

Species Status Assessment

Common Name: Smooth skate

Date Updated: 1/12/2024

Scientific Name: *Malacoraja senta*

Updated by: Siobhan Keeling

Class: Chondrichthyes

Family: Rajiformes

Species Synopsis (*a short paragraph which describes species taxonomy, distribution, recent trends, and habitat in New York*):

The smooth skate is one of the smallest species of skate endemic to the north-western Atlantic, occurring off the banks of Newfoundland and the southern Gulf of St. Lawrence, Canada, southward to New Jersey. There are four (possibly five) distinct concentrations of smooth skate off Canada, separated by wide areas where individuals never occur (Kulka et al. 2006). Individuals have been caught off the south shore of Long Island in Northeast Fishery Science Center (NEFSC) trawl surveys, but generally very few individuals are caught in inshore areas of Southern New England and the Mid-Atlantic Bight (44th SAW 2007). Smooth skate are not targeted in any commercial fishing operations, but are taken in mixed fisheries or as by-catch by trawls, long-lines, crab pots and scallop dredges (Kyne et al. 2012). The Northeast Skate Complex Fishery Management Plan (FMP) prohibits the possession of smooth skate and establishes biomass targets and essential fish habitat for this species. Like other elasmobranchs, this species exhibits characteristics that make them vulnerable to exploitation such as late maturity and a long life span.

I. Status

a. Current legal protected Status

i. **Federal:** Not Listed **Candidate:** No

ii. **New York:** Not Listed

b. Natural Heritage Program

i. **Global:** GNR, Unranked

ii. **New York:** SNR, Unranked **Tracked by NYNHP?:** No

Other Ranks:

-New York 2025 SGCN status: Species of Greatest Conservation Need

-IUCN Red List: Vulnerable

-Northeast Regional SGCN: RSGCN

-COSEWIC: Funk Island- endangered, Laurentian-Scotian- special concern, Hopedale Channel- data deficient, Nose of the Grand Bank- data deficient

Status Discussion:

The majority of the smooth skate population occurs in Canada, where survey data show population declines of 73-91%, warranting the endangered status. The U.S. portion of the population declined in the 1970s but has been stable at lower levels since. The U.S. population is negatively affected by fisheries and biomass indices were below biomass thresholds until recently, resulting in a status of Near Threatened (44th SAW 2007, Sulikowski et al. 2009b). The globally endangered status is

justified as the majority of the total population (~75%) is found within Canadian waters (Kyne et al. 2012). The smooth skate has been flagged for priority reassessment by the IUCN and is currently undergoing revision (Kyne et al. 2012). The 3-year average survey biomass of 0.23 kg/tow for 2009-2011 was 77% above the overfished threshold and 85% above the maximum sustainable yield target, indicating the stock could be rebuilt before the 2020 deadline if the current biomass trends continue (NEFMC 2012).

II. Abundance and Distribution Trends

Region	Present?	Abundance	Distribution	Time Frame	Listing status	SGCN?
North America	Yes	Declining	Unknown	1980-present		-
Northeastern US	Yes	Stable	Stable	1980-present (Mid-Atlantic Bight)		-
New York	Yes	Declining	Unknown	1980-present		-
Connecticut	Yes	Declining	Unknown	1980-present	Not Listed	No
Massachusetts	Yes	Declining	Unknown	1980-present	Not Listed	No
New Jersey	Yes	Declining	Unknown	1980-present	Not Listed	No
Pennsylvania	No	-	-			-
Vermont	No	-	-			-
Ontario	No	-	-			-
Quebec	Yes	Declining	Unknown		E, SC, & DD	-

Column options

Present?: Yes; No; Unknown; No data; (blank) or Choose an Item

Abundance and Distribution: Declining; Increasing; Stable; Unknown; Extirpated; N/A; (blank) or Choose an item

SGCN?: Yes; No; Unknown; (blank) or Choose an item

Monitoring in New York (*specify any monitoring activities or regular surveys that are conducted in New York*):

There are currently no monitoring activities in New York.

