



**NOAA
FISHERIES**

Tab M, No. 4(a)

Stock status, abundance trends, and fishery mortality trajectories of U.S. Atlantic coastal shark stocks with a focus on the Gulf of Mexico

A presentation to the GMFMC

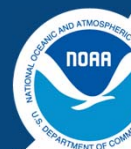
Enric Cortés, SEFSC

24 August 2022



Objectives / Topics

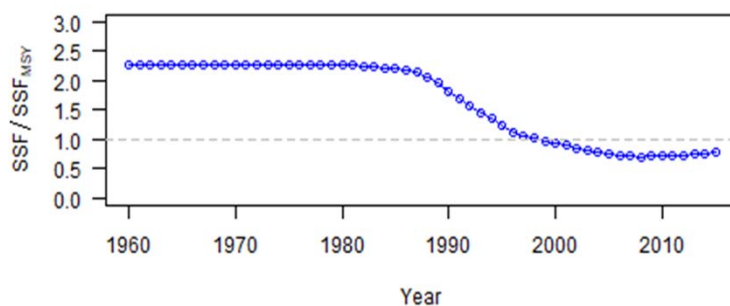
1. Compare stock status from the previous to the latest stock assessment for Atlantic coastal sharks (large and small coastal sharks)
2. Examine trends in biomass (or abundance) and fishing mortality with respect to MSY from the latest stock assessments
3. Discussion



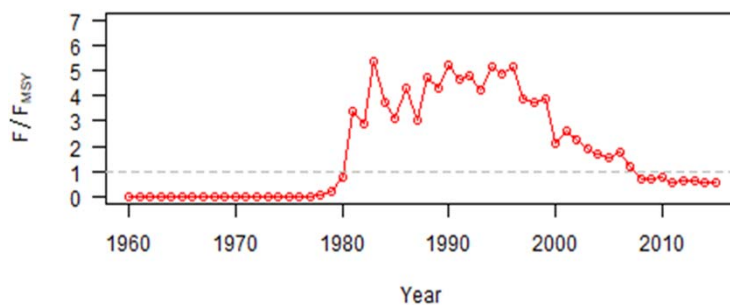
Stock status of large coastal sharks

Stock	Area	Previous assessment			Latest assessment			Improved status?	Projections / Comments
		<i>SEDAR / Date</i>	<i>Overfished? (B/Bmsy)</i>	<i>Overfishing? (F/Fmsy)</i>	<i>SEDAR / Date</i>	<i>Overfished? (B/Bmsy)</i>	<i>Overfishing? (F/Fmsy)</i>		
Sandbar	Atlantic + GOM	SEDAR 21 (2011; benchmark)	Yes (0.66)	No (0.62)	SEDAR 54 (2017; standard)	Yes (0.77)	No (0.58)	YES (overfished and overfishing)	TAC increased from 220 to 246 mt dw
Dusky	Atlantic + GOM	SEDAR 21 (2011; benchmark)	Yes (0.47)	Yes (1.59)	SEDAR 21 update (2016)	Yes (0.54)	Yes (1.12)	YES (overfished and overfishing)	Required reductions in F to achieve rebuilding by rebuilding year with a 70% probability decreased from 62% to 39%
Blacktip	GOM	SEDAR 29 (2012; standard)	No (2.62)	No (0.074)	SEDAR 29 update (2018)	No (2.73)	No (0.023)	YES (overfished and overfishing)	Could support total annual removals ranging from 200,000 to 1,200,000
Scalloped hammerhead	Atlantic + GOM	Hayes et al. (2009; external)	Yes (0.45)	Yes (1.29)	SEDAR 77 (Research Track)				Also includes GOM and SA scalloped hh stocks; great and smooth hammerheads
Spinner, Bull, Tiger	Atlantic + GOM	Not previously assessed			Planned for 2024 (Research track)				May also include GOM-specific stocks of these species

SANDBAR SHARK relative SSF and F trajectories (base run)

