subject merchandise; and (3) no compelling reasons for denial exist, we are postponing the final determination and extending the provisional measures from a four-month period to a period not greater than six months. Accordingly, we will make our final determination no later than 135 days after the date of publication of this preliminary determination.

International Trade Commission Notification

In accordance with section 733(f) of the Act, we are notifying the International Trade Commission (ITC) of our preliminary determination. If our final determination is affirmative, the ITC will determine before the later of 120 days after the date of this preliminary determination or 45 days after our final determination whether these imports are materially injuring, or threaten material injury to, the U.S. industry.

This determination is issued and published in accordance with sections 733(f) and 777(i)(1) of the Act and 19 CFR 351.205(c).

Dated: February 16, 2017.

Ronald K. Lorentzen,

Acting Assistant Secretary for Enforcement and Compliance.

Appendix I

Scope of the Investigation

For purposes of this investigation, the product covered is cold-polymerized emulsion styrene-butadiene rubber (ESB rubber). The scope of the investigation includes, but is not limited to, ESB rubber in primary forms, bales, granules, crumbs, pellets, powders, plates, sheets, strip, *etc.* ESB rubber consists of non-pigmented rubbers and oil-extended non-pigmented rubbers, both of which contain at least one percent of organic acids from the emulsion polymerization process.

ESB rubber is produced and sold in accordance with a generally accepted set of product specifications issued by the International Institute of Synthetic Rubber Producers (IISRP). The scope of the investigation covers grades of ESB rubber included in the IISRP 1500 and 1700 series of synthetic rubbers. The 1500 grades are light in color and are often described as ''Clear'' or ''White Rubber.'' The 1700 grades are oil-extended and thus darker in color, and are often called ''Brown Rubber.''

Specifically excluded from the scope of this investigation are products which are manufactured by blending ESB rubber with other polymers, high styrene resin master batch, carbon black master batch (*i.e.,* IISRP 1600 series and 1800 series) and latex (an intermediate product).

The products subject to this investigation are currently classifiable under subheadings 4002.19.0015 and 4002.19.0019 of the Harmonized Tariff Schedule of the United States (HTSUS). ESB rubber is described by Chemical Abstract Services (''CAS'') Registry No. 9003–55–8. This CAS number also refers to other types of styrene butadiene rubber. Although the HTSUS subheadings and CAS registry number are provided for convenience and customs purposes, the written description of the scope of this investigation is dispositive.

Appendix II

List of Topics Discussed in the Preliminary Decision Memorandum

I. Summary
II. Background
III. Period of Investigation
IV. Scope Comments
V. Discussion of the Methodology
  A. Determination of the Comparison Method
  B. Results of the Differential Pricing Analysis
VI. Date of Sale
VII. Product Comparisons
VIII. Constructed Export Price
IX. Normal Value
  A. Home Market Viability
  B. Level of Trade
  C. Cost of Production (COP) Analysis
  1. Calculation of COP
  2. Test of Comparison Market Sales Prices
  3. Results of the COP Test
  D. Calculation of NV Based on Comparison-Market Prices
X. Preliminary Negative Determination of Critical Circumstances
  A. Legal Framework
  B. Critical Circumstances Analysis
  C. Analysis
XI. Currency Conversion
XII. Conclusion

[FR Doc. 2017–03631 Filed 2–23–17; 8:45 am]
BILLING CODE 3510–DS–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

[Docket No. 150901797–7177–02]

RIN 0648–XE163

Endangered and Threatened Wildlife and Plants; Notice of 12-Month Finding on a Petition To List Thorny Skate as Threatened or Endangered Under the Endangered Species Act (ESA)

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; 12-month finding and availability of status review document.

SUMMARY: We, NMFS, have completed a comprehensive status review under the Endangered Species Act (ESA) for thorny skate (*Amblyraja radiata*) in response to a petition to list this species. Based on the best scientific and commercial information available, including the status review report, and taking into account ongoing efforts to protect this species, we have determined that the listing of a Northwest Atlantic (NWA) distinct population segment (DPS) or a U.S. DPS is not warranted at this time. While the petition only sought the listing of one of two alternative DPSs, we exercised our discretion to consider whether the listing of the species at the taxonomic level is warranted. We conclude that thorny skate is not currently in danger of extinction throughout all or a significant portion of its range or likely to become so in the foreseeable future.

DATES: This finding was made on February 24, 2017.

ADDRESSES: The status review document for thorny skate is available electronically at: *www.nmfs.noaa.gov/pr/species/notwarranted.htm.* You may also obtain a copy by submitting a request to the Protected Resources Division, NMFS GARFO, 55 Great Republic Drive, Gloucester, MA 01930, Attention: Thorny Skate 12-month Finding.

FOR FURTHER INFORMATION CONTACT: Kim Damon-Randall, NMFS Greater Atlantic Regional Fisheries Office, 978–282–8485; or Marta Nammack, NMFS Office of Protected Resources, 301–427–8469.

SUPPLEMENTARY INFORMATION:

Background

We received a petition, dated May 28, 2015, from Animal Welfare Institute (AWI) and Defenders of Wildlife (DW) requesting that we list a ''Northwest Atlantic DPS'' of thorny skate as threatened or endangered under the ESA, or, as an alternative, a ''U.S. DPS'' as threatened or endangered. The petition also requests we designate critical habitat for thorny skate. In response to this petition, we published a ''positive'' 90-finding on October 26, 2015 (80 FR 65175), in which we concluded that the petition presented substantial scientific and commercial information indicating that listing under the ESA may be warranted, and a review of the status of the species was initiated.

We then performed a detailed review and determined that the best available scientific and commercial information does not support a listing. The resulting status review report included an in-depth review of the available scientific literature, an analysis of the five ESA section 4(a)(1) factors (16 U.S.C. 1533(a)(1)(A)–(E)), and an assessment of extinction risk. The status review report was independently peer reviewed by external experts. This listing determination is based on the status review report, along with other published and unpublished information.

Listing Species Under the ESA

We are responsible for determining whether the thorny skate is threatened or endangered under the ESA (16 U.S.C. 1531 *et seq.*). To make this determination, we first consider whether a group of organisms constitutes a ''species'' under section 3 of the ESA, then whether the status of the species qualifies it for listing as either threatened or endangered. Section 3 of the ESA defines species to include ''any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.'' On February 7, 1996, NMFS and the U.S. Fish and Wildlife Service (USFWS; together, the Services) adopted a policy describing what constitutes a DPS of a taxonomic species (61 FR 4722). Under the joint DPS policy, we consider the following when identifying a DPS: (1) The discreteness of the population segment in relation to the remainder of the species or subspecies to which it belongs; and (2) the significance of the population segment to the species or subspecies to which it belongs.

Section 3 of the ESA further defines an endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range'' and a threatened species as one ''which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' Thus, we interpret an ''endangered species'' to be one that is presently in danger of extinction. A ''threatened species,'' on the other hand, is not presently in danger of extinction, but is likely to become so in the foreseeable future (that is, at a later time). In other words, the primary statutory difference between a threatened and endangered species is the timing of when a species may be in danger of extinction, either presently (endangered) or in the foreseeable future (threatened). Section 4(a)(1) of the ESA also requires us to determine whether any species is endangered or threatened as a result of any of the following five factors: The present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; disease or predation; the inadequacy of existing regulatory mechanisms; or other natural or manmade factors affecting its continued existence. (16 U.S.C. 1533(a)(1)(A)–(E)). Section 4(b)(1)(A) of the ESA requires us to make listing determinations based solely on the best scientific and commercial data available after conducting a review of the status of the species and after taking into account efforts being made by any state or foreign nation or political subdivision thereof to protect the species. In evaluating the efficacy of existing domestic protective efforts, we rely on the Services' joint *Policy on Evaluation of Conservation Efforts When Making Listing Decisions* (''PECE''; 68 FR 15100; March 28, 2003) for any conservation efforts that have not been implemented or have been implemented but not yet demonstrated effectiveness.

Status Review

The status review report for thorny skate is composed of two components: (1) A scientific literature review and analysis of the five ESA section 4(a)(1) factors and (2) an assessment of the extinction risk. A biologist in NMFS' Greater Atlantic Region, working in cooperation with NMFS Northeast Fisheries Science Center (NEFSC), completed the first component, undertaking a scientific review of the life history and ecology, distribution and abundance, and an analysis of the ESA section 4(a)(1) factors. The Extinction Risk Assessment (ERA) was compiled by a biologist in NMFS' Greater Atlantic Region. The ERA was informed by invited workshop participants who based their individual expert opinions on the information contained in the scientific literature review. The workshop participants were comprised of a fisheries management specialist from NMFS' Highly Migratory Species Management Division, two research fishery biologists from NMFS' Northeast Fisheries Science Center, an elasmobranch expert from Sharks International, a fisheries manager from the New England Fishery Management Council, and a research director from the New England Aquarium. The workshop participants had expertise in elasmobranch biology and ecology, population dynamics, fisheries management, climate change and/or stock assessment science. The workshop participants reviewed the information from the scientific literature review. The status review report for thorny skate (NMFS 2017) compiles the best available information on the status of the species as required by the ESA, provides an evaluation of the discreteness and significance of populations in terms of the DPS policy, and assesses the current and future extinction risk, focusing primarily on threats related to the five statutory factors set forth above. We prepared this report to summarize the workshop participants' professional judgments of the extinction risk facing thorny skate. The workshop participants made no recommendations as to the listing status of the species, nor does the status review report. The status review report is available electronically at the Web site listed in **ADDRESSES**.

The status review report underwent independent peer review as required by the Office of Management and Budget Final Information Quality Bulletin for Peer Review (M–05–03; December 16, 2004). The status review report was peer reviewed by three independent specialists selected from government, academic, and scientific communities, with expertise in elasmobranch biology, conservation and management, and specific knowledge of thorny skates. The peer reviewers were asked to evaluate the adequacy, quality, and completeness of the data considered and whether uncertainties in these data were identified and characterized in the status review report, as well as to evaluate the findings made in the ''Assessment of Extinction Risk'' section of the report. They were also asked to specifically identify any information missing or lacking justification, or whether information was applied incorrectly in reaching conclusions. We addressed all peer reviewer comments prior to finalizing the status review report. Comments received are posted online at *www.cio.noaa.gov/services_programs/prplans/ID365.html.*

We subsequently reviewed the status review report, the cited references, and the peer review comments, and we concluded that the status review report, upon which this listing determination is based, provides the best available scientific and commercial information on thorny skate. Much of the information discussed below on thorny skate biology, genetic diversity, distribution, abundance, threats, and extinction risk is attributable to the status review report. However, we have independently applied the statutory provisions of the ESA, including evaluation of the factors set forth in section 4(a)(1)(A)–(E); our regulations regarding listing determinations; and, our DPS and Significant Portion of its Range (SPR) policies in making the listing determination.

Distribution and Habitat Use

The thorny skate belongs to the family Rajidae, genus *Amblyraja,* and species *radiata.* The thorny skate is a widely distributed boreal species, spanning both sides of the Atlantic. In the western North Atlantic, it ranges from western

Greenland to South Carolina. In the eastern North Atlantic, it ranges from the Barents Sea southward to the southwestern coasts of Ireland and England, including Iceland (Bigelow and Schroeder, 1953). Found over a wide variety of substrates including sand, broken shell, gravel, pebbles and soft mud, the thorny skate ranges over depths from 18 to 1400 m (COSEWIC 2012).

Despite its generalist nature, some habitat preferences exist. There is some evidence that the species prefers complex hard bottom habitat instead of sand or mud. Scott (1982) reported that catch rates of thorny skate were highest on coarser grained sediment, and catch rates diminished as grain size decreased on the Scotian Shelf. Also, more skates are caught by longlines in bottom areas that are considered categorized as rough versus those considered smooth (Sosebee *et al.,* in prep).