Trends Discussion (*insert map of North American/regional distribution and status*):

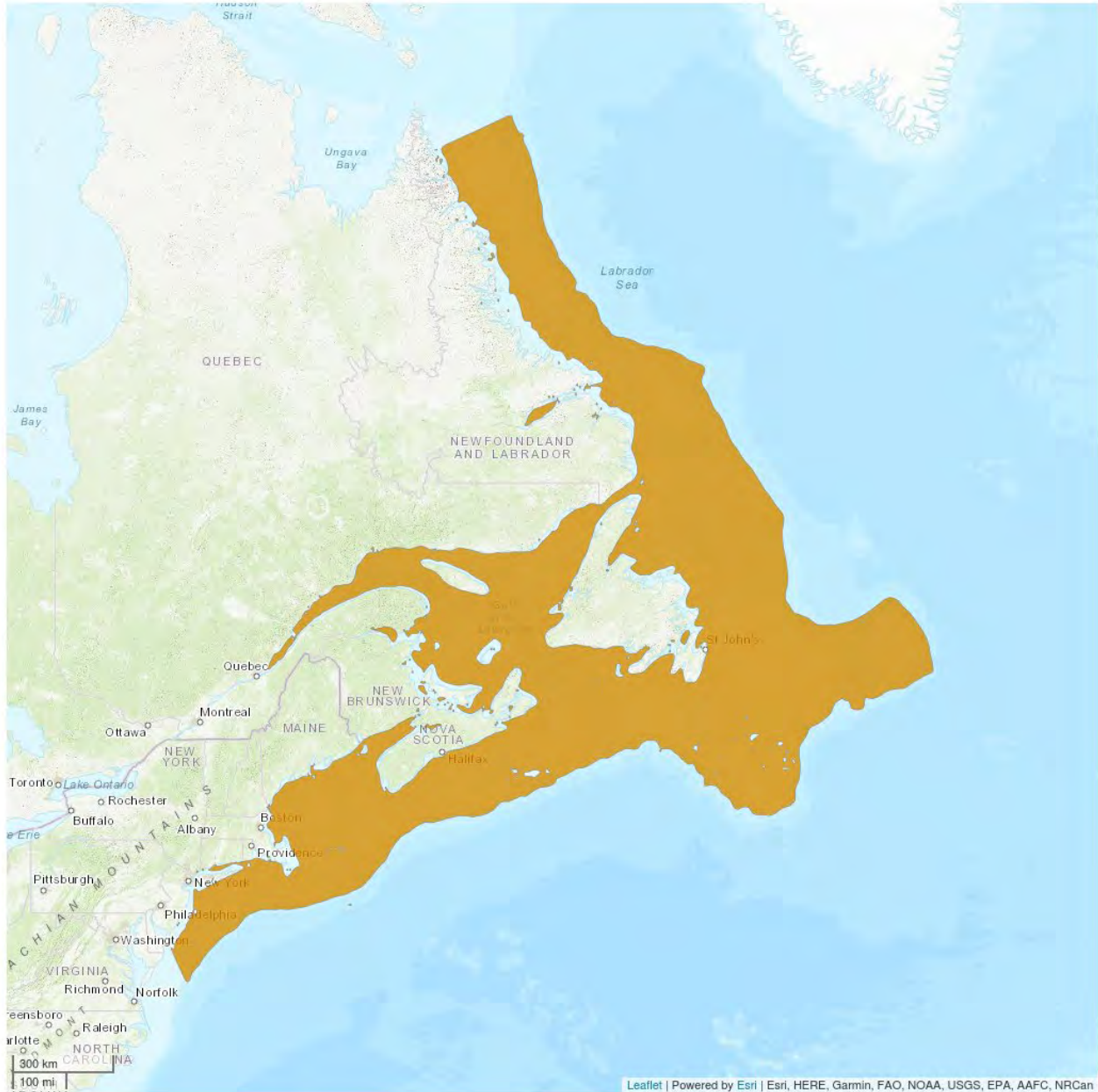
The current population trend is increasing according to the IUCN red list (Kulka et al. 2020).