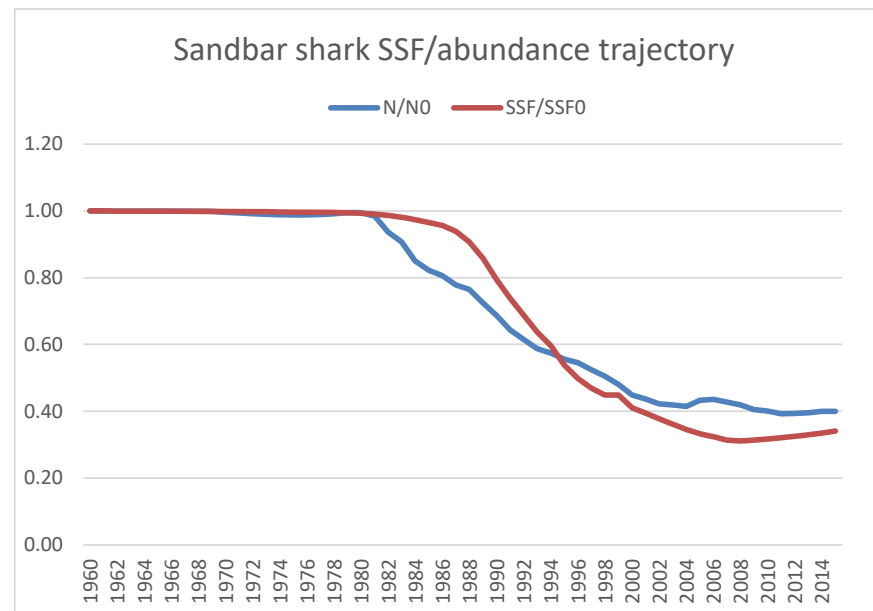


Shows a 10% increase in SSF since 2008



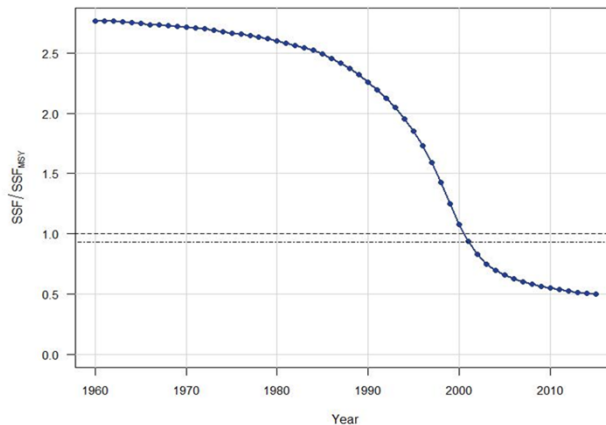
Shows a 68% decrease in F since 2006

SANDBAR SHARK relative abundance (base run)

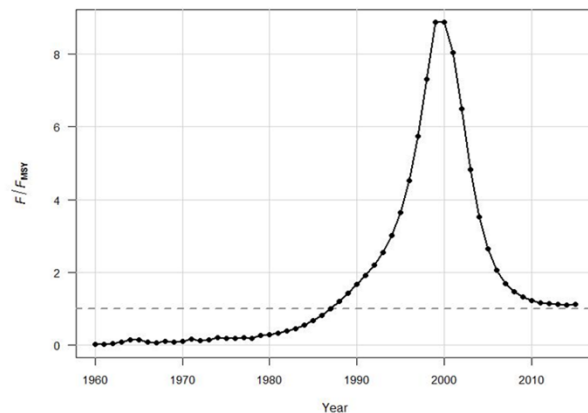


Abundance (in numbers) is recovering a little faster than SSF

DUSKY SHARK relative SSF and F trajectories (base run)

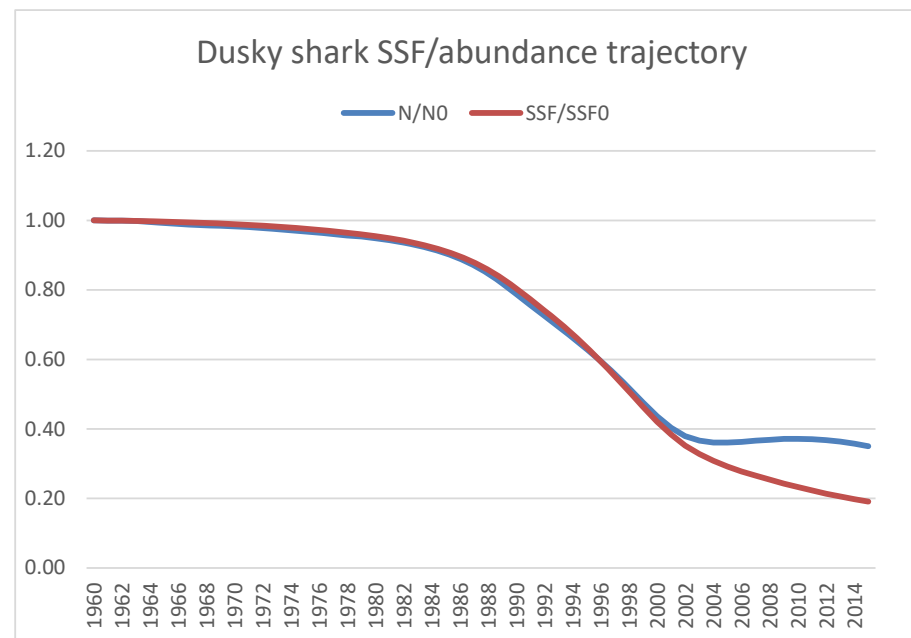


The rate of decline in SSF has slowed down in recent years, in particular since 2011



