, I would be happy
34 to send you a little list of things that you could possibly
35 consider, but I just wonder, if you think about that stuff -- I
36 know it's very hard to get that kind of information integrated
37 into something like this. Thank you.

38
39 **DR. VAUGHN:** No, and that's on-point, and so a lot of this is in
40 the sort of basic capacity building, and so things like the
41 discards. We don't have the capacity. If you ask the Science
42 Center to do that right now, it can't be done. Like we don't have
43 the software capacity to adjust those things and to optimize
44 towards that kind of pattern, and so it's building in that ability
45 to estimate these things, and that's sort of like a downside on a
46 lot of these slides, is that I'm not out there collecting
47 information, and I'm not deciding what those final values are, and
48 a lot of it is then --

1
2 Here, I've got something that's important, and I can see that it
3 changes the model, but we don't have the information on how exactly
4 to parameterize this, and so, yes, if there are people, and now
5 hearing that there are, you know, analyses looking at the discards,
6 and, for example, there's a predictive model on what discards are
7 going to do, and that seems to have fairly decent predictive power
8 of like, next year, based on CPUE, of what the discards would be
9 from the fishery.

10
11 If we had things like that, then that could be built into that
12 assessment model on projections for next year, and so all of these
13 things are putting in values and the ability to optimize and adjust
14 them year-to-year. The more things, projects, that could tie into
15 this, and how to actually set those values, are definitely
16 facilitated by this, and so hopefully getting this out there and
17 it will be that people will look at it and say, oh, I think I can
18 come up with the number that you need here, and the red tide is
19 trying to like trigger Dave to be like I can optimize that, now
20 that you're telling me that you're going to keep putting it in
21 there, and I can estimate what that value is going to be.

22
23 **VICE CHAIRMAN NANCE:** Okay. I appreciate it, and, David, thank
24 you for that. I guess, from looking at it every six months or
25 something, I guess we would have to provide -- Or, Nathan, you
26 would provide what you have for our review, for looking at it, and
27 then we could then carve out time, twice a year type of thing, to
28 be able to look at that.

29
30 **DR. VAUGHN:** Yes, and I'm totally happy to coordinate with Ryan
31 and figure out like how that -- When there is something useful to
32 present, or even just things that are tangential, like walking
33 through the sort of decision points and projections and sort of
34 why we're doing these things, and it's probably useful to -- Even
35 if there's not an update on a specific number at the time, there's
36 plenty of stuff that needs explaining.

37
38 **VICE CHAIRMAN NANCE:** I did think it was good, when you were here,
39 and I think it was -- I can't remember which assessment it was,
40 the red grouper or gag or whatever, but you provided -- You were
41 here to answer specific questions on the projections and stuff,
42 and I think that was -- I remember how helpful that was, to have
43 you here to be able to discuss that with us.

44
45 **DR. VAUGHN:** I assume that, like as this stuff starts making it
46 in, and if it makes it in for Francesca for red grouper, and we
47 want to talk about it then, even if I don't have a presentation to
48 give, I'll be here to back Francesca up and do that, and so it's

1 baked into our project budget for me to come as often as you want
2 me here, and it doesn't really --

3
4 **VICE CHAIRMAN NANCE:** Okay. Good, because I do feel like, last
5 time, when we were discussing it, it was new to us, and that having
6 you here was very helpful to those discussions.

7
8 **DR. VAUGHN:** Yes, and that's why we pushed this from last time to
9 this meeting, is like trying to go through these sort of things
10 over the phone is very difficult, but in-person is a lot easier to
11 sort of close those gaps.

12
13 **VICE CHAIRMAN NANCE:** Yes. You're doing a lot more than I had
14 suspected, which was good. Not that I --

15
16 **DR. VAUGHN:** It's like they're all half-finished.

17
18 **VICE CHAIRMAN NANCE:** Okay. I don't see any other questions.
19 Thank you.

20
21 **DR. VAUGHN:** Excellent. Thank you. Thanks, everyone, for
22 listening, and I hope it wasn't too overwhelming, but that it
23 triggers some thoughts down the line, between now and the next
24 time I see you.

25
26 **VICE CHAIRMAN NANCE:** Absolutely. We appreciate that. Going to
27 our next presentation, which is from Dr. Will Patterson, it's
28 Regional and Sector-Specific Gulf of Mexico Age, Growth, and Age-
29 Length Key Estimation Derived from Otolith-Based Ageing. We'll go
30 ahead to that presentation, and, Ryan, would you give us our scope
31 of work for that, please?

32
33 **REVIEW: REGIONAL AND SECTOR-SPECIFIC GULF OF MEXICO AGE, GROWTH,
34 AND AGE-LENGTH KEY ESTIMATION DERIVED FROM OTOLITH-BASED AGEING**

35
36 **MR. RINDONE:** I can do it. Dr. Patterson is here with us today to
37 present the results of research contracted by the council to assess
38 ageing error in Gulf gray triggerfish. The council funded this
39 work in light of its critical importance for completing a new stock
40 assessment that is currently scheduled for 2025.

41
42 The last assessment was terminated prior to completion due to
43 irreconcilable data issues, and among these were issues related to
44 differences in ages between using otoliths and dorsal spines. For
45 those unfamiliar with gray triggerfish, and Dr. Patterson will get
46 into this, the otoliths for gray triggerfish are very brittle, and
47 prone to breaking, and the spines have been used, in the past, as
48 an alternative for conducting age estimation.

1
2 The specific objectives for the council's contracted study were to
3 sample gray triggerfish from commercial fisheries landings in the
4 southeastern, northeastern, and western Gulf, to estimate age via
5 to opaque zone counts and sagittal otoliths, and to validate
6 otolith-derived ages for a subset of those samples, randomly
7 selected from each region, via application of the bomb radiocarbon
8 chronometer to eye lens cores for the age-zero portion, for those
9 delta C14 values, and to test for differences in sex-specific size-
10 at-age and growth estimates among regions and between commercial
11 and previously sampled eastern Gulf-harvested fish.

12
13 Lastly, to compute new age-length keys by sex, and potentially by
14 region and fisheries sector, pending new results of Objective 4,
15 and so you guys should review these objectives of the contract and
16 the results from Dr. Patterson and ask questions and make
17 recommendations for any modifications, as appropriate, so that a
18 final report can be submitted to the council for consideration.

19
20 **VICE CHAIRMAN NANCE:** Thank you very much. Will.

21
22 **DR. PATTERSON:** Thank you. The title of the talk is slightly
23 different than the title of the grant that we wrote for this. It's
24 "Validating Gray Triggerfish Age Estimates Derived from Otoliths
25 and Spines and Assessing Effects of Ageing Error on Estimates of
26 Size-at-Age, Growth, and Stock Status Benchmarks".

27
28 The overall goal of the project, funded by the council, was to
29 examine ageing error in gray triggerfish, and also to try to figure
30 out ways to mitigate that, and so our work, because of some
31 changes, and our understanding of gray triggerfish biology and
32 ageing had changed along the way, it also made some deviations,
33 but eventually the goal was to examine ageing error, and its
34 mitigation, and that's what we did.

35
36 The report is organized into three chapters, and the overall --
37 The authorship of the entire report is myself, Derek Chamberlin,
38 who was a post-doc -- A former graduate student and then a post-
39 doc with me at the University Florida, and Derek now works for
40 NOAA and the Alaska Fisheries Science Center, and he runs the
41 production ageing facility there, as a supervisory research
42 fishery biologist. Zach Siders is a quantitative ecologist and
43 modeler in fisheries and aquatic sciences with me at the University
44 of Florida, and so Zach became part of this work, again, as we
45 moved forward.

46
47 The reason that the three of us are the authors on the entire
48 report, yet we have different authorship for the various chapters,

1 is because Zach and Derek and I were involved in all aspects of
2 the study, and, as we publish, different folks who made
3 contributions along the way have been, and will be, authors as we
4 go along.

5
6 In addition to the three of us as the lead authors of the study,
7 Jennifer Potts and Walt Rogers, both of whom were at the Southeast
8 Fisheries Science Center Beaufort Laboratory age and growth
9 program, Miaya Taylor, who is my lab manager at the University of
10 Florida, Nick Fisch, who works for the Department of Fisheries and
11 Oceans Canada, in British Columbia, and Kelli Johnson, who is a
12 stock assessment scientist and modeler at the Northwest Fisheries
13 Science Center in Seattle, and then Kate Siegfried and Shannon
14 Cass-Calay at the Southeast Fisheries Science Center. Again, I
15 will acknowledge these contributions as I go through the report.

16
17 There are four sections here. I'm going to give a general
18 introduction, and then I'm going to talk about each of the
19 individual chapters, and then some concluding remarks, and so you
20 can stop me at any time along the way if you have questions, and
21 I will also pause at each section ending, so that you're able to
22 ask questions in sequence.

23
24 Gray triggerfish, *Balistes capriscus*, is distributed in tropical
25 and temperate waters on both sides of the Atlantic. You can see
26 the map to the right there and their distribution. They spend up
27 to a year of life associated with sargassum, and then they settle
28 onto reef habitat. Often, this occurs well before their first
29 birthday, but they can sometimes spend protracted periods of time
30 in the plankton.

31
32 They are not highly targeted, or were not highly targeted, in the
33 U.S. waters of the Atlantic and Gulf of Mexico until about the
34 1980s, or later, and the figure in the middle bottom, the
35 histograms, this is from some experimental reefs off Alabama, and
36 this was done by Carrie Simmons and Steve Szedlmayer, and you can
37 see the timeframe of settlement in that system, across months, and
38 so these are age-zero fish settling out of the plankton in their
39 first year of life.

40
41 The Gulf of Mexico fisheries sectors and estimated landings are
42 shown here on the right. We have two main fisheries sector.
43 There's a recreational, and that has private, headboat, and
44 charter. There is some spear, but these are the primary fisheries,
45 or fishing sectors, on the recreational side, and then there's a
46 commercial handline fishery. Some triggerfish are also captured
47 in the bottom longline fishery, and also as shrimp trawl bycatch.

48

1 You can see, for both commercial and recreational, or, excuse me,
2 for the recreational fishery, the peak was in the mid-1980s, and
3 then declining thereafter. For the commercial, the peak was a
4 little bit later into the early 1990s, but the recreational
5 removals have consistently been much higher than the commercial.

6
7 There was a stock assessment done in 2006, SEDAR 9, and there were
8 a couple of different modeling approaches taken there, and the
9 stock status estimates were that the stock had been overfished
10 since the 1980s, and then overfishing had been occurring as well.
11 There was a lot of uncertainty.

12
13 In 2015, there was a second stock assessment, this time led by
14 Jeff Isley, and this was performed in SS, and so this was the first
15 gray triggerfish statistical catch-at-age model, and also the
16 first time that SS was utilized, and you can see, from the phase
17 plot at the top, and I should have labeled it, but, on the bottom
18 right, that's the initial conditions, and then, in the bottom left,
19 we're at spawning stock biomass less than the threshold, but not
20 overfishing was what was concluded at the time.

21
22 You can see some of the retrospective patterns in the bottom, and
23 I just noticed a typo, and so the orange line is SEDAR 43, and the
24 blue line should have been SEDAR 9, but you can see the sort of
25 retrospective patterns that exist between the two for those time
26 series.

27
28 Then there was another assessment that was undergone, SEDAR 62,
29 which was being undertaken in 2019, and it made it to the data
30 workshop phase of that assessment, but then the assessment process
31 was terminated. There were multiple issues with the data that
32 were cited, but there was also quite a bit of discussion about
33 ageing error, because of some recent research, and so there was a
34 rebuilding plan in 2008, and so Reef Fish Amendment 30A.

35
36 Reef Fish Amendment 46, in 2017, had a new rebuilding plan, and
37 so, by the mid-2000s, the 2015 assessment, you know, it was clear
38 that the stock was still overfished, and the rebuilding hadn't
39 sufficiently occurred over the previous time period. This was
40 meant to be revisited, obviously, a few years later, in 2019 and
41 2020, but, again, that assessment was terminated.

42
43 In doing statistical catch-at-age modeling, it's critical that you
44 have accurate, and hopefully precise, age estimates, and,
45 historically, most of our fisheries, the finfish fisheries, are -
46 - The age compositions are generated by otolith ageing, but gray
47 triggerfish have very, very small otoliths, and they are delicate,
48 and they are very difficult to extract, and difficult to read.

1
2 There have been several scientists, through time, who have
3 attempted to do this, including Walter Ingram, and this is an
4 image, in the top-left, from his dissertation, showing where, in
5 the first dorsal spine, sections are made, and then the figure on
6 the right is from some of Derek Chamberlain's early work
7 demonstrating the counting of these translucent zone cuplets to
8 estimate age.

9
10 The first dorsal spine historically was the ageing structure of
11 choice, and it's relatively easy to extract and section, and it's
12 not as easy to extract and section as a red snapper otolith, but
13 relatively easy. You have to have special handling of them. Once
14 you have sampled them, they're usually frozen, because there is
15 soft tissue involved that can degrade and stink, and that has to
16 be cleared as well before the sections are made, so you're just
17 dealing with the bone of the spine.

18
19 Concerns have been raised, through time, about ageing error and
20 imprecision and then, more recently, potential bias, and so there
21 are important implications for both of those things in stock
22 assessment, and so, when you have imprecise age estimates, you may
23 overall be accurate in your age estimation, but it inhibits the
24 ability to track cohorts, and therefore recruitment signals, et
25 cetera, in the data, but, obviously, if you're biased, then you
26 can have biases in your estimates of stock productivity and
27 benchmarks, and so that is potentially of greater concern.

28
29 The image in the left shows -- This was about a two-year-old gray
30 triggerfish that we scanned with micro CT at UF, and, right behind
31 the eye lens, you can see the sagittae, in the head of the fish,
32 and there's some small structures just behind that, and so boney
33 fishes have three pair of otoliths. The sagitta is the largest
34 otolith, and then there's an asteriscus and a lapillus, and,
35 actually, right behind -- We've highlighted the sagittae here, but
36 you can see the lapilli and the asterisci right behind it, but
37 this gives you a sense of how small they are in the head of the
38 fish.