Northeast Fishery Science Center autumn survey biomass indices of smooth skate were highest during the 1960s and late 1970s, but have been stable at lower levels since the mid-1980s. The 2003-2005 biomass index was slightly above the threshold, but quickly declined. The 2007 biomass index of 0.14 kg/tow fell below the biomass threshold reference point (0.16 kg/tow) and

the National Marine Fisheries Service considered the smooth skate to be overfished (44th SAW 2007). Since 2000, the total annual catch of smooth skate in the NEFSC spring surveys ranged from 30 fish in 2000 to 71 fish in 2006, while the total annual catch in the autumn surveys ranged from 55 fish in 2000 to 44 fish in 2006 (SAFE Report 2008). The 3-year moving average survey biomass for 2009-2011 is 0.23 kg/tow, 77% above the overfished threshold (0.13 kg/tow) and 85% of the maximum sustainable yield target (0.27 kg/tow) (NEFMC 2012). If the current biomass trends continue, the stock could be rebuilt before the deadline of 2020 (NEFMC 2012).

Distribution Map

Malacoraja senta



Legend

EXTANT (RESIDENT)

Compiled by:

IUCN SSC Shark Specialist Group 2020

Figure 1. IUCN Red List Smooth Skate Distribution Map (Kulka et al. 2020)