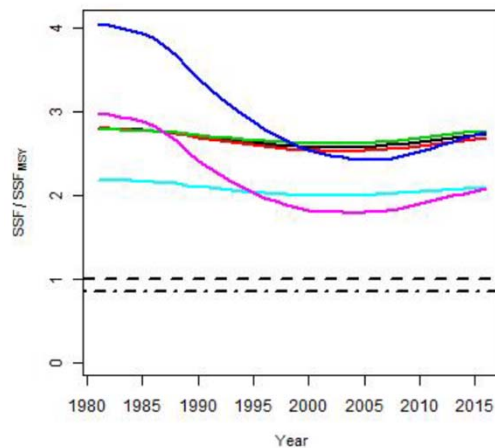
F declined precipitously since 2000 and has further decreased by 9% since 2010

DUSKY SHARK relative abundance (base run)

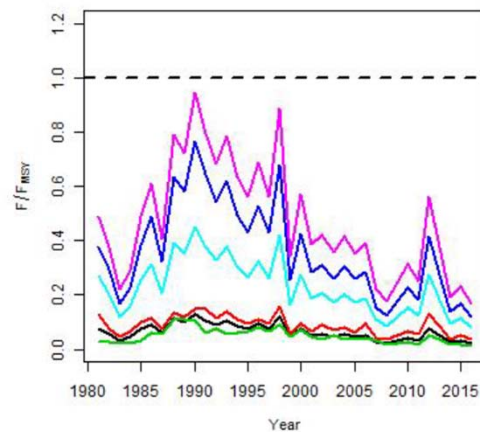


Abundance (in numbers) is recovering faster than SSF

GOM BLACKTIP SHARK relative SSF and F trajectories (base run + 5 additional states of nature)

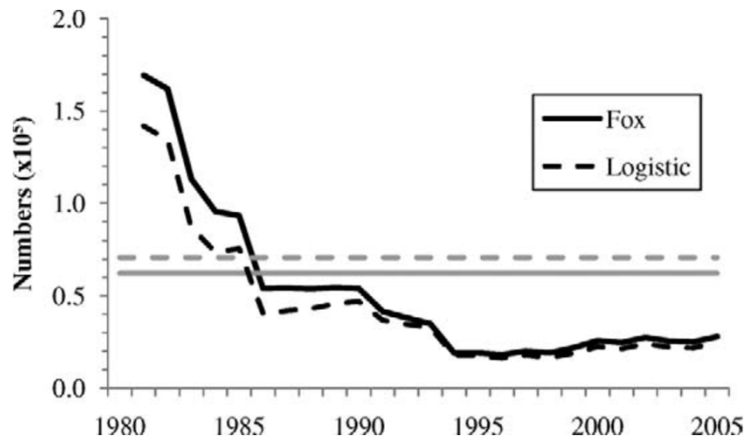


SSF has been increasing since the mid-2000s and has always been healthy

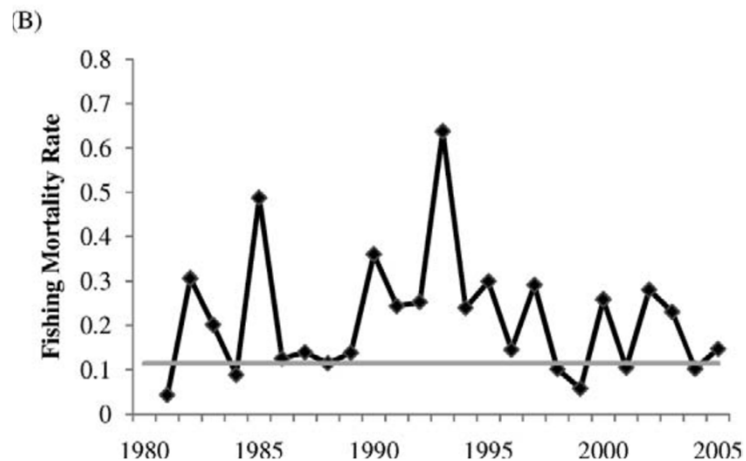


F has been decreasing since the early 1990s and has always been low

SCALLOPED HAMMERHEAD SHARK N and F trajectories (base run)