Generally, thorny skate appear to prefer deeper waters within their range, although the specific depth varies by location and may be impacted by other factors including temperature. Survey data from the inshore waters in the Gulf of Maine stratified by depth indicate catch by trawl survey gear increases sharply in depths greater than 40 meters (m), and peaks at around 95 m. Most individuals are caught between 70 m and the upper depth limit for the survey, 120 m (Sosebee *et al.,* in prep). Generally, within U.S. waters, they range from a depth of 141 to 300 m in spring and 31 to 500 m in fall, with the majority of both spring and fall captures between 141 to 300 m (Packer *et al.,* 2003). Previous studies found thorny skate most abundant between 111 m and 366 m throughout the U.S. range (McEachran and Musick 1975). In Canadian waters from the Labrador Shelf to the Grand Banks, 88 percent of thorny skate are found between 30 and 350 m (COSEWIC 2012). In the Gulf of St. Lawrence, thorny skate have been found to be increasingly concentrated in depths below 100 m since the early 1990s, with the majority of fish greater than 33 centimeters (cm) in length found around 200 m (Swain and Benoit 2006). Fish smaller than 33 cm concentrate in shallower waters around 100 m in the Gulf of St. Lawrence. In Norway, thorny skate show a preference for even deeper waters, being more concentrated between 600 and 650 m (Williams *et al.,* 2008). Within the Barents Sea, average catch is highest between 100 and 200 m but thorny skates are captured all the way to 800 m (Dolgov *et al.,* 2005a). Together, this information demonstrates that thorny skate occur in a wide range of depths throughout their range, but are most likely to occur in deeper waters.

Thorny skate have been caught at temperatures ranging from −1.4 to 14 °Celsius (C) (McEachran and Musick 1975); however, they have a more narrow thermal range than most sympatric species (Hogan *et al.,* 2013). In the U.S. waters of the inshore Gulf of Maine, surveys catch nearly twice as many skates at 2.5 °C as between 4.5 and 9.5 °C, with catch rates dropping off sharply for temperatures warmer than 10 °C (Sosebee *et al.,* in prep). Generally, in U.S. waters during spring, adult thorny skate were found at temperatures between 2 and 13 °C, with the majority between 4 and 7 °C. During the fall, they were found over a temperature range of 3 and 13 °C, with the majority found between 5–8 °C (Packer *et al.,* 2003). Preliminary tagging results are available from a 2016 Gulf of Maine study with data from 23 thorny skate with pop-up satellite archival transmitting (PSAT) tags. The daily (min/max) temperature records from all PSAT-tagged skates indicated that thorny skate occurred in temperatures of 4.5–10.5 °C from November to August and have a broad temperature tolerance (J. Kneebone, pers. comm.). On the Grand Banks, catches of thorny skate are generally highest between 3 and 5 °C, although catch has concentrated on the warmer edge of the Bank since the 1990s (Colbourne and Kulka 2004). A similar concentration on the edge of the banks has been observed in the Gulf of St Lawrence, correlating with temperatures between 2 and 4 °C (Swain and Benoit, 2006). Few thorny skates were caught where temperature was <0 °C. The available information consistently demonstrates that thorny skate are most likely to occur in areas with cooler water temperatures (0 to 14 °C).

Seasonal migrations have been noted on the Scotian Shelf and the Grand Banks, but are not well understood (NEFSC 2003). Within the Gulf of St. Lawrence, skates move into deeper waters in November and December and into shallower waters in April and May, with peak numbers present there in late summer and fall (Clay 1991; Darbyson and Benoit 2003). A change in spring and fall distributions results in higher density and concentration of biomass in deeper waters during the spring, corresponding with areas of warmer temperature in Canadian waters (Kulka and Miri 2003). These may be examples of skates seeking out their preferred temperature range.

Few data are available regarding thorny skates' preferred salinity, although catch is highest between 32 and 35 practical salinity units (PSU) (COSEWIC, 2012). In U.S. waters during the spring, they are primarily caught at salinities of 33–34 PSU and in the fall at salinities of 32–35 parts per thousand (ppt), with more than 60 percent at 33 ppt (Packer *et al.,* 2003). In the Barents Sea, thorny skate are caught at a much larger range of salinities than other species (Dolgov *et al.,* 2004a).

Thorny skates eat a varied diet, with smaller skates consuming copepods, krill, polychaete worms and amphipods, and larger skates eating other fish and larger crustaceans including shrimp and crabs (Skjaeraasen and Bergstad 2000; Dolgov 2002). Thorny skate are opportunistic feeders; important fish prey species can include cod, capelin, and redfish (Pedersen 1995; Dolgov 2002). Within the Gulf of Maine, fish make up the majority of the thorny skate diet (Link and Sosebee 2011).

Overall, thorny skate are considered a habitat generalist, found over a wide variety of substrates, depths and temperatures. Thorny skate vary widely in depth preferences over the range of the species (Dolgov *et al.,* 2005a; COSEWIC 2012; Sosebee *et al.,* in prep), likely indicating an ability to seek out ideal temperatures.

Life History

Thorny skate, like other skate, ray and shark species, are relatively slow-growing, late to mature and have low fecundity when compared to bony fishes. An oviparous (egg-laying) species, they reproduce year-round (Kneebone *et al.,* 2007), although more females contain mature egg capsules in the summer (Collette and Klein-MacPhee 2002). In the Gulf of Maine, average egg capsule size is largest in October (Sulikowski *et al.,* 2005a). Mature females are estimated to produce an average of 40.5 eggs per year, with a hatching success of 38 percent (COSEWIC 2012). Others have estimated up to 56 eggs per year, slightly higher than similar species (McPhie and Campana 2009). Incubation time is long and, depending on temperature (low water temperatures slow development), is estimated to take from 2.5–3 years after deposit (Berestovskii 1994).

Lifespan for the species is difficult to estimate, due to the slow growth of the species and limited number of maximum-sized fish available for aging. A limited number of maximum-sized fish may result from fishing and natural mortality or from differential capture rates for different sized skates. Individuals estimated to be up to 16 years of age using vertebral and caudal thorn aging have been observed from the Gulf of Maine (Sulikowski *et al.,* 2005b) and from Greenland (Gallagher *et al.,* 2006), respectively. Long-term tagging indicated these fish may live at least 20 years in Canadian waters (Templeman 1984) and further vertebral aging confirmed with radiocarbon bomb dating methodology indicated a maximum age of at least 28 years for individuals caught off the Scotian Shelf (McPhie and Campana 2009). Theoretical longevity was estimated at up to 39 years, much longer compared to other native skates (McPhie and Campana 2009).

Total length and length at reproductive maturity vary widely over the species' range. Maximum length and length at maturity (L50) decrease with increases in latitude. Maximum lengths range from 90 cm on the Labrador Shelf to 100–110 cm in the Gulf of Maine (COSEWIC 2012). The smallest L50s were reported farthest north, with female L50 reported at 44–47 cm, and male L50 at 44–50 cm reported for skates caught around Baffin Island on the Labrador Shelf (Templeman 1987). In the Gulf of Maine, L50 for females occurred at approximately 11 years and 87.5 cm; for males, L50 was reached at 10.9 years and 85.6 cm (Sulikowski *et al.,* 2005b). A later study on the eastern Scotian Shelf (midway between these populations) noted that female skates could show signs of maturity anywhere from 39.0–74.5 cm and males between 51.0–78.0 cm (McPhie and Campana 2009). The reasons behind variation in total length and length at maturity are unknown but may stem from environmental or genetic factors.

Age at maturity was estimated to be 11 years for females and 10.9 years for males. Size and age at maturity for thorny skate were greater and also demonstrated more variability than for sympatric skate species (Sosebee 2005; McPhie and Campana, 2009). Size and maturity were not found to correlate with depth (Templeman 1987).

Overall, thorny skates were found to have the highest potential reproductive rate and predicted population increase when compared to sympatric skate species (McPhie and Campana 2009); this may indicate a greater ability to recover from fishing for thorny skate than for similar species. Reproductive rate is still considered low overall compared to teleost species.

Population Structure

Tagging data from both sides of the Atlantic show thorny skates remaining in or returning to the same area with 85 percent of individuals traveling less than 120 kilometers (km) from their tagging locations (Templeman 1984; Walker *et al.,* 1997). In both studies, 13 percent of individuals traveled longer distances between 180 and 445 km. Preliminary study results from a 2016 study in the Gulf of Maine recovered data from five thorny skates tagged with PSATs in the vicinity of Cashes Ledge. The tag results indicated movements of 3–26 km at 100 days post-tagging (J. Kneebone, pers.comm). Three thorny skates tagged offshore in the Gulf of Maine near the Hague line exhibited movements of 3.5–6.5 km over 100 days post-tagging. In the western Gulf of Maine (Massachusetts Bay), data from 13 PSAT-tagged skates indicated distance traveled of 2–30 km over 100-day (n=12) and 200-day (n=1) tag deployment periods (J. Kneebone, pers. comm.). Collectively, these preliminary data corroborate previously published data and further demonstrate that thorny skates exhibit limited movements in the Gulf of Maine. However, some thorny skates off the coast of Newfoundland were observed to travel rapidly, with several individuals moving up to 200 km within a few months (Templeman 1984).

Conventional tagging data have several limitations when it comes to accurately monitoring movement for this species, including that all returns are produced from commercial fishing gear. First, these data rely on recaptures and reporting (commercial/recreational fishermen or surveys may report catch of a tagged fish) and the information obtained is generally limited to the location where the fish was recaptured in relation to where it was originally tagged. Second, the information from conventional tagging is limited by the small number of thorny skates tagged and recaptured. Return rates in the western Atlantic were 14 percent (Templeman 1984) and 25 percent in the eastern Atlantic (Walker *et al.,* 1997). The prosecution of fisheries in relatively shallow waters compared to the depth range of the species limits returns and therefore, data, because there are fewer opportunities for recapture. A particularly low rate of return of five percent was observed for skates tagged offshore (Templeman 1984), making it difficult to understand offshore movements. However, based on the available information, thorny skates are capable of occasional long distance movements, and this may be sufficient to promote reproductive mixing across the species' range.

Comparisons with sympatric skate species suggest that the thorny skate has one of the highest levels of haplotype and nucleotide genetic diversity when compared to other western Atlantic skate species, although this can be skewed by some individuals (Coulson *et al.,* 2011). Haplotype and nucleotide diversity are useful metrics for assessing species genetic diversity because they can be influenced by factors such as the size and age of a population and degree of connectivity between populations. High genetic diversity was also detected in studies that examined additional genetic markers (Chevolot *et al.,* 2007, Lynghammar *et al.,* 2014). Overall, barcode gap analysis (an analytical tool wherein the barcoding gap is the difference between interspecific and intraspecific genetic distance within a group of organisms) indicates the genetic distance within the thorny skate species is low compared to the average genetic distance within other species in the skate family (0.93 v. 3.9 percent, Lynghammar *et al.,* 2014). This means that, within the skate species sampled, thorny skates are genetically more similar to each other, suggesting greater gene flow across their range, than all of the other skate species in this study.

Distribution of genetic diversity did not mirror geographic distribution in the thorny skate, with the center of the range having the highest genetic diversity (Lynghammar *et al.,* 2014). Highest diversity in one study occurred between two adjacent sites in the eastern Atlantic, and when these were removed, there was no significant difference in genetic diversity between remaining sites (Chevolot *et al.,* 2007). Thorny skates captured in Iceland had the highest levels of diversity with fourteen different haplotypes present; thorny skates from the eastern and western Atlantic sites had significantly lower levels with three haplotypes each. The distribution of specific genetic haplotypes and the depth range of the species likely indicate gene flow across the range of the species (Chevolot *et al.,* 2007) and indicate that there are not isolated populations, as there is no significant gap in distribution across the species' range (COSEWIC 2012).