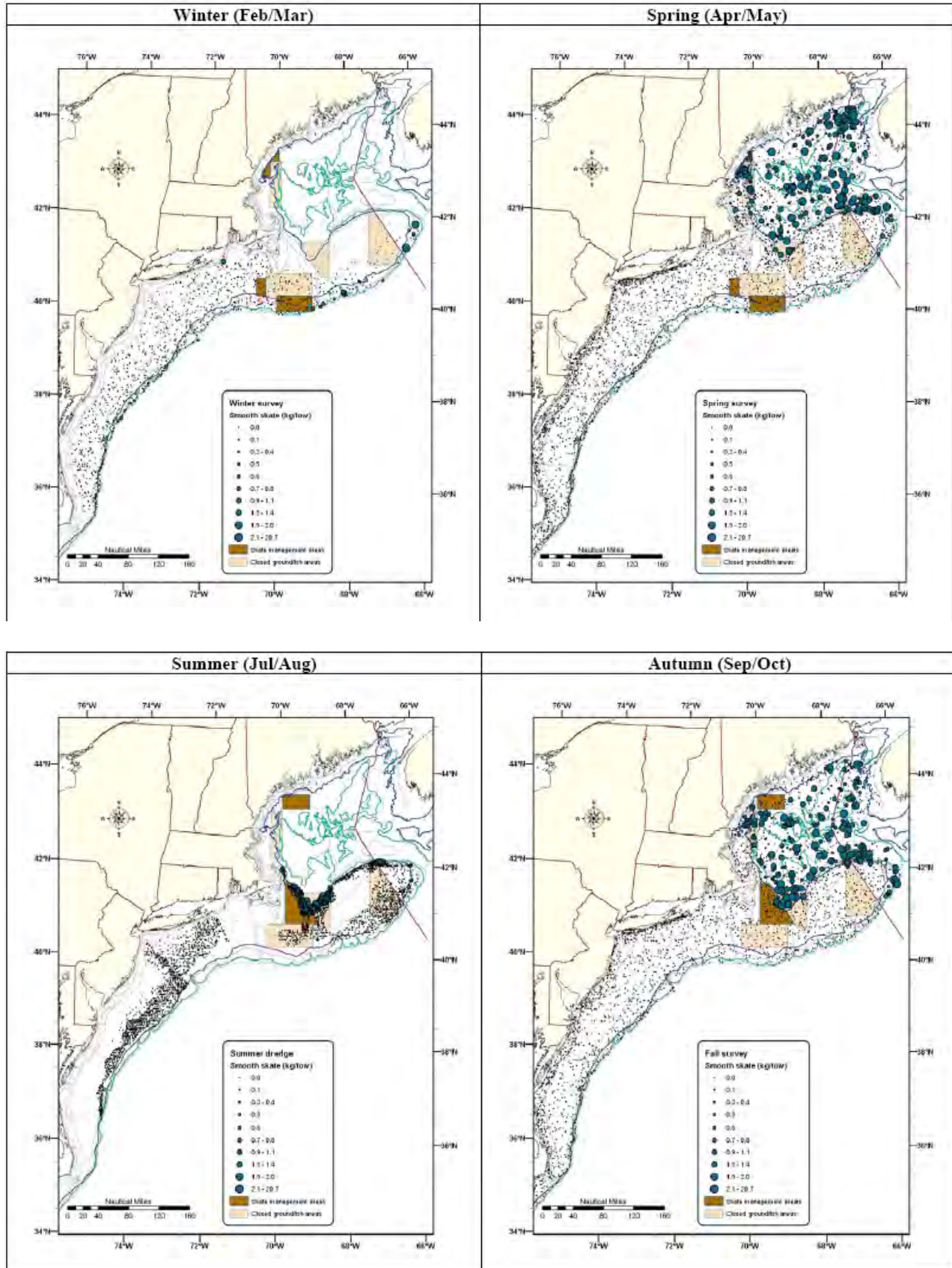


Figure 2. Smooth skate biomass distribution in the winter trawl (2000-2007), spring trawl (2000-2008), summer dredge (2000-2007), and autumn trawl (2000-2007) surveys (NEFMC 2009).