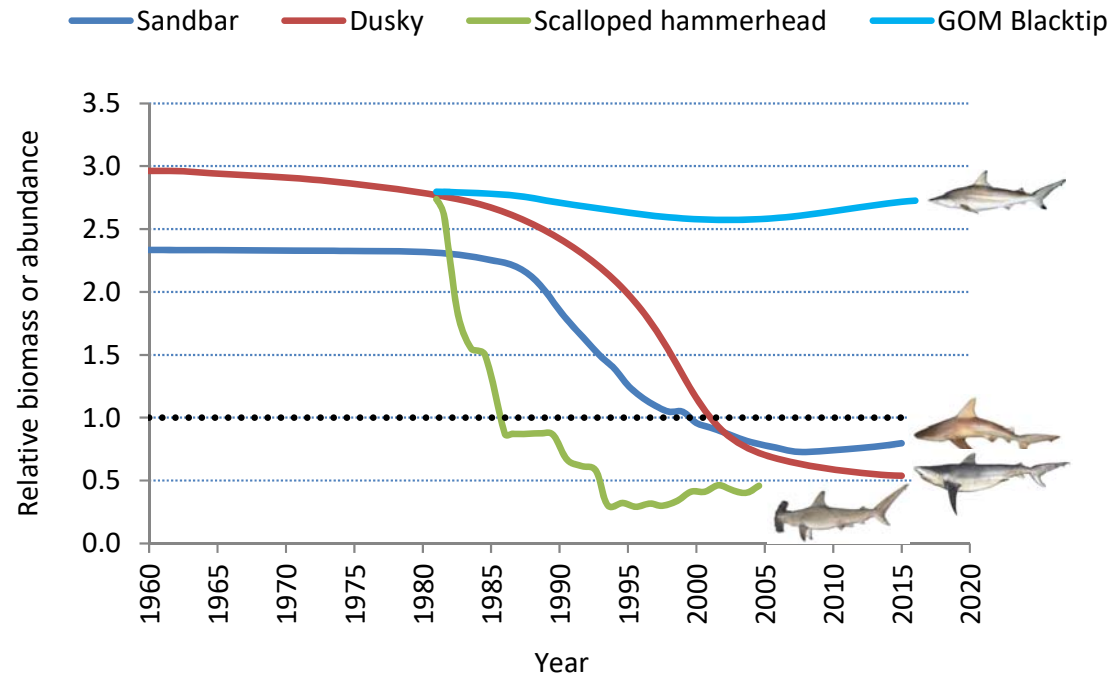


Shown an increasing trend since 1998

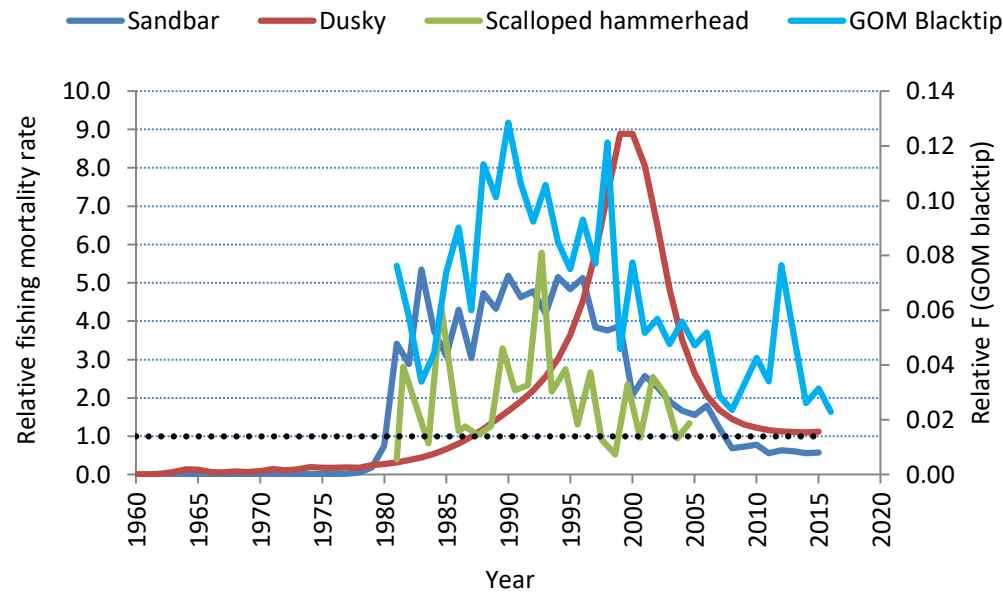


Shown an alternating pattern in F for the most recent years

Relative biomass (abundance) of large coastal shark stocks



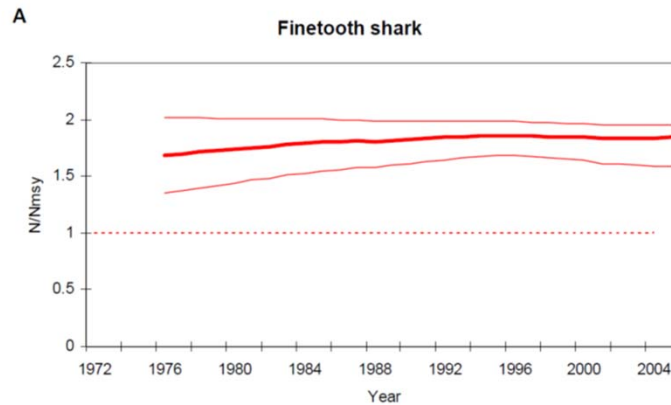
Relative fishing mortality rate of large coastal shark stocks