39
40 In the top-right, this is an image from Tuset et al. 2008. They
41 have an atlas of otoliths of Mediterranean fishes, and it gives
42 you a sense of the ornate structure of the sagitta. The image
43 below that is of a yellowedge grouper, and this is another CT scan,
44 but it gives you a sense of the three-dimensional structure of the
45 grouper otolith, and this is a much more typical shape, and sort
46 of dimensions, of an otolith, and you can see, by the scale bars,
47 that the gray triggerfish otolith is many, many, many times
48 smaller, and, also, it's not a solid structure. It has this really

1 ornate three-dimensional shape, and that makes it difficult to
2 handle, once extracted, because they are very fragile.

3
4 This is a CT scan, zoomed-in, of the otoliths in that fish that I
5 showed before, so that you can get a sense of the dorsal and
6 ventral orientations and where the anterostrum and the rostrum
7 are. I'm going to animate this, so you can get a sense of just
8 how delicate the structure is, and so these are difficult to
9 extract. They're difficult to handle and keep whole, and, because
10 of these things, people didn't use them historically, but, just in
11 looking at this image, you can see here, and I'm trying to use my
12 cursor as a pointer, but, as we move out along this fan portion
13 ventrally, you can see microstructure that are the opaque zones.

14
15 We actually utilize this region here to perform the ageing, but,
16 throughout the otolith, you can see these three-dimensional opaque
17 zones forming away from this primordium here in the very center of
18 the otolith.

19
20 Nobody -- Despite efforts, nobody had successfully extracted, at
21 a large scale, and aged gray triggerfish otoliths until Shervette
22 and Dean did so with Atlantic gray triggerfish in the early 2010s,
23 and so these are just some data plotted, from their work, that
24 shows otolith age, on the X-axis, versus estimates from vertebral
25 age, on the Y, and then, on the right-top, you have otolith age,
26 versus spine, using the traditional spine method of counting the
27 translucent zones.

28
29 There's strong agreement between otoliths and vertebrae, but poor
30 agreement between otoliths and spines, and then, down below, you
31 can see the implications for size-at-age, and so Dr. Shervette had
32 pointed this out, during the SEDAR processes for Atlantic gray
33 triggerfish, and demonstrated that we get two different age
34 estimates, if you count opaque zones in otoliths versus spines,
35 but, again, otolith extraction, processing, and ageing is quite
36 challenging.

37
38 How would you go about actually doing a validation of the age
39 estimates from either, and so, historically, in marine systems,
40 the bomb radiocarbon chronometer has been used extensively to
41 validate age estimation, and so the figure here on the left is the
42 Gulf of Mexico and northern Caribbean delta C14 reference series,
43 and most of these are coral data, and so the coral are cored, and
44 their skeletons lay down growth bands, similar to otoliths and
45 trees, and they're very easy to distinguish annually.

46
47 The time series, except for the last two data components, data
48 sources, was put together by Andrews et al., in their 2013 paper

1 on speckled hind in the Gulf of Mexico, and you can see the original
2 data sources plotted here, and the different colors represent
3 different data sources, and so we have Belize, the Florida Keys,
4 Vera Cruz, Flower Garden Banks in the western and northern Gulf,
5 Puerto Rico, and again another Keys series, and then the two more
6 recent ones -- One came from Beverly Barnett, which is known age,
7 the Barnett et al. paper 2018, where we had known age red snapper
8 otolith data.

9
10 Some of these were the edge otoliths, and some of these were whole
11 otoliths, of age-zero fish, and then the yellow circles -- This is
12 the most recent coral data series, and this is from the knobby
13 star coral, and we actually accidentally trawled this up on the
14 West Florida Shelf, during a class cruise, but we put it to good
15 use. We milled it out and analyzed it for radiocarbon, and so you
16 can see the yellow.

17
18 What's important to note is that, across this broad region, from
19 the northern Caribbean into the entire swath of the Gulf of Mexico,
20 these time series are very consistent. It's a semi-enclosed
21 system, and the horizontal movement of water mass means that the
22 delta C14 bomb signal that is in the dissolved inorganic carbon in
23 the water column is consistent across this broad zone, and so it's
24 very useful, especially when we deal with northern Gulf of Mexico
25 fishes, because, whether we're in the western Gulf or in the
26 eastern Gulf, they share that bomb signal, and, among all the
27 different reference series globally, this one is the tightest that
28 I've seen, and so it's a very useful series to work with.

29
30 The way it works for fish age validation is you take a hard part,
31 like an otolith, and you section it. You count the number of
32 growth zones, to estimate age, and you subtract that from the
33 collection year, to give you a birth year estimate, and then you
34 line those data up on the curve.

35
36 Historically, there have been qualitative to semiquantitative
37 methodologies to actually estimate whether the birth year
38 radiocarbon values from your fish line up with the birth year of
39 the reference series, and I'm going to show you some more
40 quantitative ways that we've developed to do this. We're not the
41 only ones that have developed quantitative models, but Zach Siders
42 has been working on some simulations to come up with sort of a
43 unifying approach to do this.

44
45 I just showed you, before, that gray triggerfish have very small
46 otoliths, and it takes about a hundred milligrams of carbon to
47 product a robust estimate of the delta C14, and, by robust, I mean
48 accurate and precise, and so the greatest precision that you can

1 get is about plus or minus two per mil, which is the unit you see
2 on the Y-axis.

3
4 If we get down to say ten micrograms of carbon, the error is plus
5 or minus ten per mil, and so that is starting to get into the range
6 of error that we see in the data for a given year, and then we get
7 much more uncertainty, and so we want a robust signal, but we can't
8 get -- In order to get a hundred micrograms of carbon, because the
9 otolith is about 12 percent carbon by mass, we would need a
10 milligram of otolith material, and these gray triggerfish otoliths
11 whole don't weigh that.

12
13 Instead, we developed an approach for other fishes, and have
14 applied to triggerfish, using the eye lens, and so, here at USF,
15 there have been some folks, like Ernst Peebles, David Hollander,
16 Amy Wallace, other students, and Chris Stallings, more recently,
17 and his students, that have been using eye lens protein for a
18 stable isotope signature to look at trophic and ontogenetic shifts,
19 but we took a different approach for validation and cored the eye
20 lenses, to see if that core of the eye lens was an appropriate
21 birth year radiocarbon signature for the fish.

22
23 The idea here is that eye lenses, like otoliths, are growing
24 throughout the life of the fish, and they're not a completely
25 closed system, but, as they grow, right, you don't lose eye lens,
26 and it's not resorbed, and so that's why the stable isotope
27 approach works, and so we did this. There have been some other
28 works with mammals that the showed that the amino acid signatures
29 in the core of the eye lens, again, was useful for ageing.

30
31 Then the figure that I show here is just one species that we looked
32 at in this first paper that we published, and you can see that the
33 otolith core and the eye lens core, the delta C14 values for red
34 snapper are almost identical, right, and the error bars are just
35 that measurement error for the accelerator mass spectrometer.

36
37 From this, we inferred that we could use eye lens cores as a source
38 of the birth year radiocarbon signature, and then we've applied
39 that for fishes across various applications and for different
40 reasons.

41
42 We worked with Dr. Shervette's group, during 2019, and she aged
43 fish with spines and otoliths, and then we then used our
44 radiocarbon approach with eye lenses to test whether -- To examine
45 whether the eye lens versus otolith core values -- Excuse me. To
46 test whether the spine-derived, and this is the old spine method,
47 and the otolith-derived age estimates -- Testing whether either of
48 those were accurate.

1
2 What you see, at the top, is we have a lot of positive residuals
3 for the spine data, which would be indicative of underageing,
4 because the radiocarbon values are shifted to the right of where
5 they should be to fit within the 95 percent prediction intervals
6 of that linear portion of the reference series, whereas the
7 triggerfish otolith data are within those 95 percent predict
8 intervals.

9
10 We looked at the sum of squared residuals for both sets of data,
11 and the otoliths, not adding or subtracting a year, had the lowest
12 sum of squared residuals, and so we inferred, from that, that the
13 otoliths were accurate, and the spines were not. However, you can
14 see, from this, that we had small sample sizes, and one
15 recommendation was to expand this.

16
17 Since that report, and it wasn't a published paper, and it was
18 just a SEDAR report, was published, Dr. Shervette, and her
19 colleagues in the Atlantic, have published a few different papers
20 on gray triggerfish, as well as queen triggerfish, just Balistes
21 in particular, showing these similar patterns of bias, like you
22 see in the bottom-left, of otolith age estimates being greater
23 than spine age.

24
25 On the right, you can see some light microscopy, in this methods
26 paper they published, and you can see the really ornate structure
27 now, with light be transmitted through the otolith structure,
28 similar to what I showed with the CT scans, and how the ageing
29 occurs, right, and so the microstructure is there, and it's
30 somewhat difficult to interpret, but the age estimates that
31 produced from otoliths are greater than spines, and so the
32 conclusion, among these papers, and the recommendation moving
33 forward, was that otoliths needed to be used to produce age comps,
34 and correction factors needed to be applied, and that was sort of
35 the state of thinking and how we were moving forward with the
36 council-funded project as well.

37
38 There's a 2025-2026 stock assessment scheduled for gray
39 triggerfish. There were several different issues that arose in
40 that last stock assessment to be addressed, but, among them, the
41 ageing error was a really important one, because of the primacy of
42 the age comps in these statistical catch-at-age models and the
43 need to have that estimated correctly, accurately, and precisely.

44
45 We were funded to conduct this three-year study, and Ryan read you
46 the objectives, but the goal was to sample landings from different
47 regions, to estimate age using opaque zone counts and otoliths and
48 translucent counts in spines, to validate -- To basically test the

1 accuracy of these ageing methods, to test for differences in sex-
2 specific growth, and so size-at-age in growth estimates among
3 regions and between commercial and recreational fish, and then,
4 lastly, to compute age-length keys by sex, and potentially by
5 region and fisheries sector, pending results under Objective 4.

6
7 The goal for this Objective 5 was to come up with a solution to
8 try to mitigate for this issue by structure of how to age the fish
9 accurately.

10
11 As we were moving forward, we became aware of this work that
12 Jennifer Potts was leading in the Atlantic, and so spoke to
13 Jennifer, and Walt Rogers, and they -- Based on the, you know,
14 publications and early discussions in the Atlantic about otolith
15 ages versus spine ages, they knew, for the Atlantic gray
16 triggerfish stock assessment, they needed to address this issue of
17 ageing error.

18
19 They conducted an ageing study, or, excuse me, a study in which
20 they injected fish with calcine. It binds to the calcium
21 carbonate, the calcium in the otolith, and it produces a signal,
22 when hit with fluorescent light, and so you can mark the otolith,
23 or the spine, and estimate how many growth zones have formed in
24 the interim.

25
26 They did this marking study, and, during the course of that marking
27 study, they started to notice that, if they zoomed-in on the edge
28 of the dorsal spines, there was microstructure there as well that
29 we had missed, by looking at it under lower magnification, right,
30 and so, when we zoom-in with higher magnification, and that's what
31 this image here in the bottom-right, and this exploded view of the
32 spine shows that there actually is more microstructure there, more
33 translucent zones, to be counted.

34
35 They developed a protocol to produce age estimates from the spines,
36 by zooming-in, and their validation work indicated that that was
37 accurate, and they had very similar age estimates between the
38 spines and the otoliths sections. They didn't read their otoliths
39 whole, as Shervette had been doing, and what we had planned, and
40 they sectioned them.

41
42 A problem with the sectioning, or a benefit of the sectioning, is
43 the opaque zones in the otoliths do appear to be more distinctive,
44 and a problem is that these otoliths are so small, and fragile,
45 that they were only able to effectively section half of the
46 otoliths that they had in their study, and so that creates a big
47 problem, and we've tried to do sectioning in our lab, and it just
48 -- You know, we've tried a variety of different methods, and you

1 just end up breaking a lot of otoliths, and it's not a very
2 effective approach.

3
4 Based on this new spine, this zoomed-in margin spine approach, as
5 we were starting to age the fish that we had collected during the
6 council-funded work, we worked with Jennifer and Walt and actually
7 incorporated this new spine methodology, in addition to the old
8 spine method and the otoliths. We'll transition here to the first
9 chapter of the report, and I can take questions, if there are any,
10 or just keep on --

11
12 **VICE CHAIRMAN NANCE:** When you're sectioning and they break, does
13 that make that otolith useless for anything else?

14
15 **DR. PATTERSON:** Well, yes, and so usually they break in a way that
16 you can't then estimate age, but they don't really break when we're
17 sectioning them, because what we do first is embed them, so they're
18 in a solid block of resin, and they typically break as we're trying
19 to set them, and that's how fragile they are.

20
21 It's also difficult to get the right plain, because of the complex
22 three-dimensional structure, and even ones that are set --
23 Sometimes you make a section, and you just don't get anything,
24 and, because of that, you've basically lost that otolith, and it's
25 not like a big red drum otolith, or a red snapper otolith, where
26 you can make multiple sections, and you basically have one shot at
27 it.

28
29 **VICE CHAIRMAN NANCE:** Thank you.

30
31 **DR. ISAACS:** Are there a lot of fish that have these tiny otoliths,
32 or it is just --

33
34 **DR. PATTERSON:** So there are several pelagic species that are
35 routinely aged that have small otoliths, like swordfish, and ling
36 cod on the west coast, and they use actually the fin rays for ling
37 cod. Marlins, and a lot of pelagic fishes, have relatively small
38 otoliths, compared to their body size, but not as small as these.

39
40 Dr. Shervette, and her team, have looked at several other
41 tetraodontiform fishes, like boxfishes, filefishes, and they all
42 seem to have these highly-derived, small, ornate otoliths, and
43 it's probably because these fishes are -- They're highly
44 maneuverable, and they're reef-associated, or they live on reefs,
45 and so they're moving around this matrix, and the otolith -- You
46 know, the fish uses the otolith for sound detection, but also
47 balance, and I think probably what's happening with this three-
48 dimensional structure is that they're using that as part of their

1 sensory system, and it's in the vestibular system, to help their
2 maneuverability through this reef matrix, so they don't scrape
3 into things and bang into things.