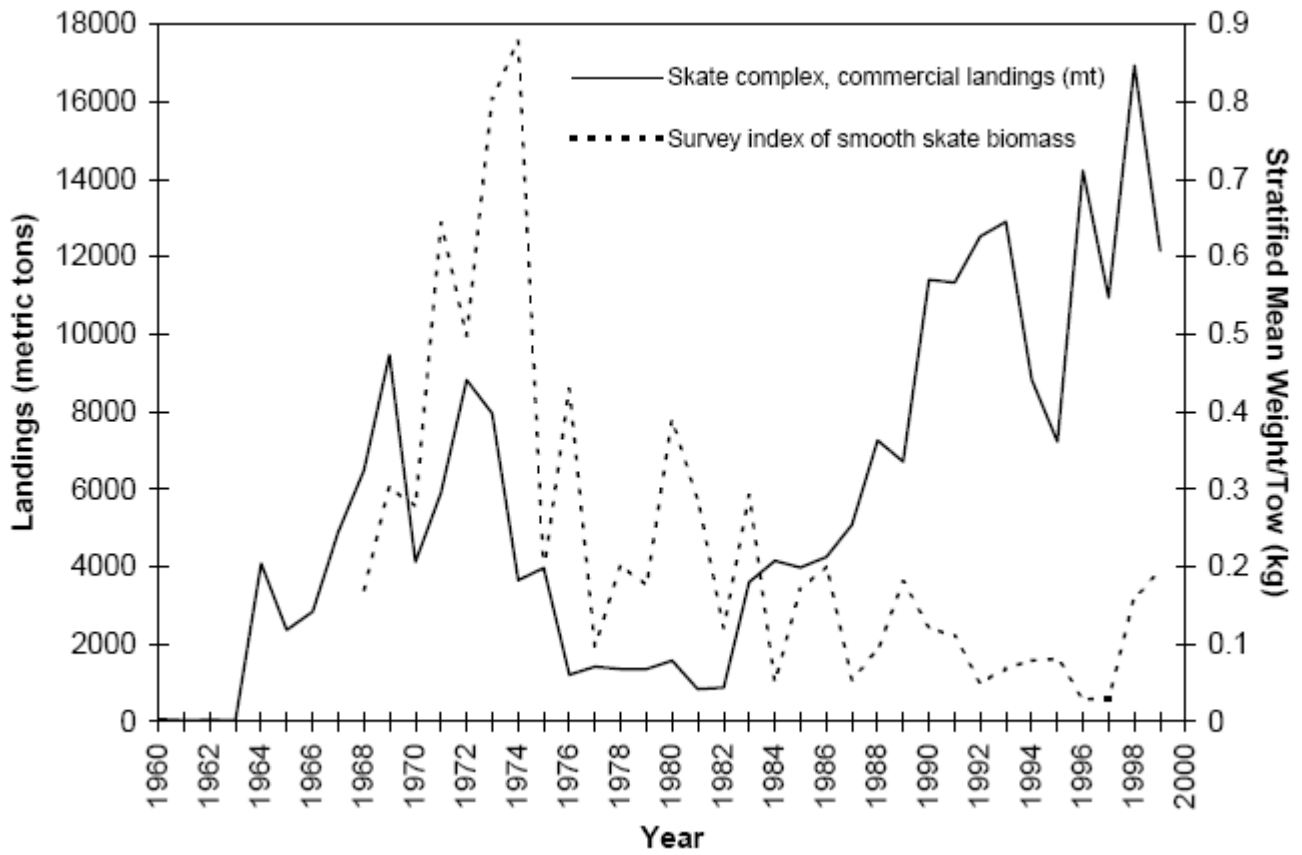


Figure 3. NEFSC spring survey index of smooth skate biomass and commercial landings for the skate complex from the Gulf of Maine to the Mid-Atlantic Bight (Packer et al. 2003).