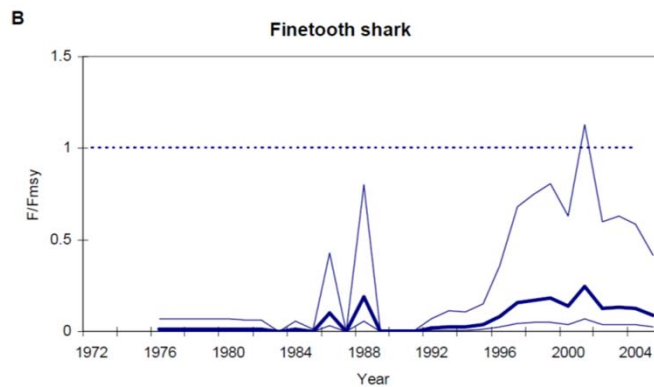
Stock status of small coastal sharks

Stock	Area	Previous assessment			Stock / Area	Latest assessment			Improved status?	Comments
		SEDAR / Date	Overfished? (B/Bmsy)	Overfishing? (F/Fmsy)		SEDAR / Date	Overfished? (B/Bmsy)	Overfishing? (F/Fmsy)		
Finetooth	Atlantic + GOM	SEDAR 13 (2007; benchmark)	No (1.80)	No (0.17)		Planned for 2024 (Research track)				May also include GOM-specific stock
Blacknose	Atlantic + GOM	SEDAR 13 (2007; benchmark)	Yes (0.48)	Yes (3.77)	Gulf of Mexico	SEDAR 21 (2011; benchmark)	N/A ¹	N/A ¹		With respect to original single stock
Atlantic sharpnose	Atlantic + GOM	SEDAR 13 (2007; benchmark)	No (1.49)	No (0.70)		SEDAR 34 (2013; standard)	No (1.73)	No (0.34)	YES (overfished and overfishing)	
Bonnethead	Atlantic + GOM	SEDAR 13 (2007; benchmark)	No (1.13)	No (0.61)		SEDAR 34 (2013; standard)	No (1.27)	No (0.50)	YES (overfished and overfishing)	
Smoothhound complex						SEDAR 39 (2015; benchmark)	No (1.78)	No (0.18)		
¹ Assessment not accepted by CIE reviewers										

FINETOOTH SHARK relative N and F trajectories (base run)