4
5 **DR. ISAACS:** Of course, I'm not a biologist, and everybody knows
6 that, and I hear a lot of folks talking about extraction of
7 otoliths, and is it the spines -- Are spines frequently used in
8 other fisheries, and is this a commonly-used methodology that they
9 teach in graduate school or whatever?

10
11 **DR. PATTERSON:** So there are some species for which spines are
12 utilized, and there are some species of freshwater fish where the
13 operculum is used, and most of the hard parts, the bony structures,
14 in the fish are laying down growth zones. Scales, for many
15 different species, are utilized, like the salmonids on the Pacific
16 coast, but scales typically are only useful for maybe five or ten
17 years of life, and so, you know, for a king salmon, that might be
18 in the sea for three to five years, it's perfectly appropriate to
19 use the scale. It's nonlethal, and you grab it off the outside of
20 the fish, but, for something like a red snapper, that lives to be
21 sixty, you can't use that, and so there are other structures that
22 are used, and spines are among them.

23
24 One thing that I should have mentioned earlier, and I will just
25 try to pull up a picture of a gray triggerfish here, but so, to
26 get the otoliths, right, for many species of bony fish, we can
27 just go in through the operculum, scrape the gills back, pop to
28 otic capsule, and pull the otolith out, and then you close the
29 operculum, and nobody knows you were there, and so it's a very
30 effective way for recreational harvest, if they don't want you to
31 mutilate the fish, or, in commercial fisheries, you can take an
32 otolith, and there's no physical evidence that the fish has been
33 changed in any way.

34
35 For these small otoliths for gray triggerfish, you basically have
36 to shave the top of the head, take it off, and then go in to get
37 them, and so, unless you can get carcasses at the fish house, from
38 commercial fisheries, which we did, it's really, really difficult
39 to be able to do the sampling, unless you collect the samples as
40 part of a scientific survey. I will show you some images later
41 about that.

42
43 **VICE CHAIRMAN NANCE:** Any other questions? Okay. Thank you.

44
45 **DR. PATTERSON:** Okay, and so the first paper, the first chapter of
46 this -- So the chapters are set up as different manuscripts, and
47 the first one has been accepted, and the second one is now in
48 review, and the third one we're still working on, but the first

1 chapter is "Bomb Radiocarbon Validates Gray Triggerfish Dorsal
2 Spine and Otolith Ageing Protocols".

3
4 Over the course of the study, we sampled 1,370 fish. In the
5 western Gulf, we had 172 samples, and these were principally
6 speared. We had a very difficult time, although, working with
7 Brett Falterman, we tried multiple different ways to get fish
8 sampled in the western Gulf, and, finally, we just had Brett go
9 out and shoot them, and then we also had some age-zero fish from
10 the trawl survey, that we got in the western Gulf.

11
12 In the north-central Gulf, or northern Gulf, we had 805 samples.
13 These came from a mix of commercial hook-and-line, as well as
14 recreational harvest, and then, in the eastern Gulf, we had 391.
15 Some of this was scientific sampling, and some of this was
16 commercial handline, and some of it was commercial longline, in
17 those regions.

18
19 Of those 1,370 samples, the first 100 were treated as a training
20 set among our three readers of Derek Chamberlain, Jennifer Potts,
21 and Walt. Jennifer and Walt had not done whole otolith ageing,
22 and Derek had not used the zoomed-in spine approach, and so the
23 first 100 samples were treated as a training set.

24
25 You can see the female-to-male sex ratios for all the regions. It
26 was less than one-to-one, but, if we look at this as a function of
27 the size of the fish, and so length bins here less than 250, and
28 then every fifty millimeters, you can see that, for small, young
29 fish, they're mostly females, at less than 250, and, you know, we
30 have that bin, but you can see that most of the fish were unknown.

31
32 You know, gray triggerfish become mature at about 180 millimeters,
33 and so many of these were either unknown, and it may have been
34 tough to distinguish, if we had females and males that were mature,
35 and we just weren't seeing that, and so, starting at 250
36 millimeters, you can see it's 1.6 to one, female to male, and, as
37 you get to larger sizes, that drops, until we get to the largest
38 category, where we only had twenty-eight fish between 551 and 600
39 millimeters, and these are mostly males.

40
41 Well, their sexual dimorphism -- This has been reported by many
42 authors back in time, by Johnson, Simmons and Szedlmayer, et
43 cetera, et cetera, and so what's happening here is the females
44 become less represented in the samples, because they don't grow as
45 large as the males do.

46
47 Also, because of the large amount of commercial samples that we
48 had, and the fact that the commercial fish are gutted at-sea, over

1 a quarter of the samples, even of the adult fish, we couldn't
2 actually estimate, or determine, their sex, because of missing
3 gonads.

4
5 Reader agreement among structures, for this validation chapter, we
6 limited it to 573 samples, and the age ranges were from zero to
7 fourteen for otoliths, from one to sixteen for spines, and one to
8 twelve for the old spine method, and one to sixteen for the new
9 spine method.

10
11 The historical spine method age estimates were lower than otolith
12 or new spine protocol estimates after age-five, and so the figure
13 on the right, Panel A, and so Reader 1, again, is Derek
14 Chamberlain, and so you can see we have otolith opaque zone count
15 along the X-axis, and then the historical spine protocol along the
16 Y-axis, and so, after about age-five, we start to see this
17 divergence.

18
19 The error bars increase with age, because we have fewer samples,
20 and there's also more variability because of the ageing error. if
21 we look at the new spine protocol on the right, versus the
22 historical spine, we see almost the same pattern, right, a very
23 similar pattern between the new spine protocol and the historical
24 spine protocol, and, in the pattern at the bottom, Panel C, this
25 is from the Potts et al. paper, and so now they're comparing their
26 new spine, versus the historical spine, and you can see, again, a
27 very similar pattern as what we're picking up in the Gulf, in that,
28 after age-five, we start to see this divergence, where the old
29 spine protocol just wasn't picking up the growth zones on the
30 margins of the spines.

31
32 The index of average percent error for all of these approaches is
33 relatively high, and so around 10 percent, plus or minus. In the
34 Potts et al. paper, their sectioned otolith index of average
35 percent error was about 13 percent, and so, you know, early, thirty
36 years ago, forty years ago, Campana recommended, sort of as a rule
37 of thumb, that about 5.5, as a percent -- As an index of average
38 percent error was appropriate for ageing studies, production
39 ageing studies.

40
41 That number has been debated, you know, to-and-fro, but, typically,
42 we like to see less than 5 percent for red snapper, and we often
43 get less than 2 percent, and so gray triggerfish don't live very
44 long, and so shorter-lived fish -- Automatically, there's going to
45 be an inflation factor, because, if you're off by a year for a
46 ten-year-old fish, versus off by a year for a sixty-year-old fish,
47 that causes, you know, different problems. Still, 10 percent,
48 qualitatively, would be considered high.

1
2 Then we have the reader agreement among ageing structures and
3 readers, and so, again, Reader 1 is Derek, and Reader 2 is Jennifer
4 Potts, and Reader 3 is Walt Rogers, and so we have within-reader
5 otolith, versus new spine, across the top, and so Reader 1, Reader
6 2, and Reader 3, and you can see very similar patterns. There is
7 pretty tight agreement between the otolith opaque zone counts and
8 the new spine counts.

9
10 The middle panel is the otolith ages among readers, the middle
11 row, and the bottom row is among readers with the new spine ages,
12 and so, for the otolith opaque zones between readers, you can see
13 pretty strong agreement again, and then, at the very bottom,
14 probably the strongest agreement that we see is new spine versus
15 -- New spine protocol between readers, and so Reader 1 versus 2,
16 1 versus 3, and then 2 versus 3, across the bottom.

17
18 Overall, otolith and new spine ages agreed pretty closely, and I
19 showed you, on the previous slide, that both of these methods do
20 not agree very well with the old, or historical, spine estimates.

21
22 I'm showing this slide for a couple of reasons. We've done work,
23 again, on other species, using this eye lens approach, and this is
24 blackbelly rosefish, and it's a deepwater scorpionfish, and the
25 figure on the left shows eye lens cores and then otolith cores,
26 and let's focus on the eye lens cores. I can talk about the
27 otolith stuff later, if you're interested, but the eye lens cores
28 line up very well with the reference curve, but the function that's
29 fit to the data here is a Bayesian spline.

30
31 Zach Siders, working with Derek, developed a Bayesian spline
32 methodology so that we could fit a function all the way across the
33 data and then test whether our age validation data were
34 significantly biased, and so we can produce an estimate of bias in
35 years and test whether that's significantly different than zero,
36 and so a highly-quantitative approach to actually testing the null
37 that ageing is unbiased.

38
39 Then, in the right, this is just a Bayesian formulation of the Von
40 Bertalanffy growth model, which I will show in the next chapter,
41 with a new spin, and we have two different colored dots on the
42 curve, and that's not male and female. That's two different
43 readers, and so we developed this approach where we can have
44 multiple readers. Therefore, we can get a better estimate of the
45 observation error, or the measurement error, in the data.

46
47 To develop the protocols for actually doing the eye lens coring
48 for gray triggerfish, we looked at trawl-caught fish, and we went

1 back to the Simmons and Szedlmayer 2011 paper and looked at the
2 size, the mean size, of fish at the end of December, and we also
3 looked in the trawl data, from the SEAMAP surveys, and looked at
4 the size progression of fish in the fall groundfish survey, and,
5 more or less, they're about 130 millimeters, on average, by the
6 end of the year, and, based on the nonlinear relationship here
7 between length of the fish and the milligrams of eye lens, we
8 settled on three milligrams as our target, and, in the paper, you
9 can see that we very effectively were able to target three
10 milligrams as a mass, and I think it was three-point-one-something
11 was what our mean was, with very little variance.

12
13 There has been some discussion in the literature about there being,
14 you know, microstructure within the lens that can either point to
15 age, or maybe even like a settlement mark for fish, and we haven't
16 seen that in any of our work, and you can see some scans here, and
17 these are electron micrographs done at UF, and it shows the
18 individual eye lens layers, as you go from the core out to the
19 edge, and so these eye lens layers are only twenty micrometers
20 think.

21
22 What happens is, as the lens is growing, the outer layer -- As the
23 new layer forms, the penultimate layer starts to become
24 denucleated, and, as you move progressively in toward the core of
25 the eye lens, it becomes less liquid, right, and so the solubility
26 decreases, and, as you move out to the edge, the outer layer is
27 really gooey, but then all of the -- It's pure protein. It's
28 crystalline proteins, and the crystalline, or those layers -- As
29 the new layer forms, the penultimate layer loses its organelles,
30 and it just becomes -- The protein that's left behind is residual.

31
32 These lenses are growing throughout life, in these twenty-
33 micrometer layers, and, as we peel back to like trophic studies,
34 we're actually peeling back chunks of these layers, and they're
35 not individual laminae that are being peeled off in that analysis.

36
37 On the top-right, this actually shows the Bayesian fits to our
38 thirty fish that were selected to do the age validation, and you
39 can see the whole otolith, in the top-left, the new spine in the
40 top-middle, and the old spine in the top-right, and so the PMAP
41 Bayesian test of significance for whole otolith was not significant
42 for ageing error. The new spine was not significant, but the old
43 spine was.

44
45 On average, the estimated error is negative 1.72 years for the old
46 spine. I should add that the selection of samples here -- We
47 randomly selected two fish from ages two through nine, across the
48 geographic range of samples, and then we put every fish into this

1 that was older than ten, in our database, and so we wanted to get
2 those old fish, in particular, to be able to examine ageing error.

3
4 That mean ageing error of negative 1.72 years, it appears like --
5 You know, so that's given as a mean across all ages, but I've just
6 shown you that, at age-six, there is barely any ageing error. By
7 age ten or twelve, there's quite a bit of ageing error, and so
8 that's not a -- That doesn't reflect the nonlinear relationship
9 that we actually see in the data, but, again, no significant ageing
10 bias was estimated for the new spine method or the whole otolith
11 method.

12
13 Conclusions from Chapter 1, and I apologize for changing the image
14 here, but I'm glad that I did, relative to Jack's question just a
15 little while ago, and age estimates that were derived from whole
16 otoliths, or the new spine ageing protocol of Potts et al. 2023
17 are unbiased, but precision issues persist with both methods.

18
19 New dorsal spine protocol ageing was slightly more precise among
20 readers than otolith ageing, but not appreciably, but read times
21 are two to three-times faster for dorsal spine sections than whole
22 otoliths. Also, you know, the analysts themselves, the hard part
23 readers, commented on eye strain, when doing the otolith ageing
24 versus the other, and so the potential for, I think, cumulative
25 effects may be greater with that approach.

26
27 For the 2025 assessment, right, a recommendation to move forward
28 is to re-age archived spine samples for fish aged greater than
29 five, to zoom-in on the margin and count those translucent zones
30 that are there, but we missed them earlier, to produce unbiased
31 age composition estimates, and so, in talking to Robert Allman at
32 the Panama City Laboratory, a few months ago, he indicated this is
33 the approach they're taking, and Jennifer Potts, again, is
34 instrumental in producing this method, and that's what she had
35 done in that region.

36
37 You know, really, in the Atlantic, what they were thinking about
38 doing is either having a plus-group, and so just cutting it off at
39 five and saying everything above that is the plus group, and, in
40 the Gulf, the plus group is ten, or has been historically, and so,
41 you know, we would be losing a lot of information in the data by
42 cutting it off at five, and so we think this is an effective way
43 forward, and these images just show that -- At least, you know,
44 how we were taking out the otoliths, that you really have to
45 mutilate the fish. You know, I'm sure, through time, there may be
46 more delicate techniques, but you still have to go in through the
47 cranium to get them.