Comparisons of haplotype frequencies between the Northwest and Northeast Atlantic alone indicated that there was a statistically significant difference between haplotype frequencies of thorny skates in these two areas; however, when samples from Greenland were included, the differences in haplotype frequencies among thorny skates from these locations were not statistically significant (Lynghammar *et al.,* 2014). Additionally, Greenland represented a higher number of genetic haplotypes than either the Northwest or Northeast Atlantic, confirming previous results and suggesting that genetic mixing is occurring in the center of the species' range (Lynghammar *et al.,* 2014).

Further work comparing individuals of different sizes from two sites in the Gulf of Maine and two sites in Canadian waters found no significant genetic differences (Tsang *et al.,* 2008). Comparison of ''late maturing'' skates collected mostly north of Newfoundland and ''early maturing'' skates collected within Canadian waters south of Newfoundland also showed no significant genetic differences (Lynghammar *et al.,* 2014).

In summary, current information indicates thorny skates in the Northwestern Atlantic comprise a single stock, despite the differences in length and length at maturity. Some genetic differentiation is present between the Northwest Atlantic and Northeast Atlantic, but the center of the range appears to have genetic mixing between these two areas. This is likely made possible by the depth range of the species, which allows for continuous distribution as there are no known barriers to migration.

Abundance and Trends

The best available information regarding population abundance and trends is provided by independent trawl surveys within different regions of the species' range. Trawl surveys underestimate thorny skate abundance, however, because skates are able to escape capture by sliding under the foot rope of trawl gear (Templeman 1984). Capture efficiency varies widely with the configuration of the gear and size of the fish, as well as area (COSEWIC 2012), making it difficult to compare results or pool surveys. In addition, surveys are generally conducted to support fisheries management and are designed for other (commercial) species and thus may not be optimal for estimating skate abundance. In Europe, the areas surveyed do not always overlap with areas of known thorny skate abundance, particularly in deeper waters (Templeman 1984; Walker and Hislop 1998). Across the species' range, available data vary widely in survey gear, timing of surveys, and time series, making comparisons between different areas difficult (COSEWIC 2012).

Trawl surveys are limited in the types of bottom they can survey. For trawls, catch efficiency increases with the smoothness of the bottom. The roughest bottoms may be avoided by survey operators to prevent gear hang-ups. The increase in number and length of skates caught by longline surveys, particularly on rough bottom (Sosebee *et al.,* in prep), confirms that trawl gear underestimates total abundance and biomass of thorny skates (Dolgov *et al.,* 2005b) because rough bottom areas are not as efficiently surveyed with trawl gear.

The utility of trawl survey data to provide information on the thorny skate is thus limited in two ways: By location, missing an unknown portion of the species' preferred habitat; and by catch efficiency, underestimating the number of skates in surveyed areas. Trawl survey data, therefore, are an index and represent a minimum estimate of overall thorny skate abundance. Trends are still evident from these data but should be viewed with the sampling caveats described above, given the lack of information collected beyond the survey areas and the unknown proportion of individuals in un-trawlable habitat (see Davies and Jonsen 2011).

United States Waters

Northeast Fisheries Science Center Surveys

In U.S. waters, the relative abundance of the thorny skate is measured via NEFSC bottom trawl surveys. The NEFSC trawl survey has been conducted in the autumn from the Gulf of Maine to Southern New England since 1963 as a method of measuring abundance of groundfish for fishery management purposes. A spring survey was started in 1968. The autumn surveys provide a longer time series and are used for stock assessment purposes.

Numbers and catch-per-unit-effort (CPUE; abundance or biomass per tow) of thorny skates caught by this survey have declined over time. After reaching a peak during the 1970s with 5.3 kilogram (kg) per tow (2.9 fish per tow) during the spring survey and 5.9 kg per tow (1.8 fish per tow) in the autumn survey, catch has declined to less than five percent of these maximum levels, with the average current CPUE from 2013–2015 being 0.17 kg/tow (Sosebee *et al.,* in prep). Average length decreased from a high of 63 cm in 1971 to a low of 23 cm in 2003, but has been stable from 2014–2015 at 40–50 cm. From 1963 to 2015, minimum swept-area abundance and biomass estimates decreased from a high of 10.9 million individuals and 36,393 metric tons (mt) in the 1966 autumn survey to a low of 518,900 individuals (mean length = 19 cm) and 365 mt in autumn 2012 and 485,000 individuals (mean length = 30 cm) and 499 mt in autumn 2013. Spring survey numbers have followed a similar trend. Despite the decline from 1970s levels, recent data demonstrate increased capture. Survey estimates from 2014–2015 have increased from previous lows, with estimates of 865,000 individuals and 1,264 mt in spring 2015 and 628,000 individuals and 844 mt in autumn 2015.

It is important to note that the low efficiency of the gear in capturing skate for these surveys (as described above) indicates minimum abundance and biomass in the survey area, and true abundance and biomass are higher than numbers reflect. Historical survey efforts also likely underestimated thorny skate abundance and biomass. Edwards (1968) estimates the catch efficiency of thorny skates in the NEFSC trawl survey at 0.1. Using this value, the 2015 autumn survey represents an estimated 8,440 mt and 6 million fish within U.S. waters surveyed by NEFSC (Sosebee *et al.,* in prep).

State Surveys

Additional surveys in shallow water show similar patterns regarding trends of thorny skate biomass and abundance, or fluctuations without trend. The Massachusetts Division of Marine Fisheries (MADMF) surveys inshore state waters in spring and autumn. Catch of thorny skates is variable in this survey (1978 to 2015) but demonstrates an overall decreasing trend in thorny skate biomass and abundance. The spring index had stabilized around the median of 0.07 kg/tow throughout the 2000s, but has since declined, and none were caught in 2013. The autumn index has generally been below the median of 0.14 kg/tow since 1994. Average length of fish in this survey is variable but tends toward smaller fish (Sosebee *et al.,* in prep).

The Maine-New Hampshire Inshore Trawl Survey was established in 2000. This survey is stratified by depth and demonstrates low abundance of thorny skates in the inshore area with little trend over the time series (Sosebee *et al.,* in prep).

The Atlantic States Marine Fisheries Commission shrimp survey samples deeper offshore waters within the Gulf of Maine. A decreasing trend is evident here in both abundance and biomass of skate for the duration of the time series (1985–2015); however, recent survey results show stable biomass estimates from 2009–2015. Although average length has varied considerably over the time series (1985–2015), in general it shows a stable trend (Sosebee *et al.,* in prep).

Overall, NEFSC bottom trawl surveys indicate that thorny skates are most abundant in the Gulf of Maine and Georges Bank offshore strata regions, with very few fish caught in inshore (<27 m depth), Southern New England, or MA regions (NEFSC 2007, Sosebee *et al.,* in prep). More recent surveys (2007–2009) show a broadening of thorny skate distribution into deeper water but also a concentration in the western Gulf of Maine (Sosebee *et al.,* in prep).

Canadian Waters

Where data are available, a decrease in abundance has been observed since the 1970s in Canadian waters; however, recent data indicate an increasing or stable trend in Canadian waters. The thorny skate is widely distributed and is the most common skate species in Canadian waters. The amount of decrease varies widely between different regions, varying from 30 percent on the Southern Labrador Shelf to more than 80 percent on the Scotian Shelf between 1977 and 2010 (COSEWIC 2012). Over the same time period, the average individual weight of commercially targeted demersal fish on the Scotian Shelf declined from 41–51 percent with the larger decline being on the eastern portion of the shelf (Zwanenburg 2000). Most Canadian areas saw a decline in abundance of thorny skates between 50–60 percent during this time period (COSEWIC 2012).

From 1990 to 2011, survey abundance has been mostly stable on the Southern Labrador Shelf and Northern Gulf of St. Lawrence, and has increased 61 percent on the Grand Banks (COSEWIC 2012). More recent information is available for the Grand Banks region, where a fishery persists for skates. Biomass in some Northwest Atlantic Fisheries Organization (NAFO) subdivisions has been increasing, but overall abundance and biomass remains at low levels, averaging 33,500 tons (t) (30,391 mt) from 1993 to 2012 (DFO 2013). Biomass of thorny skates overall on the Grand Banks has been stable since 2006 (Simpson *et al.,* 2016, Nogueira *et al.,* 2015).

Overall declines in abundance have been higher for larger thorny skates (COSEWIC 2012). In Canadian waters around Newfoundland, mortality for the smallest thorny skates has declined since the 1970s, while mortality has increased for older juveniles and adults in the Gulf of St. Lawrence (Swain *et al.,* 2013). Fishing effort in the area has declined over the same period; suggesting natural mortality factors (not attributable to fishing) are responsible for this change in mortality rates. On the Grand Banks, average length has increased since the 1990s (Nogueira *et al.,* 2015). Recruitment rate has also increased in the Southern Gulf of St. Lawrence since the 1970s (Benoit and Swain 2011).

Despite the overall downward trend in abundance of thorny skates within Canadian waters throughout the entire time series, recent (mid to late 1990s to 2012) trends for abundance, biomass, average length, and recruitment rate have been stable and increasing and thorny skates remain numerous. Estimated minimum abundance for Canada in 2010 was more than 188 million individuals, with recent increases in abundance of 61 percent on the Grand Banks (COSEWIC 2012). The true number is likely much higher because of the limitations of sampling gear and sampling locations and depth (as discussed above). Approximately 30–40 percent of the species' range lies within Canadian waters (COSEWIC 2012).

Northeast Atlantic

The thorny skate is widely distributed and is the most common skate species in the Northeast Atlantic. Within the Barents Sea, the population abundance was estimated to average 143 million fish and the biomass 95,000 mt during the period 1998 through 2001 (Dolgov *et al.,* 2005a). In Norway, their numbers fluctuated without trend between 1992 and 2005. They remain the most widely occurring skate species with a mean catch rate in Norwegian waters of 55.2 per km^2 (Williams *et al.,* 2008). While not directly comparable given differences in tow length and capture efficiency of different gears, this is relatively high when compared to capture rates in Canada and the United States. In Iceland and East Greenland, population estimates are not available, but abundance in groundfish surveys has remained stable since 2000. Area occupied has likewise remained stable, averaging 50 percent from 2000–2014 (International Council for the Exploration of the Sea (ICES) 2015).

In the North Sea off the coast of Scotland, thorny skates comprise eighty percent of the total skate biomass (Walker and Heeseen 1996; Piet *et al.,* 2009). Biomass was estimated to be greater than 100,000 t (90,718 mt) during the early 1980s (Sparholt and Vinther 1991). Abundance of thorny skates in the area increased greatly when comparing the 1906–1909 and 1990–1995 time periods, despite the overall decrease in landings of skates and rays in this region over the same time period (Walker and Hislop 1998). Abundance decreased (1977–2015) but is comparable to the abundances observed during the early 1970s (ICES 2015). Recent abundance estimates of thorny skates in the Northeast Atlantic have been stable (ICES 2015).

Area Occupied in the Northwest Atlantic

Some evidence suggests a contraction of the thorny skate's range over time. In Canadian waters, area occupied has remained stable through much of the species' range. Populations off Labrador, north of Newfoundland and on the St. Pierre Bank have all remained stable. Areas south of Newfoundland and St. Pierre Bank have experienced a decline in area occupied. On the Grand Banks, area occupied has decreased approximately 50 percent from a high of almost 60,000 km^2 to approximately 30,000 km^2 in 2010 (COSEWIC 2012). It appears fish in this area have been avoiding colder waters present on the top of the Bank, instead moving towards the warmer edge (Kulka and Miri 2003). In the Southern Gulf of St. Lawrence, the area occupied has decreased from about 55,000 km^2 in the mid-1970s to approximately 20,000 km^2 in 2010. Meanwhile, within the Northern Gulf of St. Lawrence, the area occupied has doubled from 42,300 km^2 from 1991–1993 to 90,400 km^2 from 2008–2010 (COSEWIC 2012). This supports the conclusion that the range of the thorny skate is shifting within the Gulf of St. Lawrence.