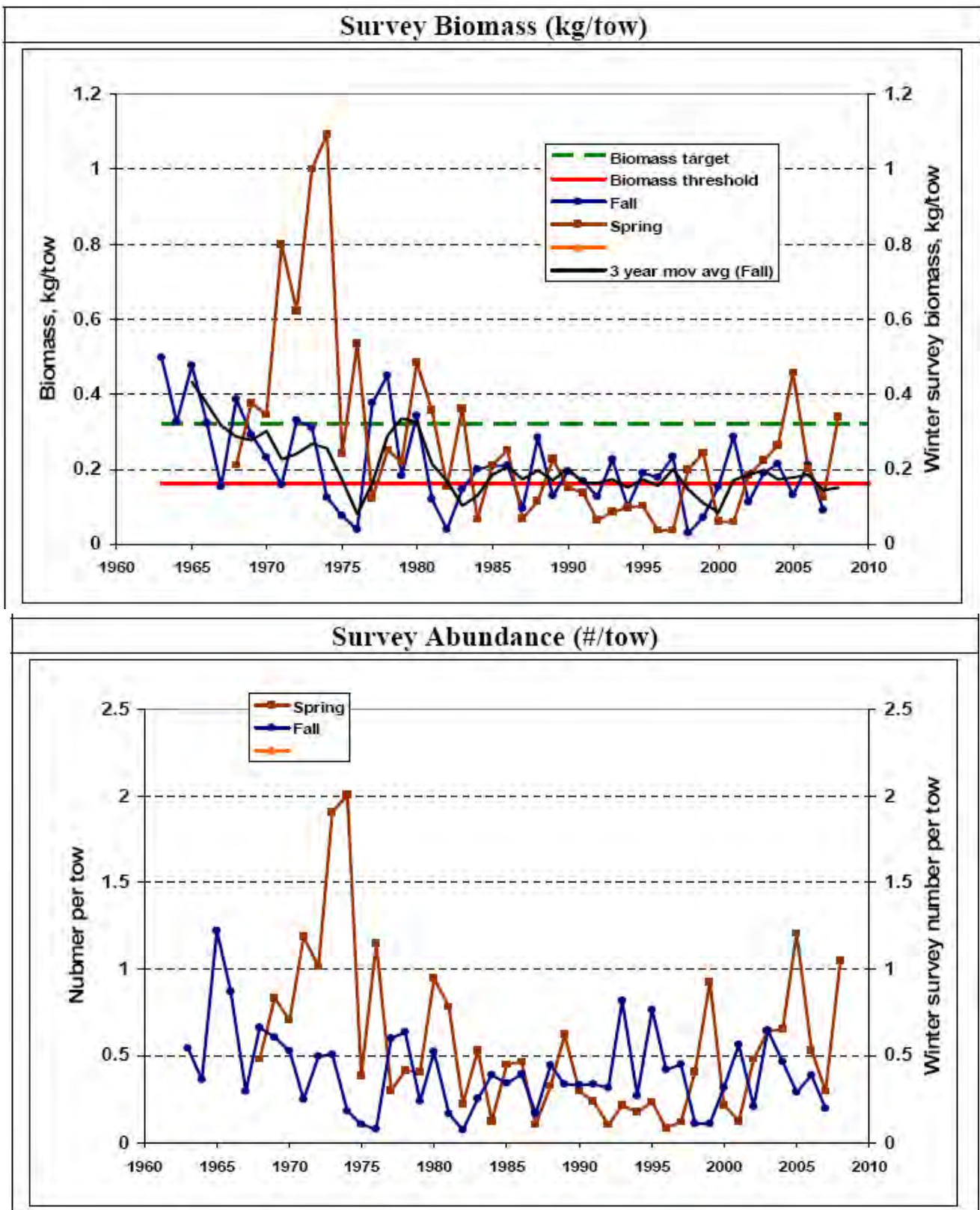


Figure 4. Smooth skate stratified mean weight and number per tow for the winter, spring and fall NEFSC trawl surveys from Cape Hatteras, NC to the Gulf of Maine (NEFMC 2009).

III. New York Rarity (provide map, numbers, and percent of state occupied)

Smooth skate are a boreal species whose center of distribution is in the Gulf of Maine, therefore occurrences in New York are uncommon.

Details of historic and current occurrence:

Historic:

McEachran and Musick (1975) found no individuals in the Mid-Atlantic Bight during their groundfish surveys from 1969-1970, but NEFSC trawl surveys have caught individuals off the south shore of Long Island since the 1960s (NEFMC 2009, Packer et al. 2003).

Current:

NEFSC bottom trawl surveys have caught individuals off the southern shore of Long Island as recently as 2008 (NEFMC 2009).

New York’s Contribution to Species North American Range:

Percent of North American Range in NY	Classification of NY Range	Distance to core population, if not in NY
1-25%	Peripheral	

Column options

Percent of North American Range in NY: 100% (endemic); 76-99%; 51-75%; 26-50%; 1-25%; 0%; Choose an item

Classification of NY Range: Core; Peripheral; Disjunct; (blank) or Choose an item

IV. Primary Habitat or Community Type (from NY crosswalk of NE Aquatic, Marine, or Terrestrial Habitat Classification Systems):

- a. Marine, Deep Subtidal
- b. Estuarine, Brackish Deep Subtidal
- c. Marine, Deep Subtidal, Benthic Geomorphology, Benthic Flat

Habitat or Community Type Trend in New York

Habitat Specialist?	Indicator Species?	Habitat/Community Trend	Time frame of Decline/Increase
No	No	Stable	

Column options

Habitat Specialist and Indicator Species: Yes; No; Unknown; (blank) or Choose an item

Habitat/Community Trend: Declining; Stable; Increasing; Unknown; (blank) or Choose an item

Habitat Discussion:

The smooth skate occurs in deep brackish and marine waters from 25 to 1,436 meters but is most abundant between 70-480 meters (McEachran and Musick 1975, Kyne et al. 2012, Kulka et al. 2020). It appears to be temperature specific, occupying a narrow range of water temperature throughout its range (3-10°C) (Kyne et al. 2012). Smooth skate are a demersal species found on continental shelves and slopes (Kulka et al. 2020). It prefers substrates of soft mud and clay bottoms of deeper troughs and basins, and sand and shells of the offshore banks (Sulikowski et al. 2009b). Smooth skate are very selective in their diet, eating mostly small crustaceans through most of its life and only taking fish at largest sizes (Sulikowski et al. 2009b). Co-occurrence and

possibly competition with the thorny skate may have led to food specialization in smooth skate and possibly caused the low abundance and low diversity of prey species in the diet of this species (Packer et al. 2003). Smooth skate do not undergo large-scale migrations but they do move seasonally in response to temperature, moving offshore in summer and autumn and returning inshore in winter and spring.