1 I will note that, in one of the Shervette et al. papers, or
2 Shervette and Hernandez papers, they report an otolith, whole
3 otolith, ageing IPE of around three-and-a-half percent, and so
4 perhaps, with training, and persistence, the otolith ageing IPE
5 could be lower, but, in our work, and Jennifer and Walt and Derek
6 are all seasoned otolith agers, they weren't able to come up with
7 an IPE that was anywhere close to that 3.5 percent. Okay, and so
8 that's it for Chapter 1. Any questions here? No? Okay.

9
10 So Chapter 2 is Gray Triggerfish Growth Estimation, and so this
11 paper has now been submitted to *The Journal of Marine Science*.
12 The title is "Bayesian State-Space Estimation of Von Bertalanffy
13 Growth Parameters for Gray Triggerfish Incorporating Multiple
14 Readers and Ageing Structures".

15
16 In addition to what we saw with the model for blackbelly rosefish,
17 now we have different ageing structures, and protocols, that are
18 involved in growth estimation, and so, because we used those first
19 hundred samples as a training set, and we had 1,270 samples in the
20 dataset, and, again, the ageing protocols were whole otolith, and
21 we have spine sections with the old protocol, and spine sections
22 with the new protocol of Potts et al. 2023, and our three readers
23 are Derek Chamberlain, Jennifer Potts, and Walt Rogers.

24
25 This first result slide here just shows the three-factor ANOVA
26 that was run to test for differences in size-at-age, and this is
27 just for Reader 1 ages. Derek Chamberlain was the only reader who
28 used all three methods. He read the otoliths, and the new spines,
29 and then, a year later, when we started working with Walt and
30 Jennifer more closely, he went back and read the spines again using
31 -- Excuse me. He read spines using the old protocol, and then he
32 went back and read them all with the new protocol, once he went to
33 North Carolina and trained on how to do that and came back.

34
35 He read those blind, to get his new spine estimates, and so Walt
36 and Jennifer -- When Derek was in North Carolina, he trained them
37 on how he is ageing the otoliths whole, and they had already done
38 this work, comparing new spine and old spine methodologies, and
39 they felt like there was no way they would be able to read a spine
40 and not look at the edge and try to figure out how many translucent
41 zones were there, and so they only used the new spine protocol.

42
43 Anyway, this figure is just Reader 1 data, or Derek's data, and I
44 put the red lines in here, on the slide here, just so you can get
45 a sense of comparison among methods, but all three approaches show
46 the sexual dimorphism between males and females, and so that's
47 being picked up, regardless of structure, but the old spines have
48 fish estimated to be larger at-age than the new spine or otolith-

1 based age estimates, and these are 95 percent confidence intervals.
2
3 The asterisks at the top are, when we take the interaction between
4 sex and protocol and age, and slice it by sex and protocol, these
5 are the -- These showed the significant age effect on those
6 estimates, and so you can see that, for sex, we have significant
7 differences all the way across the board, except for the smallest,
8 youngest fish, for either the new spine or the otolith, and we
9 think what is probably happening here is, because those fish are
10 just recruiting to the gear, we get more variance in the females,
11 and it swamps the signals that is otherwise there.
12
13 In this Bayesian state-space parameterization of the growth model,
14 we start with the Von Bertalanffy model. The size at birth
15 formulation you can see in the top-right, and so this is the
16 original 1934 model, but it's also utilized extensively in the
17 elasmobranch literature, because $T_{subzero}$ is not really that
18 meaningful in elasmobranchs, because they're born at such large
19 size, in many cases, and so this state-space approach allows for
20 more effective separation of process error, or sort of the natural
21 variability, from observation or measurement error in the data,
22 and we do this by including multiple readers, right, and so this
23 is a new approach, that includes multiple readers, and we also
24 have multiple protocols, and so we're able to partition process
25 error from observation error more effectively, but we can also
26 test for the effective protocol in our growth models.
27
28 Again, there are clear differences in estimated age between otolith
29 or new spine estimates versus the old spine method, and this is
30 just a model that shows, for the various, in this case, fractional
31 age estimates, we have the otolith minus the new spine at the top,
32 the otolith minus the old spine in the middle, and then new spine
33 versus old spine at the bottom, and so the only one that doesn't
34 show a clear pattern of difference is at the very top, where we
35 have otolith minus the new spine.
36
37 We had significant difference in the growth models among ageing
38 protocols and between sexes, and so, you know, I just showed you
39 the size-at-age data, and we have historical evidence of
40 significant sexual dimorphism, and so that's nothing new, and we
41 didn't have significant difference in parameters between otolith
42 and new spine ageing protocols.
43
44 There were significant differences in $T_{subzero}$ and K between
45 otolith or new spine versus the old spine age estimates, but I
46 will add that we have very small absolute differences in $T_{subzero}$.
47
48 I failed to mention that the way the Bayesian model was

1 parameterized is we first fit just to all the data, and we came up
2 with priors for L infinity, K, and L subzero, and it was just the
3 median fit to the whole dataset, and we put uninformative priors
4 on those parameters. We put CVs of 0.5, right, and so there's
5 lots of solution space, except for L zero. L zero was taken from
6 some other data from Simmons and Szedlmayer that was the size at
7 hatching of triggerfish.

8
9 We were able to -- We put in a formative prior there, because we
10 had empirical data that showed what the size at hatching was for
11 those fish, for this species.

12
13 The figures on the right here, there are columns for females and
14 columns for males, and then we have the parameters of L infinity,
15 K, at the very bottom, T subzero, and then we have the sigma Von
16 Bertalanffy, and then the sigma -- So that's the process error,
17 and then we have the observation error, sigma observation, at the
18 bottom, and so, by including all the data in one model, we were
19 able to more effectively estimate this observation error, and,
20 again, this helps us to partition the process from observation
21 error more effectively.

22
23 The solid lines in each of these panels shows the otolith minus
24 the new spine and then the test statistics, on the right, are that
25 PMAP test statistic, and I -- In the earlier presentation that I
26 emailed to Ryan, I had only put asterisks before less than 0.05,
27 but, actually, our alpha here was set to 0.1, and so we have 0.08
28 is significant as well, and that was done a priori, but we just
29 have that one instance where we had one factor, and this was K,
30 for the old spine, otoliths minus the old spine methodology, and
31 that's significant at 0.1, versus 0.05, and it's kind of moot, and
32 you can see the patterns that emerge.

33
34 Again, the T subzero parameter was significantly different, and
35 not different between otolith versus new spine models, but
36 different for otolith versus old spine, or new spine versus old
37 spine, but the absolute differences were so small that it's kind
38 of irrelevant, right, because we're looking at less than 0.01
39 years, and so it doesn't have an appreciable effect on the model.

40
41 The biggest difference that you see are in the K parameters, and
42 so the old spine K parameters, and this is Brody's growth
43 coefficient, were much higher, and the reason for that is because,
44 if you're estimating fish to get larger quicker, then the growth
45 coefficient has to be larger, and so this is a measure of
46 productivity in the stock, and so, by having K higher, we're
47 overestimating the productivity, or growth, in this species.

48

1 The conclusions from this modeling is that we have a lack of
2 significant difference in Von Bertalanffy growth models between
3 otolith and new spine ageing data, and that's consistent with the
4 results that both methods produced accurate age estimates.

5
6 Next, the Bayesian state-space approach enabled us to include
7 multiple readers, and therefore more effectively separate process
8 error from observation error, and, oftentimes, you know, in
9 previous otolith ageing, index of average percent error is
10 reported. Sometimes folks then developed a consensus age, and
11 used that to fit models, and sometimes folks just used the most
12 experienced, or primary, reader, or they sometimes have, you know,
13 a secondary reader that reads a subset of the samples. In this
14 case, we can actually include all those readers, and the
15 structures, in the same model.

16
17 Moving forward, we feel the new spine ageing protocol proposed by
18 Potts et al. is an effective approach for estimating gray
19 triggerfish growth models as well as producing age composition
20 data for statistical catch-at-age stock assessment models. That's
21 the end of Chapter 2. Any questions on that component? Okay.
22 Moving to Chapter 3, we asked ourselves --

23
24 **VICE CHAIRMAN NANCE:** We'll go ahead and take a ten-minute break,
25 and then we'll conclude with Section 3. We'll come back at quarter
26 to three.

27
28 (Whereupon, a brief recess was taken.)

29
30 **VICE CHAIRMAN NANCE:** Okay. It looks like it's time to start
31 gathering. Okay. Let's go ahead and start. Will, we'll go ahead
32 and start with Chapter 3.

33
34 **DR. PATTERSON:** Okay. I'm looking at fewer faces across the room
35 now, but that's okay. In the process of all this, you know, when
36 people deal with ageing error, especially for assessed species,
37 there's a lot of qualitative banter, in the literature, about
38 effects, and effects can be substantial and effects can be this,
39 and so, when we got to the end of trying to figure out what the
40 extent of the ageing error was, and could we mitigate it, we also
41 asked ourselves so what, and does ageing error actually matter for
42 the gray triggerfish stock assessment and management?

43
44 We did some stock assessment simulations, and this work involved
45 several people that aren't listed on the chapter, because it's a
46 very small version of what will become the submitted paper for
47 this, but Katie Siegfried, Shannon Cass-Calay, Kelli Johnson, who
48 was instrumental in helping Derek get SS converted, the code

1 converted, from SS 3.24 to 3.3, and also for utilizing the SS --
2 The R package SS.sim, and Zach was very involved in this as well,
3 and then Nick Fisch and Derek have been working on a separate,
4 more generalized assessment model, incorporating ageing error,
5 that will be part of the initial, but, for gray triggerfish, this
6 is what we have, and this is what's presented here, and, anyway,
7 sorry for that sort of tangent.

8
9 We used the SS 43 data input files and model code, which was
10 provided by Doctors Siegfried and Cass-Calay. Again, Derek
11 converted the code from SS 3.24 to SS 3.3, which was needed for
12 SS.sim, and the 2015 assessment configuration, including ageing
13 error definition, was retained, to ensure that gray triggerfish
14 dynamics were accurately captured by the model, and that was to do
15 the burn-in, to make sure that we're getting convergence and that
16 things looked sensible.

17
18 Then the assessment includes catch-at-age composition data from
19 five fleets, plus nine indices of abundance. Six are fishery-
20 dependent, and three are fishery-independent, and this is just
21 from the SEDAR 43 data inputs that you can see there on the right,
22 and so we didn't deviate from any of that.

23
24 Again, the simulation framework was SS.sim, SS.3sim, in R, and the
25 operating models were based on the SEDAR 43 gray triggerfish
26 assessment, but utilizing different ageing error components, and
27 so we specified the ageing error matrices, which were applied in
28 the operating model, and then the estimation model operated under
29 the assumption that the original age comps generated with the old
30 spine protocol were accurate, and so we basically inverted the
31 Punt et al. ageing error matrices that you see on the right, and
32 so this is the Punt et al. 2008 model for ageing error, and then
33 the R package -- Jim Thorson coded it up, and they reported it in
34 2012, and it's called NWFSC ageing error R, and so it's the R code
35 to produce these ageing error matrices based on the Punt model.

36
37 The blue line that you see moving across is how standard deviation
38 is increasing with age, and so it's not a static standard deviation
39 in the model, and so, without boring with you too many laborious
40 details, that's the gist of things, is that we told the model that
41 the ageing was accurate, but we inverted the ageing error matrix
42 so that we could simulate the effect of old spine versus the two
43 new ageing protocols.

44
45 This just shows the mean absolute error across the number of
46 replicates for the burn-in, and I'm just showing you the stability
47 in the spawner-recruit steepness estimate, and so, again, you know,
48 after about a hundred cycles through here, we get a pretty stable

1 model, and so we're happy to see that.

2
3 I'm not going to talk about this slide as much as I had planned,
4 because we're all tired, and so am I, but I did want to show you
5 that, for the three study scenarios, the convergence was great,
6 and I have a couple of pretty pictures, on the next couple of
7 slides, that makes it easier to digest the rest of this
8 information, and those are these.

9
10 Each row -- We have the top row is the estimated F to FMSY, the
11 relative error, and then B to BMSY, the relative error in that,
12 and the columns are old spine, otolith, and new spine, and so,
13 basically, the simulations -- These are the results from the
14 simulations showing you the effect of old spine, otolith, or new
15 spine age estimates, or the model's, and it's basically, if we
16 assume --

17
18 It's basically showing you the bias that is imparted by using the
19 old spine protocol, and so, if we assume the old spine is correct,
20 and we use the old spine protocol in the left-hand column, you can
21 see it does a pretty good job. The estimation models do a pretty
22 good job tracking the relative error in F to FMSY. It's a little
23 bit underestimated, and so we're underestimating F to FMSY in a
24 little bit, but, overall, it performs pretty well, as you can see
25 by the confidence bands.

26
27 Then, for the biomass to biomass BMSY relative error, you can see
28 that it tracks really well, and so we're matching what we would
29 expect, and then, for the otolith and the new spine, we see very
30 similar patterns, and so, if the otolith ageing is correct, and we
31 use the old spine age estimates, we're underestimating F by about
32 50 percent, or 60 percent, and then the bottom row, the biomass to
33 BMSY relative error, shows that -- This is more progressive, and
34 increasing over time, is that we're overestimating biomass to BMSY,
35 between 55 and 75 percent, depending on -- In the terminal year,
36 depending on the two methods and the uncertainty in the estimates.

37
38 Basically, the take-home here is that ageing bias imparted from
39 old spine ageing did have a practical effect. It does matter.
40 Excuse me. A substantial effect.

41
42 It's unclear to what extent, but ageing error likely contributed,
43 we feel, to the lack of recovery observed in gray triggerfish
44 during the 2000s and 2010s. There are a lot of moving parts, and
45 different modeling platforms, but there was a recovery plan in
46 place, and effort reductions, but recovery wasn't estimated.

47
48 Then there are several issues that need to be addressed in the

1 next Gulf SEDAR triggerfish assessment, but re-ageing archived
2 samples, spine samples, for fish greater than age-five, with the
3 Potts et al. protocol, should alleviate ageing error issues
4 revealed during the overall study.