On the Scotian Shelf, area occupancy has declined steadily over the time series, by 58 percent since 1970–1972, and 66 percent since 1974–1976 (when it occupied 150,000 km^2). The decline ceased in 2000, and skate in this area now occupy approximately 50,000 km^2. There is a strong correlation in this location between area occupied and abundance (Shackell *et al.,* 2005), indicating that remaining skates are using the most suitable habitat. Thorny skate occupancy has also declined on the Canadian side of Georges Bank by about 40 percent. Overall, area occupied for all areas surveyed off Canada (averages for 2007–2009) is approximately 290,000 km^2, about 90,000 km^2 less than in the 1970s. Most of the decline occurred prior to 1991 with the largest decrease on the Scotian Shelf (COSEWIC 2012).

Within the United States, NEFSC bottom trawl surveys show an approximately 75 percent decrease in number of total tows containing skate from 1965 to 2008. There is an upward trend in the number of positive tows since 2008. There are several distribution indicators of possible contractions or expansions in distribution, such as positive tows, the Gini index (a measure indicating deviation from equal spatial distribution), and design-weighted area of occupancy, which takes into account the area swept by the tows and the proportion of positive tows. Multiple estimates of biomass and abundance versus area also show a moderate increase in concentration of fish (Sosebee *et al.,* in prep).

An example of this is the design-weighted area of occupancy from the spring and fall NEFSC surveys, which incorporate a stratified random survey design (Kulka 2012). This index takes into account the area swept by the tows and the proportion of positive tows (Swain *et al.,* 2012). The calculation is the proportion of positive tows within a stratum multiplied by the area of that stratum and summed over the stock area. For the thorny skate, the design-weighted area of occupancy declined over time, from a high of almost 85,800 km^2 in the mid-1970s to 14,000–17,000 km^2 in 2008. Area occupied has increased recently, but concentrations of thorny skates remain within the Gulf of Maine (Sosebee *et al.,* in prep).

Abundance of the thorny skate has declined since the highs of the 1970s. The areas of greatest decline have been along the southern portion of their range, including U.S. waters and Canadian waters of the Scotian shelf. Abundance has declined by up to 80 or 95 percent in these areas (COSEWIC 2012), although recent surveys show the number of thorny skates in these areas are stable or slightly increasing (Sosebee *et al.,* in prep; COSEWIC 2012). In more northern parts of the range, decline in abundance has been closer to 60 percent on average and recent surveys show the number of thorny skates in these areas is increasing or stable (ICES 2015).

Biomass has also decreased, in part due to decreased abundance but also due to high average adult mortality. Recent biomass estimates indicate stabilization (at low levels) or increasing trends in some regions (COSEWIC 2012; Sosebee *et al.,* in prep). Thorny skates remain numerous throughout the greater portion of their range, numbering in the hundreds of millions (COSEWIC 2012). Due to low catchability, the species may be even more numerous than estimates predict. Area occupied has declined by approximately half since the 1970s; however, some expansion of area occupied has been observed recently and current estimates have demonstrated an upward trend in recent years (COSEWIC 2012; ICES 2015).

Distinct Population Segment Analysis

As described above, the ESA's definition of ''species'' includes ''any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.'' The term ''distinct population segment'' is not recognized in the scientific literature and is not defined in the ESA or its implementing regulations. Therefore, the Services adopted a joint policy for recognizing DPSs under the ESA (DPS Policy; 61 FR 4722) on February 7, 1996. Congress has instructed the Secretaries of Interior and Commerce to exercise this authority with regard to DPSs '' * * * . . . sparingly and only when biological evidence indicates such an action is warranted.'' The DPS Policy requires the consideration of two elements when evaluating whether a vertebrate population segment qualifies as a DPS under the ESA: (1) The discreteness of the population segment in relation to the remainder of the species or subspecies to which it belongs; and (2) the significance of the population segment to the species or subspecies to which it belongs.

A population segment of a vertebrate species may be discrete if it satisfies either one of the following conditions: (1) It is markedly separated from other populations of the same taxon (an organism or group of organisms) as a result of physical, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation; or (2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA (*e.g.,* inadequate regulatory mechanisms). If a population segment is found to be discrete under one or both of the above conditions, its biological and ecological significance to the taxon to which it belongs is evaluated. This consideration may include, but is not limited to: (1) Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon; (2) evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon; (3) evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historical range; or (4) evidence that the discrete population segment differs markedly from other population segments of the species in its genetic characteristics.

The petition from AWI and DW requested that we list a ''Northwest Atlantic DPS'' of the thorny skate as threatened or endangered under the ESA, or, as an alternative, a ''United States DPS'' as threatened or endangered under the ESA.

In May 2016, we convened an ERA workshop with thorny skate experts. The workshop participants provided individual expert opinions regarding the available information to assess whether there are any thorny skate population segments that satisfy the DPS criteria of both discreteness and significance. Data relevant to the discreteness question included physical, ecological, behavioral, tagging, and genetic data. As described above, the thorny skate is widely distributed across the Northern Atlantic, without any significant known gaps or barriers in the species range (COSEWIC 2012) or between the Northwest and Northeast Atlantic. Likewise, populations are considered contiguous between the United States and Canada.

Conventional tagging data suggest that individual movement is limited (Templeman 1984; Walker *et al.,* 1997); however, tagging studies to date have been small and relied upon recapture of individuals by fishing operations. There is a lack of information regarding species' movements in deeper water. However, the long distance movements of some tagged individuals (hundreds of kilometers) suggest that occasional long distance movements by some individuals may be sufficient to promote reproductive mixing across the species' range (Templeman 1984; Chevolot *et al.,* 2007). Connectivity between areas is also supported by high areas of genetic diversity in the center of the range (Lynghammar *et al.,* 2014). There are no physical barriers to thorny skate migration, and migratory pathways appear to be present between all ocean basins (*i.e.,* connected areas of appropriate habitat). Collectively, this information indicates that thorny skates are one contiguous population.

As highlighted in the DPS Policy, quantitative measures of morphological discontinuity or differentiation can serve as evidence of marked separation of populations. No genetic difference was detected between thorny skates caught within Canadian versus U.S. waters (Tsang *et al.,* 2008). Best available genetic information (Lynghammar *et al.,* 2014) suggests a significant amount of genetic diversity between populations in the Northwest and Northeast extremes; however, no significant difference is found when individuals from the center of the range are included, which indicates genetic mixing is occurring in the center of the range (Lynghammar *et al.,* 2014). The center of the species' range around Iceland and Greenland contains the highest amount of genetic diversity, with the edges of the species' range in the Northwest and Northeast Atlantic both having lower levels of diversity. We do not know if the diversity is in neutral genetic markers or is indicative of adaptation. It should be noted that Lynghammar *et al.* (2014) was not specifically targeting thorny skates; therefore, improved sampling for thorny skates is suggested for future research. However, this study represents the best available scientific information on thorny skate genetics.

In summary, current information indicates thorny skates in the North Atlantic comprise a single species, despite the differences in age and length at maturity. Some genetic differentiation is present between the Northwest Atlantic and Northeast Atlantic, but the center of the range bridges genetic diversity between these two areas, indicating that there is mixing and gene flow across the range. This is likely made possible by the continuous distribution and depth range of the species, as there are no known physical barriers to migration. Morphological differences in thorny skate populations are limited to body size and age at maturity. Comparisons of individuals of different sizes from two sites in the Gulf of Maine and two sites in Canadian waters found no significant genetic differences (Tsang *et al.,* 2008). Comparison of ''late maturing'' skates collected mostly north of Newfoundland and ''early maturing'' skates collected within Canadian waters south of Newfoundland also found no significant genetic differences (Lynghammar *et al.,* 2014).

Thorny skates are habitat generalists. None of the populations appear to occur in an ecological setting unusual or unique for the taxon. Thorny skates are well distributed throughout the Atlantic; there is no population that represents the only surviving natural occurrence of the taxon. Thorny skates do not exist as an introduced population outside their historical range.

A population can be determined to be discrete if it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the ESA. A directed fishery for thorny skates is permitted in the central portion of the species' range comprising the area of the Grand Banks in Canadian waters, as well as Iceland and Greenland. Landings of thorny skates are prohibited in the extreme western (U.S.) and eastern (U.K. eastward) portions of the species' range. In most shallow water areas across the species' range, thorny skates undergo some form of fishing mortality because they are a common bycatch species. There are some differences in management in the Northwestern Atlantic (by the Northwest Atlantic Fisheries Organization (NAFO) and the Northeastern Atlantic (by ICES). In 2004, the NAFO Fisheries Commission set a total allowable catch (TAC) of 13,500 mt for 2005–2009 in Division 3 LNO. This TAC was lowered by NAFO to 12,000 mt for 2010–2011, and to 8,500 mt for 2012. The TAC was further reduced to 7,000 mt for 2013, 2014, 2015 (Simpson *et al.,* 2016). In the Northeastern Atlantic there is a prohibition against landing thorny skates from European Union waters in the Barents Sea and east of the United Kingdom (ICES 2015). A very small fishery exists in Iceland and off East Greenland, where survey numbers have remained stable since 2000 (ICES 2015). With populations within the Northeast Atlantic currently considered stable (ICES 2015), existing regulatory measures appear sufficient to control fishing mortality within this region. Iceland reported 1,625 mt of thorny skate landings in 2014. A 2016 EU regulation prohibits thorny skate landing for EU waters of ICES divisions IIa, IIIa and VIId and ICES subarea IV Subareas II and IV and Division IIIa (Norwegian Sea, North Sea, Skagerrak, and Kattegat), based on ICES advice that a precautionary approach dictates no targeted fishing and measures to reduce bycatch. ICES advice for this species west of the UK is currently pending.

Within U.S. waters, thorny skates are managed under the Magnuson-Stevens Fishery Conservation and Management Act (MSA). Landings of thorny skates within U.S. waters were unregulated until 2003 when the New England Fishery Management Council (NEFMC) established a Fishery Management Plan (FMP) for the skate complex. In 2003, the stock was deemed ''overfished'' and a landing prohibition was put in place, requiring all catch of thorny skates to be discarded at sea. Compliance with the prohibition against landing thorny and other skates is examined via port sampling. While thorny skates are still considered overfished within the United States, overfishing is no longer occurring (NEFMC 2009), indicating that fishery management measures are successfully controlling fishing mortality in those waters.

Under the Fisheries Act, Canadian fisheries may take thorny skates as bycatch in other fisheries, and a small directed fishery still operates on the Grand Banks. Available information suggests that catch is well below the total allowable catch limits as set by NAFO and Canada, indicating fishing mortality is controlled (Simpson *et al.,* 2016). The Scotian shelf has been closed to directed fishery for skates (thorny and winter) since the early 2000s. In addition to compliance with catch limits, thorny skate abundance has been stable on the Grand Banks and the rest of Canada, yet still below historical levels (COSEWIC 2012). Therefore, existing regulatory measures appear sufficient to control fishing mortality.

Throughout its range, thorny skates cross international governmental boundaries. There are regulatory mechanisms in place across the species' range with respect to conserving and recovering the thorny skate. While there are regulatory differences in different parts of its range, when evaluated as described further below in the Inadequacy of Existing Regulatory Mechanisms section, these regulatory mechanisms are adequate and the effects on thorny skates are similar. These mechanisms include regulating directed catch and bycatch, and result in effective management of the harvest of thorny skates throughout their range.

In summary, thorny skates rangewide exhibit genetic continuity between the Northwest and Northeast Atlantic through a high degree of diversity in the center of their range, a lack of significant differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms across international borders. We have determined that neither thorny skates in the United States nor thorny skates in the Northwest Atlantic are discrete from thorny skates throughout the rest of the North Atlantic.

The workshop participants provided their individual expert opinions regarding the best available information related to the discreteness criterion for thorny skates. Upon our review of their individual analyses and the DPS policy, we have concluded that there are no populations of the thorny skate that are discrete. Because we do not find any populations that are discrete, we do not go on to the second element of the DPS criteria (significance). Therefore, none of the segments suggested by the petitioners (*i.e.,* Northwest Atlantic or United States) qualifies as a DPS. Because there are no DPSs of the thorny skate, the workshop participants next provided their individual expert opinions regarding extinction risk rangewide for the thorny skate.