V. Species Demographics and Life History

Breeder in NY?	Non-breeder in NY?	Migratory Only?	Summer Resident?	Winter Resident?	Anadromous/Catadromous?
Unknown	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Column options

First 5 fields: Yes; No; Unknown; (blank) or Choose an item

Anadromous/Catadromous: Anadromous; Catadromous; (blank) or Choose an item

Species Demographics and Life History Discussion *(include information about species life span, reproductive longevity, reproductive capacity, age to maturity, and ability to disperse and colonize):*

Smooth skates are oviparous, and offspring are 8 to 10cm total length (TL) when hatched. This species reaches a maximum size of 71cm (TL). Males reach maturity at 41 to 54cm (TL), and females reach maturity at 47 to 57 cm (TL) when they are about 9.5 years (Kulka et al 2020). Not much is known about the life history of smooth skate. A single fertilized egg is deposited in a capsule and incubation time may be anywhere from 6 months to 2 years (NEFMC 2009). The smooth skate, like many other north Atlantic skates, is reproductively active year round. Age at 50% maturity is estimated to be between 9 and 10 years for males and between 8 and 9 years for females (Sulikowski et al. 2009a). Maximum age is 14 years and generation length is about 16 years (Kulka et al. 2020). The greatest source of mortality is from overfishing and by-catch mortality, although individuals may be prey for grey seals in some portions of their range.

VI.Threats (from NY 2015 SWAP or newly described)

Threat Level 1	Threat Level 2	Threat Level 3	Spatial Extent	Severity	Immediacy	Trend	Certainty
5. Biological Resource Use	5.4 Fishing & Harvesting Aquatic Resources	5.4.2 Commercial fishing (bycatch)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.3 Gradual temperature change (warming ocean temperatures)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.
11. Climate Change	11.3 Changes in Temperature Regimes	11.3.4 Increase in temperature fluctuations (temperature extremes)	Choose an item.	Choose an item.	Choose an item.	Choose an item.	Choose an item.

Table 1. Threats to smooth skate.

The primary threat to smooth skate is incidental catches in a variety of fisheries throughout its range. Although there are no direct fisheries for this species, they are often taken as by-catch in fisheries targeting other species then discarded. Coupled with their low reproductive rate and low intrinsic rate of increase, smooth skate have low resilience to fishing mortality (Sulikowski 2009b). Although there are possessions on smooth skate landing and the population is considered to be stable, albeit at low levels, this species has the potential to become overfished again (Sulikowski 2009b). Direct potential effects of climate change on skates have not been studied, but temperature fluctuations and habitat shifting may negative affect the smooth skate since they occupy a relatively narrow temperature range.

Are there regulatory mechanisms that protect the species or its habitat in New York?

Yes: X No: Unknown:

If yes, describe mechanism and whether adequate to protect species/habitat:

The smooth skate is managed under the New England Fishery Management Council’s Skate Complex Fishery Management Plan (FMP), implemented in 2003. The FMP includes mandatory reporting by species, possession prohibition on the smooth skate, and other various measures to aid in the recovery of overfished species, however, landings have yet to be recorded by species and over 99% are reported as ‘unclassified skates’ (Kyne et al. 2012). Smooth skate were petitioned for listing under the Endangered Species Act in 2011, but NOAA Fisheries determined that status review was not warranted at that time. The rebuilding target for this species is 2020, and it appears that the stock may be rebuilt before the deadline if the current biomass trend continues (NEFMC 2012).

Describe knowledge of management/conservation actions that are needed for recovery/conservation, or to eliminate, minimize, or compensate for the identified threats:

Fishery-independent data for skates where individual species are reported is important to understand populations and abundance of smooth skate as well as their distribution in New York. Monitoring and collection of biological data for the smooth skate would provide an updated biological assessment to better understand life history characteristics and determine if they are breeders in New York waters. Implementing rules and regulations as necessary and appropriate consistent with the rules and regulations implemented by the NMFS will support the recovery of this species throughout its range.