5
6 Then overall conclusions are ageing error does matter for the gray
7 triggerfish stock assessment and management, and by quite a bit.
8 The second is state-of-the-art eye-lens-based bomb radiocarbon age
9 validation was used to test for gray triggerfish ageing bias, but
10 a relatively simple solution exists to correct for that bias in
11 future assessments, and so, you know, we all have Jennifer Potts,
12 and her team, to thank for that.

13
14 Then, lastly, issues related to sexual dimorphic growth in gray
15 triggerfish are likely to persist in the next assessment, and the
16 reason for that is we don't have sex data going back in time, and
17 we don't have an effective way to recreate that. However, we do
18 have some ongoing research that hopefully will alleviate these
19 issues into the future, and so the figure on the left is a cartoon
20 that depicts epigenetic ageing.

21
22 We start out with tiny gray triggerfish, and we go to big, old
23 gray triggerfish, and epigenetic ageing is the process by which
24 the DNA molecule becomes methylated, or demethylated, at certain
25 loci over the lifespan of the fish.

26
27 Epigenetic ageing has been used in human health studies, primate
28 studies, many different taxa, but, in the past five years, there's
29 growing literature on fish, and Dave Portenoy, and his group at
30 Texas A&M Corpus Christi, have developed epigenetic clocks for red
31 snapper, red grouper, and blackbelly rosefish, and we're working
32 on clocks for gray triggerfish and gag, and they have a clock
33 they've also built for cownose ray. We're attempting to do this
34 for other species.

35
36 The principle here is that you take a fin clip, and, once you have
37 the genome for a given species constructed, then you can look for
38 specific regions that have methylation that occurs. It happens on
39 the surface of the molecule, and it doesn't affect gene expression
40 or alter -- You know, there's no mutagenic effect, and, if you can
41 then look for loci for which the percent methylation is age-
42 correlated, then you can select those loci and build models to
43 predict age from the degree at methylation at those specific loci.

44
45 On the far right is the clock for blackbelly rosefish. These fish
46 can live to be a hundred years old, and maybe older, and that's
47 the oldest one that we've sampled to-date. We did blackbelly
48 rosefish because they're a deepwater scorpionfish, and they're the

1 oldest fish that we could put our hands on in some numbers from
2 the Gulf of Mexico, and you can see this clock was built with male
3 and female components, and the panel at the top, A, is a leave-
4 one-out approach, where we built the clock with all the data, and
5 then you leave out one sample, and then resample, and predict the
6 age of that one sample.
7
8 You can see that we had ages out to the early sixties, and the
9 mean absolute error is less than a year, or about a year, on
10 average, between the two sexes.
11
12 Then we had an application dataset, at the bottom, and, for this,
13 the mean absolute error, again, from, you know, twelve-year-old
14 fish, out to sixty-year-old fish, was less than half-a-year, and
15 we show, in the paper for this, that the index of average percent
16 error is much lower for the epigenetic approach than it is for
17 otolith ageing, and so it's accurate. It's more precise than
18 otolith ageing. It's much faster, and it's much less expensive,
19 and another key of this epigenetic approach is it's non-lethal.
20
21 Once you build a clock, you can take a fin clip from a given
22 individual from that species for which you have a clock built, and
23 you can estimate the age of the fish.
24
25 Now, gray triggerfish have sexual dimorphism, and so Dave is
26 leading another study, that my team is involved in as well, and
27 Dave, and Andrew Field, who is his post-doc working on epigenetic
28 ageing, and they're also doing the genetic sex ID work --
29 Basically, once you've constructed this genome, assembled the
30 genome for the fish, you can start to look for markers, loci, or
31 even chromosomes, or sections of chromosomes, which are distinct
32 and determine -- Or distinguish the two sexes.
33
34 Then, when you develop your panel to do the epigenetic ageing, you
35 can also put in the markers for sex, and so every individual that
36 you then determine age for, epigenetically, you can also determine
37 its sex, and so, in the future, this could be -- This is potentially
38 an effective way to produce age comps, and we're working to
39 operationalize that in the Gulf of Mexico.
40
41 Additionally, if we had a system in place, throughout the Gulf and
42 other regions, whereby tissue samples are routinely collected,
43 then we can apply a suite of other genomics tools to the process,
44 and so we can look at genetic population structure. Often, you
45 know, we're dealing with trying to figure out what the stock
46 structure is for a fishery, but, if we have the genetic population
47 structure, that could be very informative.
48

1 You know, oftentimes, populations, genetic population structure
2 studies, have a few hundred, at the most, individuals, but we have
3 a study, in the Atlantic, on Atlantic red snapper, where we're
4 using all of these approaches that you see on this page, and we
5 have 20,000 fish sampled over the past three years, and it will be
6 the most comprehensive marine fish genomic, population genomic,
7 study, and we'll be able to look, in very fine detail, what the
8 genetic population structure is there, because we have samples
9 that we collected for the second application here, which is close-
10 kin mark-recapture.

11
12 Close-kin mark-recapture is just a genetic mark-recapture approach
13 in which the tag is the DNA imparted from parent to offspring, and
14 so you do POP, parent offspring, type of analysis, and you can
15 look for half-sibling pairs, which is what the cartoon kind of
16 depicts here, and so that mark is in the denominator, and so, for
17 a given random sample, say a thousand, or however many fish, the
18 more half-sibling pairs that you get, the lower the population
19 that produced that, and there's a lot of life history math that
20 goes into that.

21
22 We're actually doing simulations, Dave Chagaris and Liam Kehoe are
23 working on that, with Eric Anderson and Chris Hollenbeck and Dave
24 Portenoy for red snapper and blacktip shark, to look for, if you
25 get the life history wrong, how bad of a mistake can you make in
26 your estimate of population size, and, again, we've been working
27 with Dave on genetic ID for a suite of species, including gray
28 triggerfish, and then, on the right-hand side, I just mentioned
29 the epigenetic ageing and its utility.

30
31 So, if we have a system in place by which we can routinely collect,
32 archive, and utilize these DNA samples, it solves a lot of the
33 problems that we're having, that have been talked about here today,
34 potentially, I should say, and we're not quite there yet, but we're
35 getting there, and it's coming fast.

36
37 The second thing I will say is that, you know, we have an approach
38 in the Atlantic to estimate the magnitude of discards, based on
39 genomics tools and conventional tagging, and the way it works is,
40 typically, you have an estimate of discards per unit effort, and
41 then you have to multiply that by the total effort in the fishery,
42 and that gives you an estimate of the total discards, but we have
43 effort estimates in two of those, and those effort estimates are
44 typically highly uncertain.

45
46 We have talked about FES and MRIP quite a bit, at every meeting,
47 and not -- We do talk about it at every meeting, but, with the
48 conventional tagging, if we can estimate what the discard mortality

1 rate is, or the exploitation rate, and we then can apply that to
2 an independent estimate of population size, then you get the
3 estimate of the number of discards, and so we're using CKMR, and
4 we have another model based on video and optical data, to estimate
5 population size, and so we'll have two different population
6 estimates.

7
8 Then, if we can multiply it through by the discard exploitation
9 rate, we can get an estimate of discards without ever having to
10 worry about effort estimation and FES, and a similar approach could
11 actually be used to estimate the exploitation rate in the fishery.
12 Our current add-on to our red snapper study simply focused on
13 discards.

14
15 Anyway, I'm kind of droning on and on and on about this, but I
16 just want to say that genomics tools are already powerful. Dave's
17 group are leaders in the country, for many of these, and we have
18 a chance, in the Gulf, to be trendsetters in all of this, and I
19 think, again, it's coming fast.

20
21 There are lots of different folks that have contributed to the
22 work that we presented here, and so I would like to acknowledge
23 them, and thank them for their help, and, again, it was funded by
24 the Gulf Council. We're very appreciative of their support, and
25 I also want to thank Carrie Simmons, John Froeschke, and Ryan
26 Rindone, who read an earlier version of our report and suggested
27 editorial edits and corrections, and so we thank for them for that,
28 and, otherwise, that's what I've got.

29
30 **VICE CHAIRMAN NANCE:** Thank you. That was excellent. John.

31
32 **MR. MARESKA:** Will, with the epigenetic clock, is there a
33 relationship with length, particularly for species that don't have
34 dimorphic growth, and I guess what frequency would we have to
35 continue to collect these genetic samples? Is it something that
36 you think we can do on an every-other-year basis, or it needs to
37 be something done on an annual basis?

38
39 **DR. PATTERSON:** So I'll answer the first one first. The reason
40 that we're doing sex, in the case of gray triggerfish sex
41 determination, is because of the sexual dimorphism, and, to be
42 able to attribute samples to either sex, we have size-at-age by
43 sex.

44
45 If we put length into the epigenetic models, it actually -- It
46 actually improves the models, but we don't want to rely on that.
47 I mean, just because there's a relationship between age and length,
48 and then, up to a certain point, it -- We don't put that in our

1 model, and some folks are doing that around the globe, and there's
2 only a few labs that are working on this, because we think it's
3 kind of a crutch, and, if you don't have length data, then you're
4 kind of in a pickle.

5
6 The second part of your question, about what does that mean for
7 like future monitoring and sample collection, so Steve Garner has
8 been doing some simulations and trying to figure out like what's
9 the optimal sampling that Panama City can handle, and what's
10 necessary to get representative age comps for different species
11 that Panama City does the predominant ageing for. Dave Portenoy
12 is leading a RESTORE proposal that Zach Siders and Lisa Ailloud
13 and myself are involved in, along with a suite of other folks that
14 we're trying to get onboard, to try to develop this, operationalize
15 this, Gulf-wide.

16
17 Part of that process is the first two years would be to develop
18 workshops, have workshops to develop what that might look like for
19 collecting samples, and then operationalize that, as best we can,
20 in the next two years, and then put those data into assessments,
21 to see how effective our approach is.

22
23 I can't really answer your question about every other year, or
24 what the sampling effort would be, but what I will say is that
25 there are a lot of otoliths actually being collected today that
26 don't ever get aged, and so the expense, in talking to the folks
27 like Larry Beerkircher, and Gregg Bray at Gulf States, who
28 coordinates with the states, and I'm sure you have knowledge of
29 this as well, and, you know, the major expense is getting somebody
30 to the dock to collect the samples.

31
32 If you take a fin clip, it might add twenty extra seconds to
33 processing that sample, but, if we can optimize it, so that we
34 have to take fewer samples to get better data, it actually becomes
35 less expensive in the long run, and so I can't tell you where that
36 sweet spot is right now, but we're thinking about it, and trying
37 to figure that out, and, you know, we've reached out to the various
38 states, and we're trying to get the folks who handle that onboard,
39 to understand what we're up to and trying to optimize that Gulf-
40 wise. Does that answer your question?

41
42 **MR. MARESKA:** Yes, it did, and I guess a major impetus for the
43 length question was, you know, discard data, and so, instead of
44 getting fin clips off of all the discards, if you could just get
45 lengths, then maybe you could associate it back to a cohort that
46 may be, you know, discarding at a higher rate.

47
48 **DR. PATTERSON:** I guess what I would say to that is, if we're going

1 to estimate the age comps from lengths, we can do that now, just
2 based on the ageing data we have, right, and the epigenetic ageing
3 isn't really going to be that much of a precision improvement that
4 would help that, but, for something like gray triggerfish, if we
5 got a fin clip from a percentage of the discards, now we can get
6 the age comps, and we can get the sex estimate as well, and so
7 that's one thing that I didn't stress earlier, but John's question
8 kind of brings to mind, is one of the greatest benefits of this
9 approach is that it's nonlethal, right, and we can just get a
10 tissue sample.

11

12 **VICE CHAIRMAN NANCE:** Jason.

13

14 **MR. ANDRIANCE:** Thanks. I'm just curious, and is there any
15 epigenetic ageing work on crustaceans, and like I was thinking
16 blue crabs. It would be interesting to be able to get blue crab
17 ages.

18

19 **DR. PATTERSON:** Great question. We were -- We presented some eye
20 lens work on rockfishes in the Gulf of Alaska, and then Nick Webber
21 presented his blackbelly rosefish work, at the Western Groundfish
22 Conference in Juno last spring, and, after, we got a lot of
23 questions. Nick and Dave got a lot of questions about crustaceans.

24

25 In that system, it's king crab and snow crab, and so we did some
26 looking to see, and we can't find anything, and we don't know of
27 anybody that is working on it. We're very interested in it, or
28 Dave is very interested in it, I should say, but I'm interested in
29 it from a how do we estimate age, because that's, you know,
30 obviously, the question, is we don't have an otolith, and so you
31 have to get known-age individuals and build a clock.

32

33 There's a group in Australia, Ben Mayne, who is has been out in
34 front on this epigenetic thing, and they have a different approach
35 than what Dave has been working toward in the Gulf, and trying to
36 develop species-specific clocks, because we see some differences.
37 They developed a clock, a few years ago, for zebrafish. Zebrafish
38 live for five years. They grew them for sixty months in tanks, in
39 controlled conditions, and then they built a clock. It's got like
40 thirteen loci in it.

41

42 The clocks that Dave and Nick have been building have, you know,
43 fifty to a hundred, and that's not to say it's any better, but
44 it's got a lot more information, and, by applying the zebrafish
45 clock to other species, what you end up getting is, for the small,
46 young ages, it predicts pretty well, but then it fans out, and
47 probably that's because what's happening in early life, where you
48 have up and down regulations of genes during early development,

1 and methylation and demethylation occurring, and it probably
2 doesn't happen later in life.

3
4 Ultimately, what should be done is to look across species, and
5 we're not there yet, but, as far as the crustacean one, if we had
6 a crustacean model that we could use, to have known-aged animals,
7 and there are a few candidates, and I won't say too much here,
8 then you could potentially build that clock. The question is,
9 across species, would you have the precision?

10
11 For blue crabs, you know, maybe three or four years, and like
12 they're not living a terrible long time, and so is there enough
13 precision -- Like, if we got a mean absolute error of half-a-year,
14 is that good enough, you know, and, if you are comparing across a
15 range of species, that error is going to inflate, and so the
16 question is I don't know. If blue crabs lived to be thirty, then
17 it would be a much more useful endeavor, I think.