Assessment of Extinction Risk

The ESA (section 3) defines endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range.'' A threatened species is ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' We consider the best available information and apply professional judgment in evaluating the level of risk faced by a species in deciding whether the species is currently in danger of extinction throughout all or a significant portion of its range (endangered) or likely to become so in the foreseeable future (threatened). We evaluate both demographic risks, such as low abundance and productivity, and threats to the species, including those related to the factors specified by the ESA sections 4(a)(1)(A)–(E).

Methods

As described above, we convened a workshop of invited experts to provide individual input regarding extinction risk to the species. This section discusses the methods used to evaluate demographic factors, threats, and overall extinction risk to the species now and in the foreseeable future. For this assessment, the term ''foreseeable future'' was defined as 40 years. The workshop participants reviewed other comparable assessments (which used generation times of either one or two generations) and provided their expert opinions on the appropriate timeframe for the thorny skate. Each of the workshop participants considered thorny skate generation time (16 years), the ability to predict population trends, climate-modeling predictions, and the time for management actions to be realized and reflected in abundance trends when considering a foreseeable future timeline. The individual workshop participants determined that, for the thorny skate, there was reasonable confidence across this time-period (40 years) that the information on threats and management is accurate. We agree that, because of the factors listed above, this is a reasonable definition of ''foreseeable future'' for the thorny skate, and we use the same definition here.

Often the ability to measure or document risk factors is limited, and information is not quantitative or very often is lacking altogether. Therefore, in assessing risk, it is important to include both qualitative and quantitative information. In previous NMFS status reviews, Biological Review Teams have used a risk matrix method, described in detail by Wainwright and Kope (1999), to organize and summarize the professional judgement of a panel of knowledgeable scientists. The approach of considering demographic risk factors to help frame the consideration of extinction risk has been used in many of our status reviews (see *http://www.nmfs.noaa.gov/pr/species* for links to these reviews). In this approach, the collective condition of individual populations is considered at the species level according to four demographic viability factors: Abundance, growth rate/productivity, spatial structure/connectivity, and diversity. Connectivity refers to rates of exchange among populations of organisms. These viability factors reflect concepts that are well founded in conservation biology and that individually and collectively provide strong indicators of extinction risk.

Using these concepts, the workshop participants each evaluated demographic risks by individually assigning a risk score to each of the four demographic criteria (abundance, growth rate/productivity, spatial structure/connectivity, diversity). The scoring for the demographic risk criteria corresponded to the following values: 1—very low risk, 2—low risk, 3—moderate risk, 4—high risk, and 5—very high risk. A demographic factor (or viable population descriptor) was ranked very low if it was unlikely that this descriptor contributed significantly to risk of extinction, either by itself or in combination with other viable population descriptors. A factor was ranked low risk if it was unlikely that this descriptor contributed significantly to long-term or near future risk of extinction by itself, but there was some concern that it may, in combination with other viable population descriptors. A factor was ranked moderate risk if this descriptor contributed significantly to long-term risk of extinction, but did not in itself constitute a danger of extinction in the near future. A factor was ranked high risk if this descriptor contributed significantly to long-term risk of extinction and was likely to contribute to short-term risk of extinction in the near future, and a factor was ranked very high risk if this descriptor by itself indicated danger of extinction in the near future.

Each workshop participant scored each demographic factor individually. Each workshop participant identified other demographic factors and/or threats that would work in combination with factors ranked in the higher categories to increase risk to the species. During the workshop, the participants provided their expert opinions for each of the demographic risks, including considerations outlined in McElhany *et al.* (2000) and the supporting data on which it was based. Workshop participants were given the opportunity to adjust their individual scores, if desired, after the workshop. The scores were then tallied, reviewed, and considered in our overall extinction risk determination. As noted above, this scoring was carried out for the species rangewide.

Each workshop participant also performed a threats assessment for the thorny skate by evaluating the impact that a particular threat was currently having on the extinction risk of the species. Threats considered included habitat destruction, modification, or curtailment; overutilization; disease or predation; inadequacy of existing regulatory mechanisms; and other natural or manmade threats, because these are the five factors identified in section 4(a)(1) of the ESA. Workshop participants each ranked the threats for the thorny skate at a range-wide scale. The workshop participants used the ''likelihood point'' (FEMAT) method to allow individuals to express uncertainty in determining the contribution to extinction risk of each threat to the species. Each workshop participant was allotted five likelihood points to rank each threat. Workshop participants individually ranked the severity of each threat through the allocation of these five likelihood points across five ranking criteria ranging from a score of ''very low contribution'' to ''very high contribution.'' The scoring for the threats correspond to the following values: 1—very low contribution, 2—low contribution, 3—moderate contribution, 4—high contribution, and 5—very high contribution. A threat was given a rank of very low if it is unlikely that this threat contributes significantly to risk of extinction, either by itself or in combination with other threats. That is, it is unlikely that the threat will have population-level impacts that reduce the viability of the species. A threat was ranked as low contribution if it is unlikely that this threat contributes significantly to long-term or near future risk of extinction by itself, but there is some concern that it may, in combination with other threats. A threat was ranked as medium contribution if this threat contributes significantly to long-term risk of extinction, but does not in itself constitute a danger of extinction in the near future. A threat was ranked high contribution if this threat contributes significantly to long-term risk of extinction and is likely to contribute to short-term risk of extinction in the near future. Finally, a threat was ranked very high contribution if the threat by itself indicates a danger of extinction in the near future. Detailed definitions of the risk scores can be found in the status review report (NMFS 2017).

Similar to the demographic parameters, the workshop participants were asked to identify other threat(s) and/or demographic factor(s) that may interact to increase the species' extinction risk. The workshop participants also considered the ranking with respect to the interactions with other factors and threats. For example, workshop participants identified that threats due to the inadequacy of existing regulatory mechanisms may interact with the threat of overutilization and slow population growth rates (a demographic factor) to increase the risk extinction.

Workshop participants were asked to rank the effect that the threat was currently having on the extinction risk of the species. Each workshop participant could allocate all five likelihood points to one ranking criterion or distribute the likelihood points across several ranking criteria to account for any uncertainty. Each individual workshop participant distributed the likelihood points as she/he deemed appropriate with the condition that all five likelihood points had to be used for each threat. Workshop participants also had the option of ranking the threat as ''0'' to indicate that, in their opinion, there was insufficient data to assign a score, or ''N/A'' if in their opinion the threat was not relevant to the species either throughout its range or for individual stock complexes. When a workshop participant chose either N/A (Not Applicable) or 0 (Unknown) for a threat, all five likelihood points had to be assigned to that category only.

During the group discussion, the workshop participants were asked to identify other threat(s) or demographic factor(s) that were interacting with the threats or demographic factors to increase the species' extinction risk. As scores were provided by individual workshop participants, each individual stated his or her expert opinion regarding each of the threats, and the supporting data on which it was based. We considered these along with the demographic scores in our overall risk assessment.

The workshop participants were then asked to use their informed professional judgment to individually qualitatively score overall extinction risk for the thorny skate. The results of the demographic risks analysis and threats assessment, described below, informed this ranking. For this analysis, the workshop participants used three levels of extinction risk, consistent with the NMFS (2016) listing guidance: Low risk, moderate risk, and high risk. Low risk was defined as: ''A species or DPS is at low risk of extinction if it is not at moderate or high level of extinction risk (see ''Moderate risk'' and ''High risk''). A species or DPS may be at low risk of extinction if it is not facing threats that result in declining trends in abundance, productivity, spatial structure, or diversity. A species or DPS at low risk of extinction is likely to show stable or increasing trends in abundance and productivity with connected, diverse populations.'' Moderate risk was defined as: ''A species or DPS is at moderate risk of extinction if it is on a trajectory that puts it at a high level of extinction risk in the foreseeable future (see description of ''High risk''). A species or DPS may be at moderate risk of extinction due to projected threats or declining trends in abundance, productivity, spatial structure, or diversity. The appropriate time horizon for evaluating whether a species or DPS will be at high risk in the foreseeable future depends on various case- and species-specific factors. For example, the time horizon may reflect certain life history characteristics (*e.g.,* long generation time or late age-at-maturity) and may also reflect the time frame or rate over which identified threats are likely to impact the biological status of the species or DPS (*e.g.,* the rate of disease spread). (The appropriate time horizon is not limited to the period that status can be quantitatively modeled or predicted within predetermined limits of statistical confidence. The biologist (or Team) should, to the extent possible, clearly specify the time horizon over which it has confidence in evaluating moderate risk.).'' High Risk was defined as: ''A species or DPS with a high risk of extinction is at or near a level of abundance, productivity, spatial structure, and/or diversity that places its continued persistence in question. The demographics of a species or DPS at such a high level of risk may be highly uncertain and strongly influenced by stochastic or depensatory processes. Similarly, a species or DPS may be at high risk of extinction if it faces clear and present threats (*e.g.,* confinement to a small geographic area; imminent destruction, modification, or curtailment of its habitat; or disease epidemic) that are likely to create imminent and substantial demographic risks.''

The workshop participants adopted the ''likelihood point'' method for ranking the overall risk of extinction to allow individual workshop participants to express uncertainty. For this approach, each workshop participant distributed 10 'likelihood points' among the extinction risk categories (that is, each workshop participant had 10 points to distribute among the three extinction risk categories). Uncertainty is expressed by assigning points to different risk categories. For example, a workshop participant would assign all 10 points to the 'low risk' category if he/she was certain that the definition for 'low risk' was met. However, he/she might assign a small number of points to the 'moderate risk' category and the majority to the 'low risk' category if there was a low level of uncertainty regarding the risk level. The more points assigned to one particular category, the higher the level of certainty. This approach has been used in previous NMFS status reviews (*e.g.,* Pacific salmon, Southern Resident killer whale, Puget Sound rockfish, Pacific herring, black abalone, and common thresher shark) to structure the workshop participant's thinking and express levels of uncertainty when assigning risk categories. Although this process helps to integrate and summarize a large amount of diverse information, there is no simple way to translate the risk matrix scores directly into a determination of overall extinction risk. The workshop participant scores were tallied, discussed, and summarized by NMFS for the thorny skate rangewide.

The workshop participants did not make recommendations as to whether the species should be listed as threatened or endangered. Rather, the workshop participants drew scientific conclusions about the overall risk of extinction faced by the thorny skate under present conditions and in the foreseeable future (as noted above, defined as 40 years) based on his/her evaluation of the species' demographic risks and assessment of threats.

Evaluation of Demographic Risks

Abundance: The workshop participants individually evaluated the available thorny skate abundance information, which is summarized in the Abundance section of the listing determination. Several workshop participants noted that the available information indicated thorny skate abundance had declined significantly from historical levels in certain parts of its range. However, in all regions where abundance trends and/or indicators are available, declines appear to have been halted, and increases in abundance were apparent in some regions. Further declines are unlikely due to improved management. Abundance estimates from the Northwest Atlantic are currently in the millions of individuals, even where significant declines have occurred. There is no evidence of depensatory processes such as reduced likelihood of finding a mate, and recruitment per spawner has remained stable for thorny skate. The mean score we calculated based on the workshop participants' individual scores corresponds to a *very low to low* ranking rangewide, as this factor is unlikely to contribute significantly to the thorny skate's risk of extinction.

Growth rate/productivity: The workshop participants individually evaluated the available information on thorny skate life history traits as they relate to this factor. As summarized in the Reproduction, Growth, and Demography section, thorny skates have low inherent productivity due to their late age at maturity, low fecundity, slow population growth rates, and long generation times (16 years). This low productivity makes thorny skate populations vulnerable to overexploitation, and slow to recover from depletion. The mean score we calculated based on the workshop participants' scores corresponds to a *low to moderate* ranking rangewide, as this factor is unlikely to contribute significantly to the thorny skate's risk of extinction.