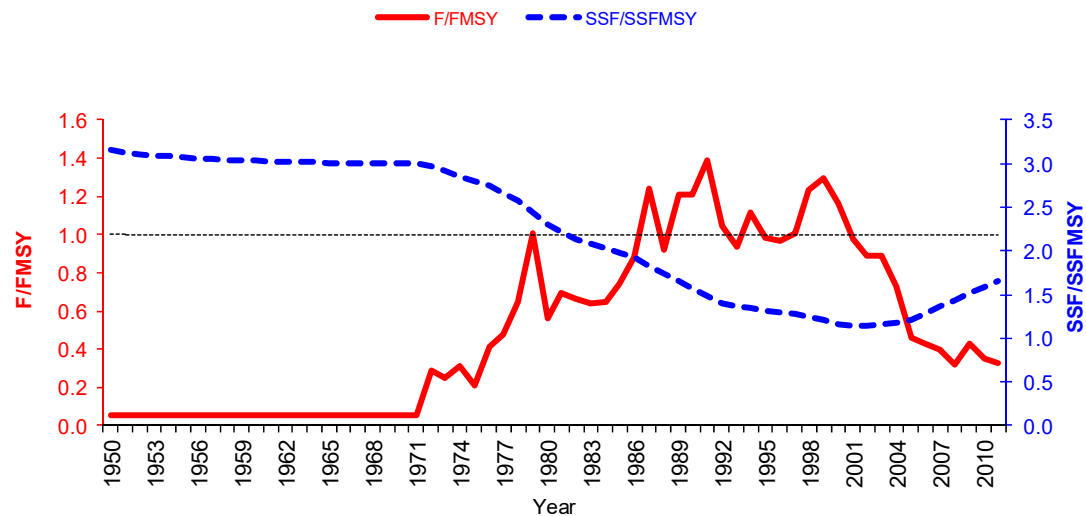


Shows a stable N trajectory



Shows a low F throughout

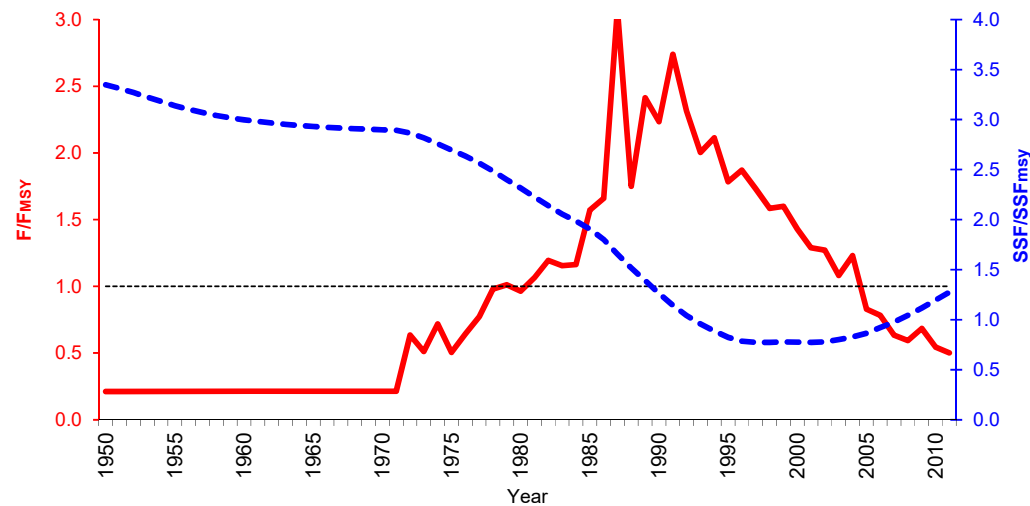
ATLANTIC SHARPNOSE SHARK relative SSF and F trajectories (base run)



Showed an increasing trend in SSF since 2002

Showed a decreasing trend in F since 2000

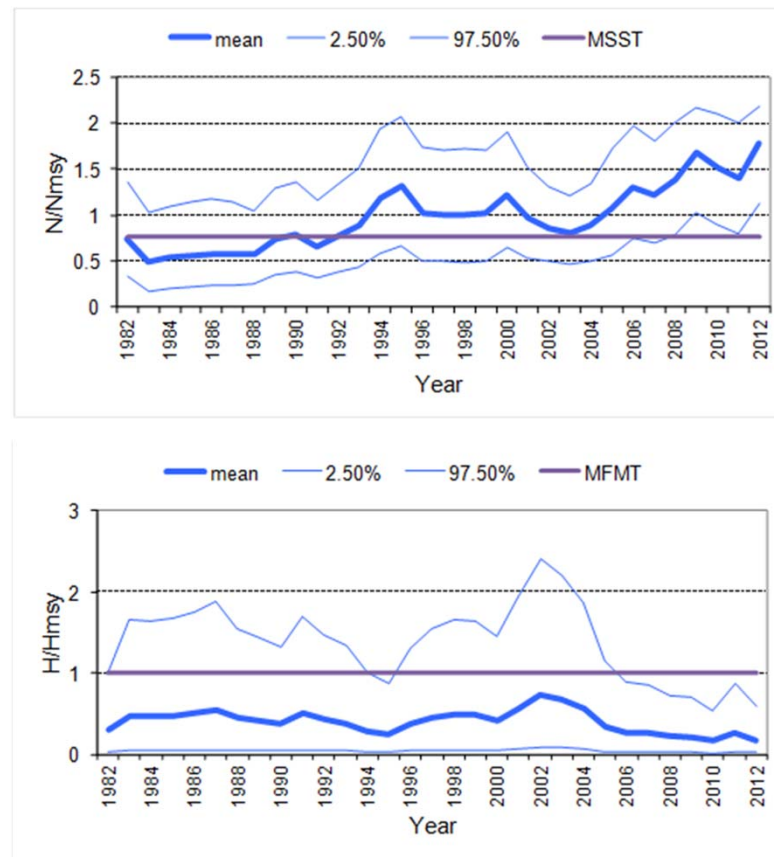
BONNETHEAD SHARK relative SSF and F trajectories (base run)