18
19 **VICE CHAIRMAN NANCE:** Thank you. John, please.

20
21 **DR. FROESCHKE:** I'm just wondering, for the sample collection, if
22 you had thought about a citizen science approach, where you could
23 work with some people from different fleets, and maybe you could
24 get more information about the depth zone, or location, and it
25 would be pretty easy. I mean, it seems like it's pretty simple to
26 do, and, I mean, I know like the HMS, the APEX tagging program and
27 things, but it would be interesting to get -- You could get
28 private, charter, for-hire, all the different modes, with really
29 good spatial coverage, it would seem like, without a lot of effort,
30 if it could be coordinated.

31
32 **DR. PATTERSON:** Yes, I agree. If it could be coordinated, and it
33 was random, and the tissue samples were in good condition, then it
34 would be something to look into. We held a couple of workshops,
35 last year, for the Atlantic red snapper work, that Dave Chagaris
36 and Liam Kehoe led, and one of the topics that we examined was
37 whether conventional tagging, or gene tagging, could be utilized
38 to get the discard exploitation rate.

39
40 Gene tagging has been used in southern bluefin tuna, to look at
41 recruitment dynamics, and it can be very effective, but, in
42 southern bluefin tuna, you have a handful of large purse seiners
43 that are operating, you know, hundreds to thousands of kilometers
44 from their homeport, and they can put observers -- You know, they
45 have crews of twenty or thirty -- They can put observers on those
46 boats, and they can get all the tissue samples they want.

47
48 It's a different proposition when you have millions of recreational

1 anglers, for example, private recreational anglers, and, in the
2 case of the gene tagging to estimate the discard mortality rate,
3 the problem would be that, in the case of conventional tagging,
4 you have to know what the tag reporting rate is, and you also have
5 to know about tag loss, but you can estimate tag loss by double-
6 tagging, and you can design high-reward, or variable-reward,
7 experiments to estimate reporting rates.

8
9 In the case of gene tagging, the issue would be -- If you're trying
10 to estimate a rate like that, the issue is participation rate, and
11 not reporting, and so we don't have to -- You wouldn't have to
12 have 100 percent participation, and 5 or 10 percent would do, but
13 the problem is you would have to know that every fish that was
14 caught and discarded, or touched, by that 5 or 10 percent group,
15 was effectively fin clipped and that was sent to -- You have to
16 know what that percentage is, in order to do the math, and that's
17 where we just couldn't -- We just -- We just didn't think that we
18 could rely on that at this stage.

19
20 Maybe there is ways to incentivize or do it, but so, in the end,
21 conventional tagging we thought was the better approach there, but
22 I agree with you that there's potential for that. It's just a
23 matter of, for anything that's quantitative, you have to know who
24 is participating, and at what level, and, if you don't, then -- I
25 mean, it's very effective for doing population structures type of
26 stuff, but, if you're trying to estimate rates, then it becomes
27 more difficult.

28
29 **VICE CHAIRMAN NANCE:** Thank you. Carrie, please.

30
31 **EXECUTIVE DIRECTOR SIMMONS:** Thank you, Mr. Chair, and so I just
32 wanted to say thank you again, Will, to your team and to you, for
33 all your hard work on this. I think you went above and beyond,
34 and we have a lot of things to investigate in the next stock
35 assessment, but I'm happy to see the result is not trying to get
36 otoliths from gray triggerfish, because I was really worried about
37 how we were going to have any type of logistics for our sampling
38 program that could make that work.

39
40 All that being said, again, a wonderful body of work, and I have
41 a question, maybe more for Dr. Siegfried, which is how practical
42 is it for the life history group to take those samples of, I guess,
43 six and up, or five and up, and look at those spines again, using
44 the -- Is it the Potts methodology, but to reexamine those ages
45 before the 2025 stock assessment, and, with this new methodology,
46 I guess the other question I have is, if that's accepted, I guess,
47 by NOAA Fisheries, how would that be rolled out to the states?

1 Is that something that happens during the improvement process, and
2 all that kind of thing, and so I don't know if you can comment on
3 that now, or if you can get back to us later, Katie, but just the
4 next step for this work, to try to get us where we need to be to
5 find out where gray triggerfish is in the rebuilding plan, because,
6 essentially, that was supposed to end in 2025.

7
8 **DR. SIEGFRIED:** I'm sorry, and I'm having trouble with my audio
9 from my headset, and can you repeat the question, or, if Shannon
10 is on and heard, she can respond. I apologize.

11
12 **VICE CHAIRMAN NANCE:** Shannon, would you go ahead, please?

13
14 **DR. SIEGFRIED:** Thank you. Sorry about that.

15
16 **DR. CASS-CALAY:** Sure, and so, in response to the question of how
17 likely would it be to re-age the spines for the gray triggerfish
18 assessment in 2025, using the Potts methodology, I think it would
19 be very time-consuming to re-age all of the spines by 2025. It's
20 possible that we could look into re-ageing some representative
21 subsample, to see if we can, for example, estimate a vector of
22 bias. It's something that we could work on and think about, with
23 Will, to determine what could be done for the 2025 assessment,
24 but, you know, at the risk of speaking for our life history branch,
25 I think re-ageing all of the spines, for a 2025 assessment, is
26 probably too ambitious.

27
28 **VICE CHAIRMAN NANCE:** Thank you, Shannon. John.

29
30 **MR. MARESKA:** So, Carrie, to your question about rolling out to
31 the states, and so the Potts paper was reviewed during the Gulf
32 States Marine Fisheries Commission's otolith processors workshop,
33 and so all the states are aware of the new method, and I can speak
34 for Alabama, and we're looking at it for those triggerfish that
35 are five and older already.

36
37 **VICE CHAIRMAN NANCE:** Steven, please.

38
39 **DR. SCYPHERS:** Thanks. Will, and perhaps Shannon, is it possible
40 to use -- So this is great work, Will, and this is fantastic. I
41 think it will be super useful, and is it possible to essentially
42 bias correct what's been aged from otoliths, using the work you've
43 done?

44
45 I mean, from slide -- Which one is it? It doesn't look like there
46 is a super clear -- On the Slide 14, where you plot otolith age,
47 and spine age, it looks like, you know, there is obviously a trend,
48 but a lot of variability and such, which makes sense, but would it

1 be possible to do something like that, in terms of using the
2 information you gathered from this research to sort of bias-adjust
3 the otoliths that have been previously aged in some way? I don't
4 know if that makes sense.

5
6 **DR. PATTERSON:** It does make sense, and I think the way to do it
7 would be to use the Punt et al./Thorson et al. ageing error matrix
8 that we produced for those, and just input that as your matrix,
9 but the issue is the -- You know, it's the imprecision, and it
10 increases later, but we didn't look at that specifically. We
11 could, and, once you get above ten, there are few fish in the data,
12 and so it's probably -- It's probably not as big of an effect as
13 these -- As big of an issue to deal with as what these curves
14 suggest, but, again, it would have to be explored, and in a
15 different way than we did.

16
17 **VICE CHAIRMAN NANCE:** Nathan, did you have a question?

18
19 **DR. VAUGHN:** Yes, and it was very similar to Steve's, from us
20 chatting online, and so those results that you showed, with the
21 bias, were uncorrected data, as opposed to like incorporating that
22 Punt correction curve, and they were just raw old spine data, with
23 the otoliths as the real -- All right.

24
25 **VICE CHAIRMAN NANCE:** Thank you. Any other questions or comments?
26 Julie.

27
28 **DR. JULIE NEER:** Just a quick comment on -- I'm not speaking for
29 the life history folks, but, if it looks like gray triggerfish
30 might not get underway until 2026, based off of the steering
31 committee meeting on Monday, and so you might have a few more
32 months, to maybe get a few more subsamples in, and, again, not
33 giving work to the life history folks, but it may not start --
34 It's certainly not starting in early 2025, and it may not even
35 start until 2026, and so maybe. Who knows? Thanks.

36
37 **VICE CHAIRMAN NANCE:** Thank you, Julie. Katie, please.

38
39 **DR. SIEGFRIED:** Thank you, Mr. Chair. Sorry about my sound issues
40 earlier. I did check in with the life history folks about the re-
41 ageing, and we did from the life history chief on Monday, during
42 the steering committee meeting, that the new protocol was being
43 used for older individuals, but I think that they are planning on
44 re-ageing the historic samples, as well as the Gulf States is
45 planning to do the same.

46
47 We can check in on the status with them. I'm just not sure whether
48 all of them can be done, but certainly the plan is to conduct that

1 re-ageing, at this point, and so, if I could follow-up with Rob,
2 the branch chief with the life history group, and Will, to talk
3 about whether the older fish need it or not, and then how long the
4 timeline is for those historic samples with Gulf States, then I
5 could get a better answer.

6
7 **VICE CHAIRMAN NANCE:** That would be perfect. Thank you. Will,
8 please.

9
10 **DR. PATTERSON:** Katie, I actually -- I had a call with Robert, and
11 I can't remember how long ago it was, and it could have been two
12 months, and it could have been five months, and I don't know, but,
13 at the time, we talked about how the simulation work was going,
14 and how the validation results -- He had been talking with
15 Jennifer, of course, before her retirement, and we tried to get a
16 sense of what ages would have to be done.

17
18 If it was five and up, that was a heavy lift. It was it six and
19 up, it was actually a quite a bit lighter lift, and so I don't
20 know -- I was under the impression that they were already doing
21 it, and you would know more than me, but, anyway, it sounded like
22 it was possible. I was kind of the under the impression that it
23 was full steam ahead, but maybe I'm wrong there.

24
25 **DR. SIEGFRIED:** I can clarify just a bit. The answer I'm getting
26 is that the new protocol wasn't needed until about seven years old
27 or so, which is pretty much some sort of negotiation, basically,
28 between how long it takes and whether it's needed, and so it looks
29 like they're doing seven-plus, and that they've completed those
30 reads, but I don't know about all of the historical samples or
31 not, and so let me see what Robert is telling me now.

32
33 Okay. Well. Sorry. Hot off the presses, and Robert says we have
34 finished re-ageing all of the historic samples five or greater,
35 and that was just chatted to me from Robert, and so, yes, full
36 steam ahead. I will thank him profusely.

37
38 **EXECUTIVE DIRECTOR SIMMONS:** Thank you.

39
40 **VICE CHAIRMAN NANCE:** Any other questions from the SSC? Thank
41 you. All right. Jason, please.

42
43 **MR. ADRIANCE:** Just another comment, following up, and I found out
44 that Louisiana is pulling ours and re-ageing them.

45
46 **VICE CHAIRMAN NANCE:** Okay. It sounds like everybody is working
47 towards that. That's very good. You must have lit a fire under
48 them, Carrie, somehow. I'm not sure -- Okay. Well, we'll go ahead

1 and end that portion of our meeting.

2
3 **MR. RINDONE:** We have one more item. I can see Dr. Simmons beaming
4 over there that, for once, lots of people care about gray
5 triggerfish.

6
7 **VICE CHAIRMAN NANCE:** It's a great species.

8
9 **DISCUSSION: 2025-2028 RESEARCH AND MONITORING PRIORITIES**

10
11 **MR. RINDONE:** I will be sent to sensitivity training for caring
12 more about gray triggerfish. No, but that is great work, Will and
13 team and everybody, for getting on the ball on pulling those spines
14 back out and reworking those.

15
16 Our last item, Mr. Chair, is the council's research priorities for
17 the 2025 to 2028 period, and these are intended to serve as a guide
18 for individuals seeking to understand where the council hopes to
19 resolve gaps in knowledge or to expand existing datasets. After
20 you guys, and the council, review and approve these, they're going
21 to be posted at the council website, and we'll send a letter to
22 NMFS and other relevant federal and state agencies for
23 consideration as priority items for funding opportunities.

24
25 These priorities, if addressed, are expected to measurably improve
26 the council's abilities to manage the federal fisheries, per the
27 Magnuson Act, and so please review the information presented, ask
28 questions of the council staff, and Dr. Froeschke is the one who
29 is going to run through this with you, and make any
30 recommendations, as appropriate.

31
32 **VICE CHAIRMAN NANCE:** Thank you. One question, and do we have one
33 item of Other Business?

34
35 **MR. RINDONE:** We did, but we dealt with it, and so --

36
37 **VICE CHAIRMAN NANCE:** Perfect. Thank you.

38
39 **DR. FROESCHKE:** Okay. Here is my presentation. Any questions?
40 No, and so this is something that the council -- We do this -- You
41 know, the council itself runs off what was previously a five-year
42 grant cycle, and now we're running off four, and so, every time we
43 go through this process, we update our research and management
44 priorities.

45
46 We have gone through that, and so, initially, we took our old one,
47 and we passed it around the staff, and kind of looked it over, and
48 we make some modest changes, and sometimes we could cross things

1 off, if we feel like they've been addressed, which is awesome, and
2 so what we wanted to do is get you all's feedback, if there are
3 things that either we missed, or that we should add, or are no
4 longer relevant, or we also have on here some priority codes, which
5 you can kind of see those on the screen. If there are some things
6 that we have that you just don't think are modified with the right
7 priority --

8
9 **VICE CHAIRMAN NANCE:** Will, please.

10
11 **DR. PATTERSON:** John, when you were talking just then, you said
12 "research and management priorities", and here it's listed as
13 "fishery monitoring and research priorities", and has that
14 changed, because I don't remember "monitoring" being a part of
15 this list before, and did I miss that?

16
17 **DR. FROESCHKE:** That has not changed, to my knowledge, and so the
18 first -- The way that it's organized, the first section is sort of
19 the big-ticket items, or the big themes, and then there are some
20 individual species priorities, and then there are socioeconomic
21 priorities.