Spatial structure/connectivity: The workshop participants individually evaluated the available information on thorny skate spatial structure (tagging and genetics information) summarized in the Population section. The thorny skate has a very broad range, including across the entire North Atlantic Ocean. The species is mobile, and some connectivity across the range is apparent from both tagging and genetics data. At the southern edges, there is an indication that a contraction or northward shift may be occurring; however, recent surveys show an increase in abundance in the southern range in U.S. waters. The mean score we calculated based on the workshop participants' individual scores corresponds to a *very low to low* ranking rangewide, as this factor is very unlikely to contribute significantly to the thorny skate's risk of extinction.

Diversity: The workshop participants individually evaluated the available information on thorny skate diversity summarized in the Population section. The available genetics studies indicate that thorny skate populations have the highest genetic diversity amongst skate species, and there is reproductive connectivity along a continuum rangewide. Therefore, genetic diversity appears to be sufficiently high and not indicative of isolated or depleted populations. The thorny skate does not appear to be at risk due to substantial changes or loss of variation in life history traits, population demography, morphology, behavior, or genetic characteristics. The mean score we calculated based on the workshop participants' individual scores corresponds to a *very low to low* ranking rangewide, as this factor is very unlikely to contribute significantly to the thorny skate's risk of extinction.

Evaluation of Threats

The workshop participants identified several threats in the low to moderate category for contribution to extinction risk, including: Climate change, manmade non-fishing habitat impacts, commercial discards, commercial landings, global and national climate regulation, and inadequacy of existing NAFO regulations. Both climate change and global or national climate change regulations received the most likelihood points in the moderate contribution to extinction risk category. Only one threat, climate change, received likelihood points in the high contribution category, but the majority of points were in the low to moderate category. We summarize the threats to the thorny skate and provide the workshop participants' expert opinions on their degree of contribution to extinction risk.

Habitat Destruction, Modification, or Curtailment: Workshop participants individually evaluated the available information on habitat use and distributions of the thorny skate summarized in the status review report. Overall, the thorny skate is a habitat generalist in the marine environment, and not substantially dependent on any particular habitat type. It occurs in coastal and offshore waters, and is not dependent during any life stage on more vulnerable estuarine habitats. Thorny skate habitat use is influenced by temperature and prey distributions, but they have broad temperature tolerances and an opportunistic diet, making them less vulnerable to habitat destruction.

Within the Northwest Atlantic, the species' range from Greenland south is a mixing zone for different currents. The Labrador Current flows down the inner shelf, bringing cooler and fresher water from the north, which flows down over the ocean shelves, including the Grand Banks, Scotian Shelf, Georges Bank and into the Gulf of Maine. Meanwhile, the Gulf Stream in deeper offshore waters brings warmer, saltier water up from the south (Saba *et al.,* 2015). The range of the thorny skate covers both of these currents and the mixing zone; thorny skates are able to occur throughout this area due to their tolerance of different temperatures. This mixing zone makes it difficult to predict the impacts of climate change within the area, although recent specific modeling suggests that the Gulf of Maine will warm nearly three times as fast as other areas from a predicted northward shift in the Gulf Stream (Saba *et al.,* 2015). Recently, the Labrador Current has had the opposite effect, decreasing salinity in the shallower parts of the Gulf of Maine and cooling temperatures on the shelves (Townsend *et al.,* 2010). Overall, waters within the range of the thorny skate are expected to get warmer, increase in salinity and decrease in pH (Saba *et al.,* 2015). In marine ecosystems, climate change impacts like these are generally expected to push species distributions northward (Frumhoff *et al.,* 2007), but possible effects on the thorny skate are unclear.

In U.S. waters, the thorny skate has experienced a relatively high amount of range contraction as measured during NEFSC surveys. A small but statistically significant northward shift in range, and increased concentration in deeper waters has been detected (Nye *et al.,* 2009). A possible explanation of the consistent, long-term decline of thorny skates in the NEFSC trawl survey is skates are shifting out of the survey area. The shift in area occupied on the Grand Banks in Canada may also be a response to climate change. In this area, skates have shifted to the warmer edge of the banks, avoiding the cooler temperatures present on the center of the banks (Kulka and Miri 2003) created by the Labrador Current. The lack of skates present in temperatures below 1 or 2° C supports this conclusion.

There is no information regarding the impacts of ocean acidification on the thorny skate. However, a study on the sympatric little skate, *Leucoraja erinacea,* demonstrates that changes in temperature and acidic concentration can result in complex effects on developmental time, body condition and survival in skate hatchlings (Di Santo 2015). There is currently no information available on how hypoxia or changes in nutrient composition might impact the thorny skate. Given its broad range, generalist feeding habits, and ability to move, localized areas of hypoxia or low prey availability are unlikely to have an impact at a species level.

Since climate change impacts are expected to shift species distributions northward and impact species diversity, recent studies have focused on the impacts of climate change to fish community assemblages, particularly on species richness and diversity. Some impacts have been observed for ''coastal'' or shallow water communities (<200 m/656 ft in depth) in the Gulf of St. Lawrence (Tamdrari *et al.,* 2014) and Iceland (Stefansdottir *et al.,* 2010). In both these studies, thorny skates were found to associate more with the deeper water fish assemblages, which had only minor, if any, impacts from climate change.

There is some evidence that suggests the species is shifting to deeper waters. Thorny skates comprised 7.97 percent of fish in the ''coastal'' species assemblage (<200m) in the early 1990s and only 5.58 percent on average from 2004–2010 in the Gulf of St. Lawrence. In the deeper species assemblage (≤200m) they went from 3.71 percent in the early 1990s to 4.52 percent averaged from 2004–2010 (Tamdrari *et al.,* 2014). This is a relatively small change for both depths when compared to change for other species, representing half as much decrease in the coastal assemblage as redfish (*Sebastes spp.*) and an order of magnitude less than the decrease in Atlantic cod (*Gadus morhua*). Additionally, thorny skates were most abundant between 100 and 350 m of depth before climate change became apparent (McEachran and Musick 1975), and this remains the case in modern surveys (Packer *et al.,* 2003; COSEWIC 2012), though depths in the fall range up to 500 m in U.S. waters (Packer *et al.,* 2003).

Recent climate vulnerability analyses have been performed for fish species in the Northeast United States and for fish assemblages on the Scotian Shelf in Canada. Despite having similar methodologies, these studies came to different conclusions regarding the vulnerability of thorny skates to climate change. Stortini *et al.* (2015) rated the vulnerability of the thorny skate on the Scotian shelf as ''low.'' This study scaled the estimated vulnerability relative to thirty-two other species found on the Scotian Shelf; therefore, the ''low'' vulnerability rating is in relation to other species in that location.

Hare *et al.* (2016) rated this species as having a ''high'' biological sensitivity and climate exposure likelihood off the Northeast United States, on a scale of ''low'' to ''very high.'' In this effort, vulnerability was equated to the likelihood of the species experiencing either reduced productivity or shifting its distribution out of the region in response to climate change. This vulnerability analysis concluded that there was also a ''high'' chance of negative impacts and changes in species distribution within its U.S. range. Both assessments used a similar variety of species life history factors to produce a species sensitivity score, but Hare *et al.,* (2016) used a larger variety of climate factors including pH, salinity, precipitation and ocean currents to determine climate exposure, whereas Stortini *et al.* (2015) looked only at mean temperature under different warming scenarios.

While thorny skates in U.S. waters are at high risk for being impacted by climate change (likely to manifest as loss of cold water habitat in U.S. waters), the best available information indicates that throughout most of the range, the generalist habitat requirements of the thorny skate will limit impacts of climate change. This conclusion is supported by studies on species diversity that indicate impacts to species assemblages have not yet occurred on communities including the thorny skate, due to its depth preferences (Stefansdottir *et al.,* 2010, Tamdarai *et al.,* 2015). In addition, modeling predicts a less than 10 percent loss of thermally appropriate habitat before 2030 in U.S. waters, but almost no habitat loss before 2030 in Canadian waters (Shackell *et al.,* 2014). A ten percent loss is expected in Canada and up to 25 percent loss in U.S. waters may occur before 2060 (Shackell *et al.,* 2014). Although the risk may be high that thorny skates will shift their distribution out of Northeast U.S. waters due to warming ocean conditions (Hare *et al.,* 2016), the species would have the ability to persist in adjacent regions with more suitable habitat.

Ocean temperature changes due to climate change may be contributing to a contraction of the thorny skate's range at its southern edges. Thorny skates appear to have comparatively low exposure to potentially harmful pollutants, and there is no information suggesting their individual fitness or populations are threatened by pollution. The mean score we calculated based on the workshop participants' individual scores indicates that climate change and non-fishing related modifications to habitat (*e.g.* drilling, offshore windfarm construction) present a *low to moderate* contribution to extinction risk.

Overutilization: The workshop participants individually evaluated the available information on fishing mortality and abundance trends of thorny skate summarized in the status review report. Overutilization for commercial purposes was once considered one of the primary threats to thorny skate populations. Significant declines have been documented throughout much of the thorny skate's range due to historical fishing pressure. The most recent information suggests that declines in several stocks have halted due to fishing restrictions (COSEWIC 2012; ICES 2015; Sosebee *et al.,* in prep). Populations appear to be stable or slowly increasing, with millions of individuals remaining in the Northwest Atlantic alone. Therefore, there appears to be a low likelihood of further population declines because of stabilization observed after management actions were put into place. The mean score we calculated based on the workshop participants' individual scores corresponds to a *very low* or *low* ranking for all threats in this category, with the commercial landings and commercial discards receiving mean scores of slightly higher than low contributions to overall extinction risk.

Thorny skates were and are taken as bycatch by fisheries throughout their range, including those in the North Sea, Barents Sea, Gulf of St. Lawrence and on the Canadian and U.S. continental shelves. Targeted fisheries, particularly by foreign fleets including those of Spain, Portugal and Russia, developed in the 1990s (COSEWIC 2012; Sosebee *et al.,* in prep). The fishery for thorny skates was largely unregulated in the Northwest Atlantic until the 2000s (COSEWIC 2012). Currently, small fisheries exist in the North Sea (Piet *et al.,* 2009) and on the Grand Banks in Canada (Simpson *et al.,* 2016), which is, as mentioned earlier, the first regulated skate fishery in international waters. Since 2003, U.S. vessels have been prohibited from possessing or landing thorny skates (NEFMC 2009). While directed fisheries on the species are currently limited, thorny skates continue to be taken as bycatch and discarded in commercial fisheries within their range.

U.S. Fisheries Catch and Bycatch

Total landings for all skate species within U.S. waters reached 9,462 mt in 1969 and declined after that, reaching a low of 847 mt in 1981 (Sosebee *et al.,* in prep). Skate landings increased substantially after that time period for lobster bait and export, rising to a high of 20,342 mt in 2007 (Sosebee *et al.,* in prep). Estimated total catch of thorny skates has declined from over 5,000 mt in the late 1960s and early 1970s to about 200–300 mt in recent years (Sosebee *et al.,* in prep). Thorny skates make up a small overall portion of skate catch, particularly in comparison to winter and little skates. Most of the early catch (1969–1989) was from otter trawl discards, while landings dominated from 1990 to present (Sosebee *et at.,* in prep). Discards from scallop dredges increased in proportion to population estimates during the late 1970s and again during the late 1990s (Sosebee *et al.,* in prep). While landings were generally low, catch of thorny skates likely contributed to the decline of the species over time.

In 2003, the NEFMC implemented a FMP for the seven skates present within the Gulf of Maine. The FMP prohibited landings of thorny skates as the stock status was considered overfished (NEFMC 2009). The limited information regarding species biomass required the NEFSC to develop survey-based overfished and overfishing reference points for the thorny skate: ''Thorny skate is in an overfished condition when the three-year moving average of the autumn survey mean weight-per-tow is less than one half of the 75th percentile of the mean weight-per-tow observed in the autumn trawl survey from the selected reference time series. Overfishing occurs when the three year moving average of the autumn survey mean weight per tow declines 20% or more, or when the autumn survey mean weight per tow declines for three consecutive years. The reference points and selected time series may be re-specified through a peer reviewed process and/or as updated stock assessments are completed'' (NEFMC 2009). The target biomass for thorny skates is currently set at 4.13 kg/tow and the minimum biomass threshold at 2.06 kg/tow. The most recent 3-year average remains below these figures at 0.17 kg/tow; however, this figure has remained steady since 2011.