Action Category	Action	Description
A.2 Direct Species Management	A.2.0.0.0 Direct species management	-Harvest management
A.2 Direct Species Management	A.2.0.0.0 Direct species management	Species recovery

Table 2. Recommended conservation actions for smooth skate (Kulka et al. 2020).

VII. References

- 44th Northeast Regional Stock Assessment Workshop (44th Saw). 2007. 44th SAW assessment summary report. US Department of Commerce, Northeast Fishery Science Center Reference Document 07-03. 58p.
- Kulka, D., D. Swain, M.R. Simpson, C.R. Miri, J. Simon, J. Gauthier, R. McPhie and J. Sulikowski. 2006. Proceedings of the review of DFO science information for smooth skate (*Malacoraja senta*) relevant to status assessment by COSEWIC. CSAS Proceedings Series 2006/030. 66p.
- Kyne, P.M., J.K. Carlson, D.A. Ebert, S.V. Fordham, J.J. Bizzarro, R.T. Graham, D.W. Kulka, E.E. Tewes, L.R. Harrison, and N.K. Dulvy. 2012. The conservation status of North American, Central American, and Caribbean chondrichthyans. IUCN Species Survival Commission Shark Specialist Group, Vancouver, Canada.
- Kulka, D.W., Anderson, B., Cotton, C.F., Derrick, D., Pacoureau, N. & Dulvy, N.K. 2020. *Malacoraja senta*. The IUCN Red List of Threatened Species 2020: e.T161477A124492029. <https://dx.doi.org/10.2305/IUCN.UK.2020-3.RLTS.T161477A124492029.en>. Accessed on 08 January 2024.
- McEachran, J.D., D.F. Boesch, and J.A. Musick. 1976. Food division within two sympatric species-pairs of skates (Pisces: Rajidae). *Marine Biology* 35: 301-317.
- McEachran, J.D. and J.A. Musick. 1975. Distribution and relative abundance of seven species of skate (Pisces: Rajidae) which occur between Nova Scotia and Cape Hatteras. *Fishery Bulletin* 73(1): 110-136.
- NatureServe Explorer. 2023. Nature Serve Explorer. Page last published 5 January 2024. https://explorer.natureserve.org/Taxon/ELEMENT_GLOBAL.2.100546/Malacoraja_senta Accessed 12 January 2024
- New England Fishery Management Council (NEFMC). 2009. Final amendment 3 to the fishery management plan (FMP) for the northeast skate complex and final environmental impact statement (FEIS) with an initial regulatory flexibility act analysis. NMFS, NEFMC. Newburyport, MA. 459p.
- New England Fishery Management Council (NEFMC). 2012. Annual monitoring report: northeast skate complex fishery management plan. NMFS, NEFMC. Newburyport, MA. 6p.
- New York State Department of Environmental Conservation. 2015. New York State Species of Greatest Conservation Need. https://extapps.dec.ny.gov/docs/wildlife_pdf/sgnc2015list.pdf
- Northeast Fish and Wildlife Diversity. 2023. Regional Species of Greatest Conservation Need (RSGCN). <https://northeastwildlifediversity.org/rsgcn> Accessed 5 January 2024.
- Packer, D.B., C.A. Zetlin, and J.J. Vitaliano. 2003. Essential fish habitat source document: Smooth skate, *Malacoraja senta*, life history and habitat characteristics. NOAA Technical Memo NMFS NE 177. 26p.

Sulikowski, J.D., A.M. Cicia, J.R. Kneebone, L.J. Natanson, and P.C.W. Tsang. 2009a. Age and size at sexual maturity of the smooth skate *Malacoraja senta* from the western Gulf of Maine. *Journal of Fish Biology* 75: 2832-2838.

Sulikowski, J., D. Kulka, T. Gedamke, and A. Barker. 2009b. *Malacoraja senta*. In: IUCN 2012. IUCN Red List of Threatened Species. Version 2012.2.