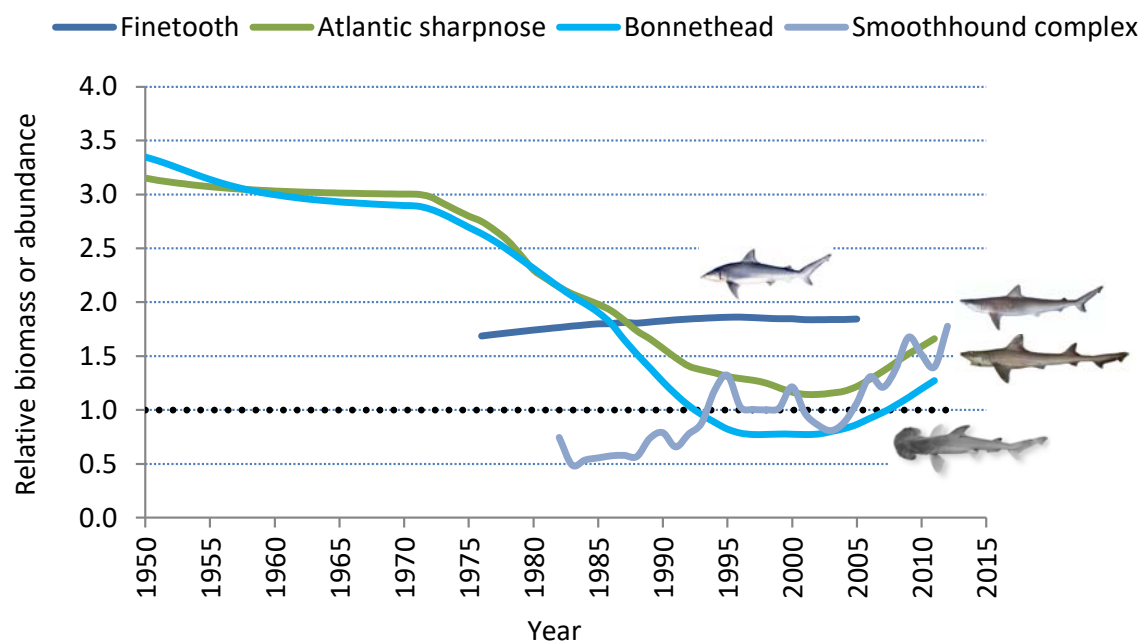
Showed an increasing trend in SSF since 2001

Showed a decreasing trend in F since 1999

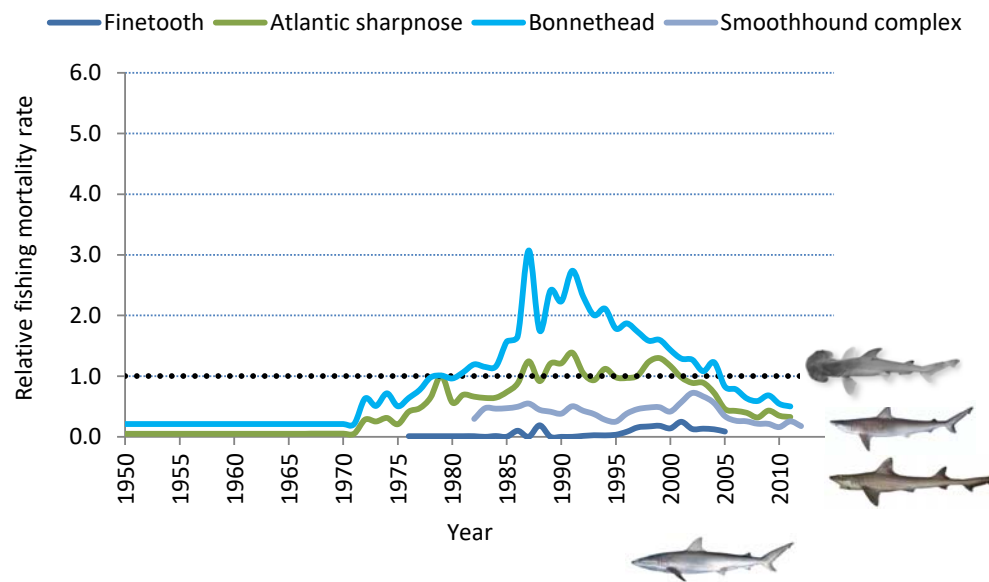
SMOOTHHOUND COMPLEX relative SSF and F trajectories (base run)



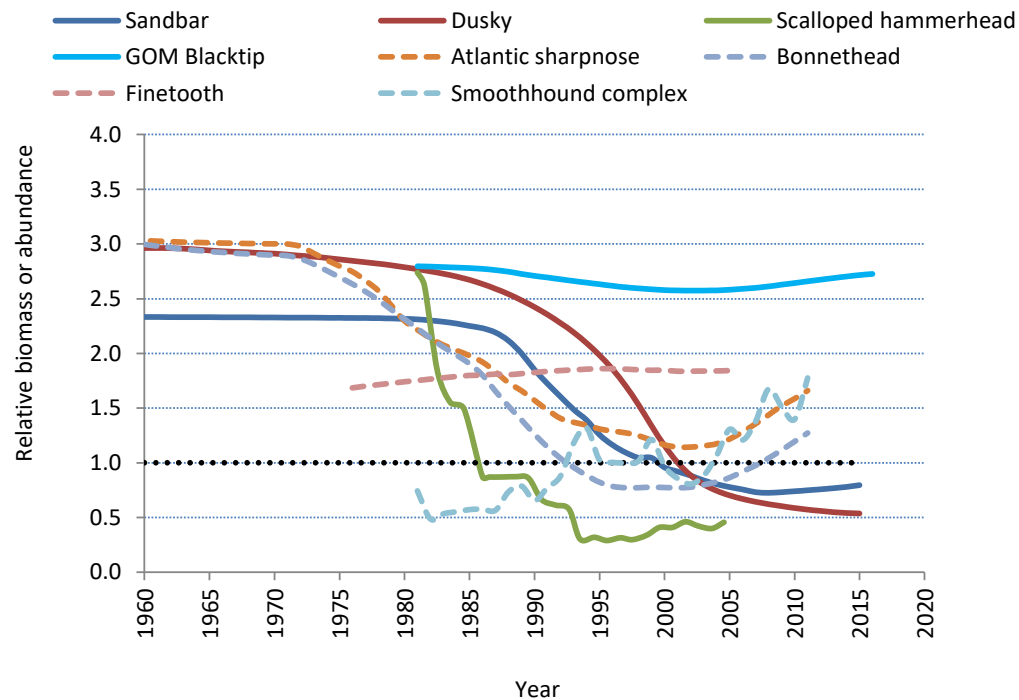
Relative biomass (abundance) of small coastal shark stocks