The MSA states: ''A stock or stock complex is considered ''overfished'' when its biomass has declined below a level that jeopardizes the capacity of the stock or stock complex to produce Maximum Sustainable Yield (MSY) on a continuing basis. MSY is defined as the largest long-term average catch or yield that can be taken from a stock or stock complex.'' The overfished/overfishing status of a stock is determined relative to its ability to produce continued yield from a fishery. The overfished status of thorny skates within the United States means that fishing mortality rates (including past landings and discards) have been too high, and caused the population to decline below acceptable levels. The stock must be rebuilt to biomass levels that can produce MSY for a fishery to be sustainable. The prohibition on harvest in U.S. waters is expected to help the stock rebuild. This means any thorny skates caught within U.S. waters must be discarded at sea.

Estimated thorny skate discards are low relative to other skates (Sosebee *et al.,* in prep). Landings and dead discards have decreased in recent years (2007–2014) and total discards have stabilized or increased.

Canadian Fisheries and Bycatch

Thorny skates comprise the majority of skates caught in commercial fisheries in Canada. The majority of thorny skate catch comes from the coast of Labrador and Newfoundland, including the Grand Banks area. This has ranged from a high of approximately 24,000 mt in the early 1990s to current levels around 6,000 mt. Relative fishing mortality has remained stable (1985- 2009) in this area at approximately ten percent (COSEWIC 2012).

Within the southern Gulf of St. Lawrence, estimated landings of thorny skates peaked in 1994 at approximately 38 t, and have since decreased to an average 1–2.7 t over the period 2006–2011(Benoit 2013). The thorny skate is the most common discarded skate species. On average, 490 t were discarded in the early 1990s, this dropped to 53.7 t on average over the period 2006 -2011 (Benoit 2013). While the majority of discards in the past came from trawl fisheries, currently half are from trawl and half from the gillnet fishery for Greenland halibut (Benoit 2013). Overall fishing effort in this area has declined or remained stable since the 1990s (COSEWIC 2012).

The only remaining directed fishery for the thorny skate is executed within the Grand Banks Area. This area is managed between two areas, 3Ps directly south of Newfoundland and entirely within the Canadian Exclusive Economic Zone (EEZ), and divisions 3LNO, which comprise the outer banks, some of which lies outside the Canadian EEZ. Quota regulation within the EEZ was enacted in 1995 (Simpson *et al.,* 2014). In 2004, NAFO enacted quota regulation for the entire 3LNO area, making this the first regulated skate fishery in the world in international waters. The regulated areas include areas within and outside the Canadian EEZ; 3Ps remained under Canada's quota system. For most years since the quotas were enacted, catch has remained well below the limits. Relative fishing mortality within the Grand Banks has decreased over time. Within the 3LNO it increased from the late 1980s to a peak of 29 percent in 1997; then stabilized at approximately 17 percent during 1998–2004 (Simpson *et al.,* 2016). In 2005, relative fishing mortality declined to 4 percent and has remained around 5 percent (Simpson *et al.,* 2016). Since 1985, fishing mortality within 3Ps was relatively constant, below 5 percent for most years (Simpson *et al.,* 2016).

Northeast Atlantic Fisheries and Bycatch

There is little directed fishing effort on thorny skates across most of the Northeast Atlantic, with a prohibition against landings currently in place in European Union waters in the Barents Sea and east of the United Kingdom (ICES 2015). There is a small fishery landing thorny skates from Iceland and Greenland. Landings here have increased but still remain below 2,000 mt, or about half that of Canada's yearly landings.

The available information indicates that current thorny skate populations are numerous in many areas and that area occupied is increasing. While the portion of the population within the United States is not currently capable of sustaining a fishery, fisheries for thorny skates are well-controlled throughout the range. Fishing mortality relative to biomass has decreased across the range through time, and is currently rather low in most areas. The mean score we calculated based on the workshop participants' individual scores indicate that commercial landings across the range of the species present a *low* contribution to extinction risk.

We have also considered the best available information on the mortality rates of thorny skates that are discarded (*i.e.,* returned to the water alive after capture in fishing gear). Factors that impact thorny skate discard survival in trawl fisheries include size, depth of capture, difference in temperature between bottom and surface conditions (Benoit *et al.,* 2013), duration of the tow and degree of injury sustained during the capture event (Mandelman *et al.,* 2013). Skates can have an overall high survival rate following discard, with up to 20 percent mortality predicted for trawl fisheries within the Gulf of St. Lawrence (Benoit, 2013). Mandelman *et al.* (2013) studied the post-discard mortality of thorny skates captured in trawl gear in the Gulf of Maine. This study indicates that while 72-hour post-discard mortality of a sample of individuals retained in captivity following cage trials was only 22 percent, the condition of many of the individual thorny skates was poor (52 percent injury rate at time of capture; most with listless appearance and lack of vigor at the end of the 72-hour period) and 7-day mortality was 66 percent. The authors note that the species may be less resilient than indicated by the 22 percent 72-hour mortality rate and cautions against the use of the 22 percent mortality rate in management. The effects of captivity on these mortality rates are unknown; however, it is reasonable to expect that captivity contributed to slightly higher mortality rates. The available information indicates a low to moderate risk of mortality to a thorny skate once it is captured (Benoit *et al.,* 2013 and Mandelman *et al.,* 2013). The elimination of most directed fisheries and reductions in catches are expected to reduce overall fishing mortality, including discard mortality. It is also important to note that post-discard mortality is considered in developing fishing management policies for the thorny skate in the United States. Current management measures consider the available information on post-discard mortality. While overutilization had been a primary threat to the species, fishing mortality is being managed throughout the species' range. The available information indicates that current thorny skate populations are numerous in many areas and that area occupied is increasing. While the portion of the population within the United States is not currently capable of sustaining a fishery, fisheries for thorny skates are well-controlled throughout the range. Fishing mortality relative to biomass has decreased across the range through time, and is currently low in most areas. The mean score we calculated based on the workshop participants' individual scores indicates that commercial discards across the range of the species represent a *low* contribution to overall extinction risk.

Disease and Predation: Workshop participants individually evaluated the available information on disease and predation of thorny skates summarized in the status review report. Overall, there is minimal information available with which to evaluate these threats. In general, thorny skates may be susceptible to diseases, but there is no evidence that disease has ever caused declines in populations. The mean score we calculated based on the workshop participants' individual scores indicates that disease represents a *very low* contribution to overall extinction risk, as it is very unlikely that this threat contributes or will contribute to the decline of the species.

Regarding predation, there is no indication that this species would be threatened by excessive predation pressure. Egg capsules for the species are reportedly preyed upon by halibut, Greenland shark and goosefish (Collette and Klein-MacPhee 2002). Gastropods may also predate on egg cases, with a predicted predation frequency ranging from 4 to 18 percent (Cox *et al.,* 1999). It is unknown what the effect of this predation may be, but it could contribute to a slower rate of rebuilding.

Skates, including thorny skates, are prey for a number of species: Flounder, other skates, seabirds, marine mammals, sharks, cod and other large demersal fishes, with the last being the most important (Morissette *et al.,* 2006). Overall mortality for small skates has decreased while increasing for larger skates since the 1970s. Currently, recruitment for smaller skates remains high in portions of the Canadian range (Benoit and Swain 2011; Swain *et al.,* 2013). Meanwhile, the numbers of large fishes have decreased. Fishing pressure has also decreased, substantially in some regions, indicating sources of adult skate mortality may be natural. Marine mammal predation, particularly by gray seals, has been suggested as an increasing cause of mortality for some locations (Swain *et al.,* 2013).

Thorny skates are at least a minor source of prey for gray seals, composing up to 6 percent of their diet depending on age and season (Beck *et al.,* 2007). Gray seal energy requirements are high enough that this predator may be responsible for much of the natural mortality of adult thorny skates in some areas, despite the thorny skate being a minor prey source (Swain *et al.,* 2013, Benoit *et al.,* 2011). Energetics modeling has been found to explain a similar pattern of increased adult mortality in other local species (Benoit *et al.,* 2011). Further modeling work found a negative relationship between the gray seal index and thorny skate numbers in the Southern Gulf of St. Lawrence. The harp seal index was more likely to explain population trends in the Northwest portion of the Gulf. Predation by either species was not found to explain trends in thorny skate within the northeast portion of the Gulf (Ouellet *et al.,* 2016).

Predation by gray seals may have increased within the range of the thorny skate. Gray seal populations have recovered during the same time period of decreasing mortality for small thorny skates. Numbering only 15,000 individuals in the 1960s, the gray seal population increased to 350,000 by 2007. In 2014, the population estimate within the Canadian range and Gulf of Maine had increased to 505,000 (Hamill *et al.* 2014). In addition, gray seals have been expanding their range and are now present in small numbers as far south as Southern New England (DiGiovanni Jr. *et al.,* 2016).

Gray seals stay mostly local (within 50 km) to haul-out sites and forage in mostly shallow depths (~100 m) (McConnell *et al.,* 1999, Schreer *et al.,* 2001). The largest numbers of gray seals are found in the Gulf of St. Lawrence and on Sable Island off the coast of Nova Scotia, where they may impact skates on the Scotian Shelf. Smaller populations are found in coastal Nova Scotia, Seal Island, Maine and on Cape Cod, Massachusetts (Hamill *et al.,* 2014). If gray seal predation is contributing to thorny skate mortality, the impact is likely to be concentrated in the shallowest portions of the thorny skate range around major gray seal population areas.

Harp seals migrate to the Gulf of St. Lawrence to whelp before returning to Artic waters on the overlapping range of thorny skate. They migrate along the coast of Labrador and Greenland northward. Small numbers of harp seals may remain year-round in southern waters, with the majority living in the Artic. Currently there is no evidence that thorny skates comprise more than an incidental portion of the harp seal diet. Harp seal reproductive rates decreased in the latest assessment, with 8.3 million individuals estimated in 2008 and 7.7 million estimated in 2012 (DFO 2012). Harp seal predation on thorny skates is likely stable or slightly decreasing and centered around whelping sites.

Modeling indicates marine mammal predation may contribute to high natural mortality of adult thorny skates in some discrete areas, suppressing recovery of their populations (DFO 2012). For now, high levels of recruitment in small skates are still evident despite this pressure. Recent abundance of thorny skates has also been stable in areas where marine mammal populations are centered. The recent population increase of gray seals in U.S. waters and coinciding stabilization of thorny skate abundance indices suggests that seal predation was not likely responsible for thorny skate declines. The mean score we calculated based on the workshop participants' individual scores indicates that predation represents a *very low* contribution to extinction risk, as it is very unlikely that this threat contributes or will contribute to the decline of the species.

Inadequacy of Existing Regulatory Mechanisms: The workshop participants individually evaluated the available information on fisheries management regulations and abundance trends of the thorny skate summarized in the status review report. The inadequacy of regulatory mechanisms to control the harvest of thorny skates was once considered a significant threat to their populations. Legal protections for thorny skates vary between outright prohibitions on landings in the United States and much of the Northeast Atlantic, with limited fishing permitted in Canada and Iceland.

U.S. Regulations

Within U.S. waters, thorny skates are managed under the MSA. Landings of thorny skates within U.S. waters were unregulated until 2003 when the NEFMC established an FMP for the skate complex. At that time, the stock was deemed ''overfished'' and a landing prohibition was put in place, requiring all catch of thorny skates to be discarded at sea. At that time, the same prohibitions were put into place for the sympatric species, barndoor and smooth skates, to help rebuild these stocks. The skate complex FMP does still allow catch of other skate species, and other fisheries may also catch thorny skates but are likewise required to discard them.