22
23 **DR. PATTERSON:** Okay, but then, in the priority codes, it says
24 surveys to meet, and the second priority is surveys to improve,
25 and the third priority is surveys to characterize, and, from my
26 personal bias and perspective, I think monitoring and research are
27 totally different things, and my concern is that this list goes to
28 CRP, and MARFIN, and other, you know, RFPs, and, if you have
29 surveys in there, that just eats up what the research budget can
30 actually be, and like I think they're two different entirely
31 different disciplines, and, you know, if you need a survey list,
32 and a separate research list, and it seems like that makes sense
33 to me, but, I mean, we're already seeing, you know, pools of
34 funding shrink, and, in some cases, you know, more internal funds
35 are being spent than are available externally, and so I just -- If
36 we then, you know, devote say MARFIN funding to surveys that are
37 -- It just doesn't sit well.

38
39 **VICE CHAIRMAN NANCE:** My question would be, while they're on this
40 same list together, are there separate pools for survey and
41 research, or is it all one pool?

42
43 **DR. FROESCHKE:** So this isn't a -- There isn't a research -- This
44 isn't a funding opportunity. This is simply a statement of the
45 things the council thinks it needs to support its management, such
46 that other people who do have funding could do, or individual
47 researchers look at this and say I have an idea, or a project, or
48 something that could contribute to this.

1
2 **VICE CHAIRMAN NANCE:** But does MARFIN have a separation of entity,
3 as far as a budget, maybe, for large surveys, and one for research?
4

5 **DR. FROESCHKE:** Maybe Carrie could speak to that. I don't know.
6

7 **EXECUTIVE DIRECTOR SIMMONS:** I can try. I think what MARFIN has
8 is an internal pot of money and an external pot of money, and they
9 have different priorities, I think, for each of those pots of
10 money, for those federal funding opportunities. How often they
11 update those, being the S-K, MARFIN, and Cooperative Research, and
12 pretty much Cooperative Research has folded, I think, for the next
13 year or two, is my understanding, and so that leaves MARFIN and
14 the S-K.
15

16 **DR. FROESCHKE:** S-K is the same, I think.
17

18 **EXECUTIVE DIRECTOR SIMMONS:** Well, we don't know, right, and it's
19 on the chopping block for next year, is my understanding, with
20 Congress, and we'll see if it gets funded or not, but, like John
21 said, this is the council's research and monitoring priorities for
22 the next four-year cycle, is what we were trying to update.
23

24 **VICE CHAIRMAN NANCE:** Okay. Thank you. Paul.
25

26 **DR. MICKLE:** Thank you, Mr. Vice Chair. I am going to jump in the
27 weeds, I guess, on it. I read through it, and I had actual similar
28 thoughts from Will's comments, but, on the other side of it,
29 Section 2.2 and 2.3 read as identifying AJs and triggerfish for
30 sargassum remote sensing, and those things -- I thought those were
31 already funded, through a large -- I don't know all the details,
32 if it was a RESTORE grant, and Dr. Hernandez was involved, a JS
33 professor from USF, I think, and hasn't that already been
34 encapsulated, or -- I've asked it about it multiple times over the
35 years, and just could I get an update, or why is it here, if we've
36 already had it funded?
37

38 **DR. FROESCHKE:** Well, I don't know, and it may have been funded,
39 and I know that different groups have worked on it. I guess, in
40 terms of the council, and having the information they envision, I
41 will say, to manage the stock, we don't have that. I mean, we
42 don't -- I mean, I guess we've hypothesized that there is
43 information from an age class that lives in the sargassum, and we
44 don't know the population dynamics of that.
45

46 Maybe it's out there, but we don't know it, and those two stocks
47 are in rebuilding plans, and that's -- We have struggled to rebuild
48 them, as plans have suggested, and so that's a hypothesis of why.

1 I mean, if that can all be assembled, and put together, then that
2 would probably satisfy it, but it isn't right now.

3
4 **VICE CHAIRMAN NANCE:** Trevor, please.

5
6 **MR. MONCRIEF:** It's separate from that.

7
8 **VICE CHAIRMAN NANCE:** Then why don't you go ahead and address that,
9 and then Trevor.

10
11 **DR. MICKLE:** Just, if this is going on, and, from what I've been
12 told, it was going on, and it was exactly pointed toward what John
13 just said of looking at early settlement, recruitment, and seeing
14 if there's a correlation with sargassum coverage in the Gulf for
15 AJs and triggerfish.

16
17 Sean Powers and I pushed really hard for this, a long time ago,
18 when Isley presented his assessment, and the recruitments were
19 just a mess, and we were trying to figure out correlations of such,
20 and we pushed really hard for this, and I just -- We were told
21 that it was moving forward, and I think we were going to get a
22 briefing on it even, but, if there's only so much money out there,
23 and programs are being cut, if things have been already approached,
24 and we just haven't gotten the products out of them, I think we
25 should talk about that, so we don't --

26
27 We're saying this is a big priority, and I guess it still is, but,
28 if there's a product about to show up, or some sort of quantitative
29 guidance that's going to come out of a RESTORE study that's been
30 funded, we're taking up space here, and it could go towards
31 something else, and this is years and years away, and maybe there
32 is just something just around the corner, and so it's just a matter
33 of efficiency and communication and knowing what's going on.

34
35 **VICE CHAIRMAN NANCE:** John.

36
37 **DR. FROESCHKE:** Well, we welcome your feedback, and so, if you
38 have different things, and like this isn't us telling you how it
39 is, and, I mean, we're asking for your feedback, and so, if you've
40 got something else, please let us know. Verena, did you have
41 something? She's deeply knowledgeable about this stuff.

42
43 **DR. WANG:** I wouldn't go that far, but I just wanted to provide a
44 little bit of an update, because I was involved. I worked with
45 Frank Hernandez previously, and I was involved tangentially with
46 that RESTORE project that was looking at some of the gray
47 triggerfish associations with sargassum.

1 As far as I know, that's still coming, forthcoming, and I don't
2 know the timeline on that, and then the amberjack work is slated
3 to come after that, and there's kind of a step-wise thing that
4 needs to happen before those things come together, but, exact
5 timeline-wise, I can talk to Frank and see.

6
7 **VICE CHAIRMAN NANCE:** Paul.

8
9 **DR. MICKLE:** I was originally briefed by Frank, when it was
10 initiated, and I want to say that was 2017, or maybe 2018, and
11 it's been a while, and it was a lot of species, and it wasn't just
12 these two. It was a really large study scope, which is good, but
13 that's a while ago. Thank you.

14
15 **VICE CHAIRMAN NANCE:** Thank you. Trevor.

16
17 **MR. MONCRIEF:** I was just going to chime-in and say that I don't
18 disagree with Will on like a lot of those points. I do, when it
19 comes to monitoring and everything else, I do wonder if there's a
20 little bit of a bridge there though, because the one that is
21 specifically listed is GFISHER, but I'm thinking more of basically
22 camera, or visual, surveys across the Gulf, to try to basically
23 get coverage across-the-board, which is what the states are working
24 on, to a degree right now, to try to get at.

25
26 I was just wondering, and, like, yes, I mean, it's still a
27 priority, and it's not necessarily funding ongoing monitoring, and
28 the sentence in there was, you know, basically to expand, or
29 enhance, and I think part of that is a little bit of a priority
30 here, and so I do agree with like ongoing monitoring, or support
31 of ongoing monitoring, probably isn't the biggest priority, but
32 there are opportunities to enhance, or basically do the more
33 experimental side, to develop monitoring that works, especially
34 what we've seen with the vertical line survey and everything else
35 over the last decade.

36
37 **VICE CHAIRMAN NANCE:** Thank you, Trevor. Will, please.

38
39 **DR. PATTERSON:** To respond to Dr. Froeschke's comment about asking
40 for input, then I think I would love to see, on this list, the
41 need to develop a Gulf-wide system for genomic tissue sampling,
42 and archival, to use for a variety of genomic fisheries
43 applications.

44
45 **VICE CHAIRMAN NANCE:** I think that's a good one to put down.

46
47 **DR. FROEHSKE:** Do we want to add that to the list? Jess, could
48 you do that?

1
2 **VICE CHAIRMAN NANCE:** I think so. Then I think you can update
3 this later. I think that's -- I think it's just -- I think the
4 key is it can be in there. Where it goes, and how it goes, is --
5
6 **DR. FROESCHKE:** Well, full disclosure, and I intend to ask you for
7 a motion, if you're satisfied with this at the end, and so, if you
8 want to make a modification, maybe we just put it in there.
9
10 **VICE CHAIRMAN NANCE:** Trevor.
11
12 **MR. MONCRIEF:** I mean, just to be pragmatic, can we make a motion
13 that we approve it with the comments that were provided at the
14 meeting, to be updated by council staff? I know how we get with
15 wordsmithing sometimes, and a three-sentence paragraph sometimes
16 can go about four hours.
17
18 **DR. FROESCHKE:** Yes, and, I mean, if there are no other things, I
19 think you could suggest a priority for genomic -- What Dr.
20 Patterson suggested, and that and approve it, and something like
21 that would be fine with me.
22
23 Since I'm talking, just so you know, I mean, this is from the
24 council's perspective, and the things that they come from in
25 management are why these -- It's the Gulf-wide indices and things
26 that they see as, you know, every time we can't do something, and
27 why don't we have the information, and that's what we need.
28
29 The other thing that I was going to say is, when we put in the
30 GFISHER, my intent was that to represent the Gulf-wide composite
31 video index, and so, if that's not the right nomenclature -- It
32 wasn't intended to be the Florida-specific or anything like that.
33
34 **MR. MONCRIEF:** I think it's fine. I mean, that comment was just
35 saying that there's, you know, similar camera studies that are
36 being prioritized, and we are -- You know, we're funding a portion
37 of what we're trying to do, but that's kind of -- It just goes
38 along the path of, yes, it is a priority to try to support the
39 expansion or, you know, the evaluation of some of these.
40
41 **VICE CHAIRMAN NANCE:** Yes, please.
42
43 **DR. BARBIERI:** Just to clarify, GFISHER is not just a Florida
44 project, right, and so it's NOAA Fisheries Southeast Fisheries
45 Science Center and FWRI working together collaboratively, and so
46 it really allowed the survey that we had over the West Florida
47 Shelf, right, a lot of those methodologies, to be integrated with
48 what the folks in Pascagoula and the Gulf-wide Southeast Fisheries

1 Science Center, the survey that it conducts, to form, you know, a
2 joint -- That is Gulf-wide distribution.

3

4 **VICE CHAIRMAN NANCE:** Ralph.

5

6 **MR. TOWNSEND:** So I guess I'm either confused or concerned, and
7 I'm not sure which, and we were handed an eight-page list, most of
8 which are Priority A, and asked to approve it, with very little
9 discussion of -- There's just no time to go through an eight-page
10 list, and I don't understand how we can do that, I guess.

11

12 I mean, it's one thing to say that we would like to get some
13 feedback from members individually at this point about the
14 direction it's going, but to ask to endorse this --

15

16 **VICE CHAIRMAN NANCE:** Well, we have had it for several days.

17

18 **MR. TOWNSEND:** We were scheduled to discuss --

19

20 **VICE CHAIRMAN NANCE:** Ryan, who sends out our agenda -- Usually
21 it's there, and the presentation is this, and those types of
22 things, to look at it before the meeting, and so this meeting is
23 more discussion about, after we've looked at it, do you have
24 anything to add, any concerns, that type of thing.

25

26 **MR. TOWNSEND:** Well, I've done similar exercises with Sea Grant,
27 and they were like three-day symposiums, to sit down and go
28 through, largely item-by-item, and say are we getting it right,
29 and it just sounds, to me, like we're being asked -- I mean,
30 there's really -- There's not time to discuss all of the individual
31 -- I mean, I have some concerns about some of the specific
32 socioeconomic stuff, and I'm not sure where it came from, and I
33 don't have any background, but, you know, in an hour, the reality
34 is that we're not going to discuss this whole thing. We're going
35 to discuss things that people bring out individually, and so, you
36 know, being asked to endorse this, with that very limited -- We've
37 read it, and that's fine, but we've really not processed it.

38

39 **VICE CHAIRMAN NANCE:** I hear what you're saying. John.

40

41 **DR. FROESCHKE:** Well, and we're happy to take your feedback, and
42 so please give it to us, and, if we don't get time, if we don't
43 get through it, and you all are not satisfied with it, let us know,
44 and we'll bring it back. I mean, we're not trying to push something
45 through that you're not happy with, and we're just asking for your
46 feedback, and so, if you have it, give it to us.

47

48 **VICE CHAIRMAN NANCE:** Luiz.

1
2 **DR. BARBIERI:** Well, can I ask a quick question? Are we on a
3 schedule, right, to present this to the council within a specific
4 council meeting?
5

6 **DR. FROESCHKE:** I don't think so. Carrie, are we? I mean, it
7 can't be indefinite, but I don't think it has to be --
8

9 **DR. BARBIERI:** Here's why I --
10

11 **EXECUTIVE DIRECTOR SIMMONS:** I think we need to be wrapping it up
12 by the last council meeting of the year, in November, so we can
13 say this is for our next four-year award cycle. We don't have to
14 formally submit it, like we do our administrative award, which
15 this period is tied to the council's administrative funding cycle,
16 which is now going from five years to four years, which is why you
17 see that change.
18

19 **DR. BARBIERI:** Right, and it's completely understandable, by the
20 way, I mean, all of this, but, because this is a newly-
21 reconstituted -- I can understand why Ralph is having this
22 question, right, and perhaps Tiffany would as well, right, and we,
23 as an SSC, the old-timers, we discussed this, you know, much more
24 extensively, and we actually had people, you know, the
25 socioeconomic, Ralph, members of the committee make specific
26 recommendations that they felt were important to be added to this
27 list, that they felt that those things were missing, that this was
28 primarily focused on biological science, and not really
29 integrating enough socioeconomic, and so they requested this more
30 explicit listing of the socioeconomic, but, of course, the new
31 members, or the members that have been members for a while, may
32 not remember all of this.
33

34 So, if there is no timeline, would it be possible for us to revisit
35 this, you know, in October, with direction to the committee that
36 people develop a set of recommendations, after they review this as
37 part of the briefing book?
38

39 **VICE CHAIRMAN NANCE:** I would think that would be appropriate.
40

41 **MR. TOWNSEND:** Well, I'm not trying to hold this up.
42

43 **VICE CHAIRMAN NANCE:** No, and I understand.
44

45 **MR. TOWNSEND:** If the group has been working -- I mean, I don't
46 understand the background of this, but, if this group has had
47 multiple rounds of input into this already, then fine, and the
48 members who have had that input can endorse it, and I will abstain,

1 because I haven't been involved in it, but, I mean, I have sort of
2 a couple of big issues.