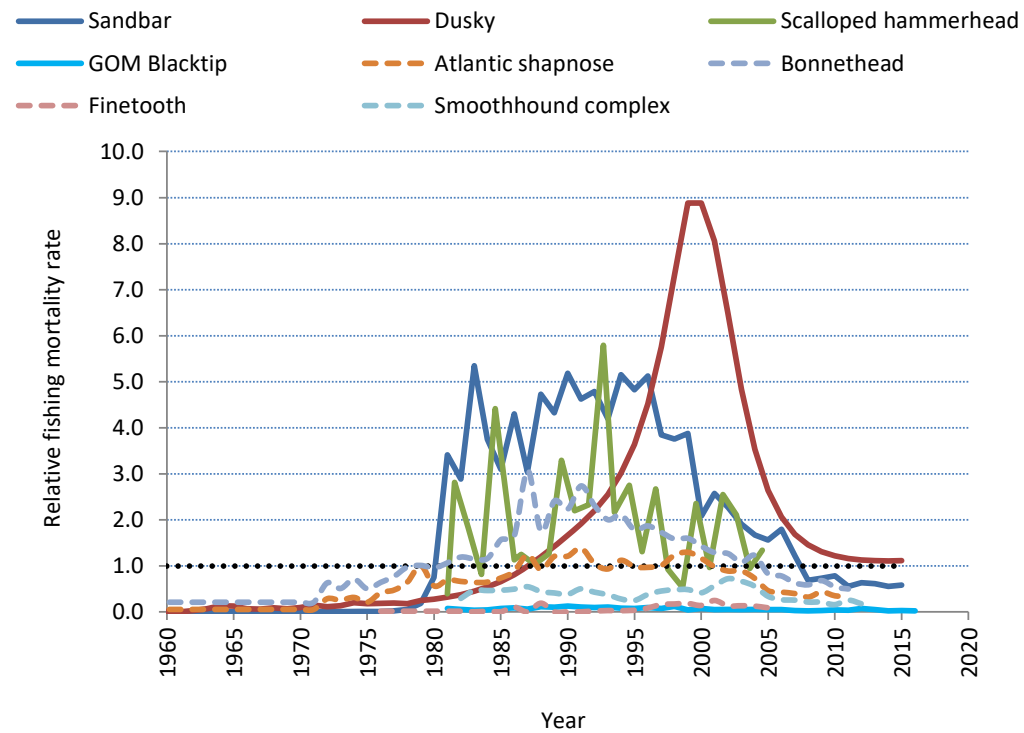
Relative fishing mortality rate of small coastal shark stocks



Relative biomass (abundance) of all coastal shark stocks

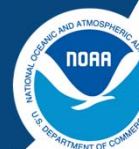


Relative fishing mortality rate of all coastal shark stocks



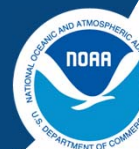
Summary of status and trends

- All large coastal shark stocks re-assessed have improved in status since the previous assessment (sandbar, dusky, GOM blacktip). Increasing trends in abundance detected in 3 of 4 cases and decreasing or stable F trends in all cases
- All small coastal shark stocks re-assessed have improved in status since the previous assessment (Atlantic sharpnose, bonnethead). Increasing trends in abundance and decreasing F trends detected in all cases



Discussion

- Is there really a discrepancy between the results of stock assessments and on-water observations?
 - Almost all trends obtained from stock assessments lend support to the on-water observations of increasing shark populations, especially if considering abundance in numbers
 - Stock assessments use multiple sources of information. In addition to CPUEs, they also use Catch, Biology, and Length Compositions
 - CPUEs (indices of abundance) are supposed to reflect changes in (be proportional to) the relative abundance of the population
 - On-water observations may reflect effort concentrated on areas of higher abundance (hyperstability) whereas stock assessments theoretically reflect the abundance of the entire population



References

SEDAR webpage where all domestic shark assessments are available:

<http://sedarweb.org/>