3
4 One is everything is Priority A, and so how much use is that to
5 funding councils, and so that's a very high-level question, that
6 I just -- That was my -- When I first picked it up, that was my
7 first reaction. If this is a prioritization, and virtually
8 everything is Priority A, how much help is this really to the
9 funding agencies?

10
11 Then, on the social science stuff, I do have some specific
12 questions, but I don't know where some of this came from, and
13 what's the background for it, and, as I said, if this committee
14 has been working on it for some time, and feels comfortable with
15 where it's at, then the members who have been working on it should
16 take a vote and endorse it, because I don't think, when you add
17 one or two new members, they should be able to derail the process.

18
19 **VICE CHAIRMAN NANCE:** Luiz.

20
21 **DR. BARBIERI:** To that point, this is why I asked, and, again, I'm
22 not trying to derail the process, or delay. You know, if this
23 something that we had scheduled to be completed, then, by all
24 means, I don't want to be the one upsetting the apple cart here,
25 but, if there is no deadline for, you know, before the end of the
26 year, it's just, you know, a way to be a bit more inclusive of the
27 new members, you know, to allow them the possibility of providing
28 more input, and I think it would be appreciated by them.

29
30 **MR. MONCRIEF:** I'm good with that.

31
32 **VICE CHAIRMAN NANCE:** What's that?

33
34 **MR. MONCRIEF:** I'm good with this giving some more time for
35 comment, until the next meeting, and it being addressed.

36
37 **VICE CHAIRMAN NANCE:** I see your point of it's a lot of As, and
38 it's hard to -- There are many important things that we're trying
39 to accomplish, and I know that having a lot of As doesn't
40 facilitate which one is more important than the other, and, in
41 each mind, it's this is a very important subject, and it needs
42 additional work. Carrie.

43
44 **EXECUTIVE DIRECTOR SIMMONS:** Thank you, Mr. Chair, and so one thing
45 we tried to do, before this meeting, but were unsuccessful, is to
46 try to get someone from the Science Center, particularly on the
47 socioeconomic side, to tell us kind of how this is used. I think
48 we could try to do a better job of that, and maybe somebody at the

1 Regional Office could tell us how MARFIN uses this, and perhaps
2 they could give input on S-K and how often they look at the regional
3 management councils across the nation, because all councils have
4 to do this, of how they use these.

5
6 The other thing that's not clear, and I don't know that we'll get
7 any more clarity by October, is, you know, what is the Southeast
8 Regional Office's and Science Center's priorities for data
9 collection with the climate resilience funding, and I don't know
10 that anybody really knows that, and maybe the Gulf States has more
11 information on that, but we've talked about it very high-level at
12 the council, and I don't think we really understand what's
13 happening there, and so we could try to get more information on
14 that as well, but that --

15
16 You know, again, Ryan, I don't know how much time we have in
17 October, but that could take up a chunk of the committee's time,
18 and so maybe we also -- I know, Luiz, you helped me with this like
19 a long, long time ago, when I was a newbie, trying to figure out
20 how to structure this thing. It gets to be kind of a bit of a
21 bear, if you don't have maybe some staff from all the expertise
22 kind of brainstorming, perhaps with SSC leadership, on how to
23 structure this thing.

24

25 **VICE CHAIRMAN NANCE:** Paul, did you have a comment?

26

27 **DR. MICKLE:** Very quickly, and thank you, Vice Chair. You know,
28 just as we close this meeting, I would make passive recommendations
29 that this seems to be a working document, over the five-year cycle,
30 and now four, and it's just going to grow, in my opinion, and
31 everything is going to either bubble up to A, or B, and I've never
32 had a problem with having a lot of As on anything, but, moving
33 forward, it would be nice if there was a limited number that we
34 set it at, and we have the arguments here, and then the council
35 approves it from our scientific perspective, and their management
36 perspective, of some exclusivity to it. That would provide
37 strength, and there can only be so many As, Bs, and Cs, and it's
38 a manageable size, that new members can retain in a sitting.
39 That's my recommendation.

40

41 **VICE CHAIRMAN NANCE:** Thank you, Paul. Tiffany, please.

42

43 **DR. HOPPER:** Just more of a process-type question here. As I'm
44 looking through this list, it looks like it's the categories that
45 are given the priority, and I'm curious as to whether or not there
46 might be some value in prioritizing the actual bullet points, or
47 the actual elements, inside those, to some degree, because, as I'm
48 looking at this, I would imagine there may be some pieces, within

1 a given category, that would be more of a priority than others,
2 and this may be -- Like I said, I'm newer to this, and this may be
3 a process reason that we're doing it this way, and so this is just
4 more of, I guess, a question.

5
6 **VICE CHAIRMAN NANCE:** John.

7
8 **DR. FROECSCHKE:** I guess I would have to think about that one a
9 little bit.

10
11 **DR. BARBIERI:** I don't remember either, but, at one point, we spent
12 quite some time trying to look at through, and we had asked staff,
13 remember, to look through, for example, the SEDAR research
14 recommendations, right, and somebody collated, and was able to do
15 a very good job of collating, all this information, to say, okay,
16 right now, our assessments have these uncertainties, or data gaps,
17 or issues, that, you know, need to be addressed, and we tried to
18 integrate them into this, but I don't remember why, and maybe it
19 was lack of having consensus in the group, right, on how to
20 prioritize, and so we just added those, you know, by those data
21 categories, and do you remember, John?

22
23 **DR. FROESCHKE:** I don't remember in more detail than what you
24 described.

25
26 **VICE CHAIRMAN NANCE:** John.

27
28 **MR. MARESKA:** I guess my comments are going back to, you know, one
29 of Will's initial comments of, you know, who is this going out to?
30 Is this going out to MARFIN, or other people, for things that they
31 might prioritize, or seek funding for, and I don't know how often
32 the council works this, but there's a lot of things going on right
33 now that may be at the council level, and like there's a lot of
34 requests for MSEs, and, to me, those are research things.

35
36 None of those things are listed here, and there's a lot of IRA
37 workshops, and there's going to be findings there. You would
38 think, in the next three years, they would try and incorporate a
39 lot of those findings, and I'm not sure they have a place in this
40 document, but maybe they should have a place. Thank you.

41
42 **VICE CHAIRMAN NANCE:** Tom.

43
44 **DR. FRAZER:** So I agree with a lot of the comments. I mean, I
45 appreciate that, if everything is a priority, then nothing is a
46 priority, right, and then, Paul, I know you never had a problem
47 getting an A in anything, and so I like that little comment.

48

1 You know, again, I don't -- The council is not in the business of
2 funding stuff, right, and they're not a funding agency, and so, I
3 mean, what you see, I think, reflected in this list is, over time,
4 you know, lots of things, when we get information, or
5 presentations, and people tell you what the weaknesses are, and
6 you say, well, if we had this information, we could do a lot
7 better.

8
9 I made a comment, earlier in this meeting, that, you know, we're
10 not in the business of getting more complicated in our lives here,
11 right, and, to John's point, I think, you know, we are moving
12 towards potentially the MSE world, and a lot of index-based
13 sampling, and so, you know, some discussion, perhaps, at the next
14 meeting, from this group about, you know, what types of indices
15 would you prioritize, for example, and that might be helpful,
16 because I think there are some -- I don't think the council is
17 going to be incredibly helpful in trying to prioritize this, but,
18 from a scientific perspective, right, I think this group should
19 certainly say, you know what, you know, we can do all these kinds
20 of things, but the return on investment for, you know, this one is
21 really low, for example.

22
23 We might be thinking five years, or ten years, down the road, and,
24 you know, let's -- We react to so many things, you know, and it
25 would be pretty nice if we could think a little more strategically
26 about the types of sampling programs that we set up.

27
28 **VICE CHAIRMAN NANCE:** Carrie, please.

29
30 **EXECUTIVE DIRECTOR SIMMONS:** So this lives on our website, and we
31 do get a lot of inquiries, you know, from various groups, of, you
32 know, we have a little bit of money, and what's a priority of the
33 council, and we direct them to this. We do write a letter to all
34 the agencies, saying this is the Gulf Council's updated research
35 and monitoring priorities, or however we decide to structure it.

36
37 What I don't know, and what we may want to ask for, is how often
38 are these utilized, as far as updating either a federal funding
39 opportunity, or some other opportunity, be it, you know, special
40 climate resilience funding, or any of those things, and I don't
41 know how that process -- I don't know how the receiving it and
42 using it -- That's what we don't understand, on our side of the
43 house.

44
45 **VICE CHAIRMAN NANCE:** So, as far as -- This is the council's
46 priority list, posted to be used by -- It could be used by Sea
47 Grant, or it could be used by MARFIN or whatever, and so I think
48 we need to do the job of, if these are really the council's

1 priorities, and we need to make sure that we understand what they
2 are and also agree that that is.

3
4 Probably, at the next meeting, we need to look at this and, Ralph,
5 I think, if there are specific things on here, for sure, especially
6 socioeconomic, we need to, you know, delve into those and see what
7 the issues are. Will.

8
9 **DR. PATTERSON:** I really like Dr. Simmons' idea about we're not
10 quite sure how this is being used, and we should look into it,
11 because, if it's not really -- I mean, it's just kind of pro forma,
12 the council has to have it, but nobody looks at it, then the
13 relevance of it becomes much less, but, if this is actually being
14 used as a basis for funding prioritization, and what actually is
15 going to get accomplished in the next five years in the region,
16 then we should take it seriously, and give sincere feedback, and
17 come up with a real ranking, and add things to it, and take things
18 off, if we think that needs to be done. Anyway, that's my two-
19 cents.

20
21 **VICE CHAIRMAN NANCE:** Thank you. Andrew.

22
23 **DR. ROPICKI:** I was just curious, and it sounded like the October
24 meeting is going to be pretty jammed as-is, and is there anything
25 that we can do in the meantime, or is that in the dark, and not
26 okay? I mean, could we send questions to council staff, things
27 like that?

28
29 **VICE CHAIRMAN NANCE:** Ryan.

30
31 **MR. RINDONE:** I mean, you guys can absolutely send us questions,
32 and just a glimpse of what I currently have listed for the October
33 meeting is you guys will be reviewing two stock assessments and
34 then doing some planning work for two more. You're going to be
35 reviewing the mutton snapper assessment and the red grouper
36 assessment, and we'll also have a discussion about recreational
37 red snapper Texas data, the calibration simulation and the effects
38 of recreational data calibration on the red snapper model
39 performance.

40
41 Then we'll also have a discussion about SEDAR process changes and
42 assessment approaches, kind of like a follow-on from what we had
43 here, to give you guys some more opportunity to talk about that
44 stuff. I mean, we're looking at nearly three full days. I have
45 about an hour-and-a-half on one day available left right now, which
46 I don't think is sufficient for you guys to flay this thing open
47 and dissect it.

48

1 **VICE CHAIRMAN NANCE:** There was something else we added, and I
2 can't remember --
3
4 **MR. RINDONE:** You're breaking up. I can't hear you.
5
6 **VICE CHAIRMAN NANCE:** Okay.
7
8 **MR. RINDONE:** I will look at it, but we only have, like I said --
9
10 **VICE CHAIRMAN NANCE:** Ralph.
11
12 **MR. TOWNSEND:** So one thing that puzzled me was that it says it's
13 the council's priority list, and my real question is, is this
14 really the staff's representation of the council's? I mean, did
15 this list really come from the council, or this is something the
16 staff has put together, and really what it represents is the
17 staff's efforts to articulate where it thinks the council should
18 be interpreting?
19
20 **MR. RINDONE:** Well, the council is the one that ultimately approves
21 this, before it's sent on, and so they see it at multiple steps,
22 and they have the opportunity to voice changes to it. I mean,
23 it's initially drafted by staff, based on council prerogatives and
24 motions and decisions and comments that are made during different
25 assessments, about, man, it would be great if we had more this,
26 and it would be great if this took less time, or what have you,
27 and so it's an amalgamation of the collective council and staff
28 experience, if you will, prior to this point, but, ultimately,
29 it's their final signature on it, before it goes out the door to
30 all of these funding agencies, and so it is their product.
31
32 **VICE CHAIRMAN NANCE:** I think, before -- I think, Carrie, it would
33 be good -- I'm not sure how to do it, but to see who utilizes this,
34 and how it's utilized, and I'm not sure how to go about finding
35 that out, but, if it's simply there, and people look at it, that's
36 one thing, but, if it's utilized by National Marine Fisheries
37 Service, or others, to create funding lists, then I think it has
38 more relevance.
39
40 **EXECUTIVE DIRECTOR SIMMONS:** So, like I said, Mr. Chair, we'll try
41 again, because we were kind of focused more on the socioeconomic
42 information we had there, to try to get some feedback from the
43 Science Center, but, again, I will reach out to the other directors
44 and see how they think, you know, this is being used, and it is a
45 requirement of our administrative award. We do send it to the
46 federal funding agencies. How often those priorities are updated,
47 and the level of detail that's used to update those, based on this,
48 I don't know that.

1
2 Again, I think it would be important for us also to understand,
3 you know, what are the agency's priorities with the climate
4 resilience funding that they're getting in the Southeast.

5
6 **VICE CHAIRMAN NANCE:** I agree. We'll go ahead and table this one,
7 and I appreciate the input, and I think we've gone through the
8 agenda. We have public comment now, and so anybody online or in
9 the audience that would like to provide public comment to the SSC,
10 please do so at this opportunity. Okay. Seeing none, we'll go
11 ahead and close our meeting and reconvene the SSC in October. I
12 appreciate all the comments, and all the presentations, and we'll
13 go ahead and stand adjourned.

14
15 (Whereupon, the meeting adjourned on August 1, 2024.)

16
17 - - -
18