MSA regulations are enforced in U.S. waters by the U.S. Coast Guard, NOAA's Office of Law Enforcement and state partners. Fishermen who do not comply with regulations established under the MSA are subject to fines and criminal penalties, depending on the severity of the offense. Compliance with the prohibition against landing thorny and other skates was examined via port sampling. In 2005, 3.61 percent of skate wing landings were identified as thorny skate. In the years since, this declined rapidly with less than 1 percent of wings identified as thorny skate in 2007, and further declined to 0.01 percent in 2012, indicating that compliance with the discard regulations and misidentifications or mislabeling is not an issue in the United States (Curtis and Sosebee 2015). While the thorny skate is still considered overfished within the United States, overfishing is no longer occurring (NEFMC 2009), indicating that fishery management measures are successfully controlling fishing mortality in those waters.

Canadian Regulations

Under the Fisheries Act, Canadian fisheries may take thorny skates as bycatch in other fisheries, and a small, directed fishery still operates on the Grand Banks. Available information suggests that catch is well below the total allowable catch limits as set by NAFO and Canada, indicating fishing mortality is controlled (Simpson *et al.,* 2016). The Scotian shelf has been closed to directed fishery for skates (thorny and winter) since the early 2000s. In addition to compliance with catch limits, thorny skate abundance has been stable on the Grand Banks and the rest of Canada, yet still below historical levels (COSEWIC 2012). Recruitment in this portion of the species' range remains relatively high. Therefore, existing regulatory measures appear sufficient to control fishing mortality.

Northeast Atlantic Regulations

There is a prohibition against landing thorny skates from European Union waters in the Barents Sea and east of the United Kingdom (ICES 2015). A very small fishery exists in Iceland and off East Greenland, where survey numbers have remained stable since 2000 (ICES 2015). With populations within the Northeast Atlantic currently considered stable (ICES 2015), existing regulatory measures appear sufficient to control fishing mortality within this region. Iceland reported 1625 t of thorny skate landings in 2014. A 2016 EU regulation prohibits thorny skate landings in EU waters of ICES divisions IIa, IIIa and VIId and ICES subarea IV Subareas II and IV and Division IIIa (Norwegian Sea, North Sea, Skagerrak, and Kattegat), based on ICES advice that a precautionary approach dictates no targeted fishing and measures to reduce bycatch. ICES advice for this species west of the UK is currently pending. Thorny skates taken from these EU waters are counted under a regional EU skate quota that lacks a robust scientific basis. EU limits on these species have been generally trending toward more precautionary over the last decade.

Legal protections for thorny skates vary between outright prohibitions on landings in the United States and much of the Northeast Atlantic, with limited fishing permitted in Canada and Iceland. While thorny skates are also a bycatch species within many fisheries, stable population numbers indicate existing protections are sufficient through its range. The mean score we calculated based on workshop participants' individual scores for both global/national climate change regulations and NAFO fishing regulations indicate that inadequacy of these regulations represents a *low to moderate* contribution to extinction risk. However, workshop participants also noted uncertainty related to other global or national environmental regulations in this category because there is more uncertainty in their effectiveness to result in protections for marine ecosystems.

Other Natural or Manmade Factors Affecting the Thorny Skate's Continued Existence

The workshop participants individually evaluated the available information on other potential threats as summarized in the status review report. Natural threats focused on the thorny skate's inherent biological vulnerability, which is also reflected in the demographic factors described above. The species has low productivity because of its life history characteristics and is vulnerable to exploitation and population perturbations. Populations can be quickly depleted and take many years to recover. However, their mobility, high genetic diversity, and generalist habitat and diet strategy contribute to a low risk of extinction. The mean scores we calculated based on workshop participants' individual scores indicate that both manmade catastrophic events and stochastic events represent *very low* contributions to extinction risk because of the wide geographic distribution of the species.

Summary of Demographic Factors and Threats Affecting Thorny Skate

Both demographic factors and threats were qualitatively ranked on a scale from very low to very high by the workshop participants (NMFS 2017). No demographic factors or threats were ranked high or very high. Abundance, diversity and spatial structure/connectivity were ranked very low to low, and growth rate/productivity was ranked low to moderate risk. For the workshop participants' threats assessments, both climate change and global or national climate change regulations received the most likelihood points in the moderate contribution to extinction risk category. Only one threat, climate change, received likelihood points in the high contribution category, though the majority of points were in the moderate contribution category. No threats considered by workshop participants were given an overall average score of medium, high or very high contributions to extinction risk of thorny skate. All workshop participants placed their individual point allocations in the very low contribution to extinction risk category for the following threats: Recreational fishing, recreational discards, educational collection, and stochastic events.

The only demographic factor ranked above low was growth rate/productivity (low to moderate risk). The thorny skate's life history traits make the populations vulnerable to threats and slow to recover from depletion. Once we compiled the individual workshop participant scores and calculated the mean score, only six threats were ranked in the low to moderate category, all others were in the very low to low categories. The threats ranked low to moderate included: Climate change, manmade non-fishing habitat impacts, commercial discards, commercial landings, global and national climate regulation, and inadequacy of existing NAFO regulations. Fishing for thorny skates is managed throughout the species' range. Efforts to manage the harvest of the species include regulations put forth by the United States, Canada, NAFO, and ICES, though workshop participants expressed uncertainty in the adequacy of NAFO regulation. Due to these recent management efforts, thorny skate abundance has stabilized in the several regions (*e.g.,* United States, South Labrador Shelf, North Gulf of St. Lawrence, Norway) and has increased in some waters (*e.g.* Grand Banks). Given its life history traits, return to historical abundances may take decades, but demographic risks are mostly low and significant threats have been reduced.

Overall Risk Summary

As described previously, the workshop participants used a ''likelihood analysis'' to evaluate the overall risk of extinction. Each workshop participant had 10 likelihood points to distribute among the following overall extinction risk categories: Low risk, moderate risk or high risk.

Overall, the mean scores we calculated based on the workshop participants' individual scores indicate that rangewide, thorny skates have a 93.3 percent likelihood of being at low risk of extinction, 6.6 percent likelihood of moderate risk of extinction, and 0 percent likelihood of high risk of extinction.

The mean scores we calculated based on the workshop participants' individual scores indicate that, overall, the thorny skate is at low risk of extinction. None of the workshop participants indicated that there was any likelihood of the thorny skate having a high risk of extinction. Additionally, there was very little likelihood of a moderate risk of extinction (4 points out of 60 total).

Thorny skates have been subjected to considerable fishing pressure for many decades, but improved fisheries management efforts in recent years have reduced fishing mortality rates on thorny skate stocks, and populations are no longer declining. Return to historical abundance may take decades, but demographic risks are mostly low and significant threats have been reduced. Based upon the available information summarized here, the mean scores we calculated based on the workshop participants' individual scores indicate that the thorny skate has a low risk of extinction, assuming the dominant threats to its populations continue to be managed. We have no reason to believe that these dominant threats will not continue to be managed.

We have independently reviewed the best available scientific and commercial information, including the status review report (NMFS 2017) and other published and unpublished information. We conclude that the thorny skate is not in danger of extinction or likely to become so in the foreseeable future throughout its range. As described earlier, an endangered species is ''any species which is in danger of extinction throughout all or a significant portion of its range'' and a threatened species is one ''which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' The workshop participants individually ranked the demographic criteria and the five factors identified in the ESA, completed an assessment of overall extinction risk, and each submitted his/her individual expert opinions to us. We reviewed the results of the ERA and concurred with the workshop participant's individual expert opinions regarding extinction risk. We then applied the statutory definitions of ''threatened species'' and ''endangered species'' to the ERA results and other available information to determine if listing the thorny skate was warranted.

The mean scores we calculated based on the ERA workshop participant scores indicate that the level of extinction risk to the thorny skate is low, with 93.3 percent of the workshop participants' likelihood points allocated to the ''low risk'' category. The workshop participants allocated only 6.6 percent of their likelihood points to the ''moderate extinction risk'' category. Given this low level of extinction risk, which is based on an evaluation of the contribution of the thorny skate's demographic parameters and threats to extinction risk, we have determined that the thorny skate does not meet the definition of an endangered or threatened species and, as such, listing under the ESA is not warranted at this time.

Significant Portion of Its Range

Though we find that the thorny skate rangewide is not in danger of extinction now or in the foreseeable future, under the SPR Policy, we must go on to evaluate whether these species are in danger of extinction, or likely to become so in the foreseeable future, in a ''significant portion of its range'' (79 FR 37578; July 1, 2014).

When we conduct an SPR analysis, we first identify any portions of the range that warrant further consideration. The range of a species can theoretically be divided into portions in an infinite number of ways. However, there is no purpose to analyzing portions of the range that are not reasonably likely to be significant or in which a species may not be endangered or threatened. To identify only those portions that warrant further consideration, we determine whether there is substantial information indicating that (1) the portions may be significant and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. We emphasize that answering these questions in the affirmative is not a determination that the species is endangered or threatened throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required (79 FR 37578; July 1, 2014). Making this preliminary determination triggers a need for further review, but does not prejudge whether the portion actually meets these standards such that the species should be listed.

If this preliminary determination identifies a particular portion or portions for potential listing, those portions are then fully evaluated under the ''significant portion of its range'' authority as to whether the portion is *both* biologically significant *and* endangered or threatened. In making a determination of significance, we consider the contribution of the individuals in that portion to the viability of the species. That is, we determine whether the portion's contribution to the viability is so important that, without the members in that portion, the species would be in danger of extinction or likely to become so in the foreseeable future.

The SPR policy further explains that, depending on the particular facts of each situation, we may find it is more efficient to address the significance issue first, but in other cases, it will make more sense to examine the status of the species in the potentially significant portions first. Whichever question is asked first, an affirmative answer is required to proceed to the second question. *Id.* ''[I]f we determine that a portion of the range is not 'significant,' we will not need to determine whether the species is endangered or threatened there; if we determine that the species is not endangered or threatened in a portion of its range, we will not need to determine if that portion is 'significant' '' (79 FR 37587). Thus, if the answer to the first question is negative—whether it addresses the significance question or the status question—then the analysis concludes, and listing is not warranted.

As described previously, we determined that there are no DPSs of the thorny skate, and rangewide, the thorny skate is at a low risk of extinction. Applying the SPR policy to the thorny skate, we first evaluated whether there is substantial information indicating that any portions of the species' range may be significant. After a review of the best available information and invited experts' opinions, as described below, we find that the data do not indicate any portion of the thorny skate's range as being more significant than another. Thorny skates are distributed across the North Atlantic and have very few restrictions governing their movements. Movements are restricted by depth and temperature; however, there are no known gaps in suitable habitat, thus allowing a continuous range. Because the Northwest Atlantic and the Northeast Atlantic are the two largest portions of the species' range, the workshop participants individually considered the SPR questions related to abundance, productivity, spatial distribution, and diversity outlined in the NMFS listing guidance. As explained below, we determined that neither the Northwest Atlantic nor the Northeast Atlantic were significant portions. Given that neither the Northwest Atlantic nor the Northeast Atlantic represents a significant portion of the range, we do not find that thorny skate in U.S. waters represent a significant portion of the range of the thorny skate. The following questions related to significance of portions were considered:

Abundance

- Without that portion, would the level of abundance of the remainder of the species cause the species to be at moderate or high risk of extinction due to environmental variation or anthropogenic perturbations (of the patterns and magnitudes observed in the past and expected in the future)?
- Without that portion, would the abundance of the remainder of the species be so low, or variability in abundance so high, that it would be at moderate or high risk of extinction due to depensatory processes?
- Without that portion, would abundance of the remainder of the species be so low that its genetic diversity would be at risk due to inbreeding depression, loss of genetic variation, or fixation of deleterious alleles?
- Without that portion, would abundance of the remainder of the species be so low that it would be at moderate or high risk of extinction due to its inability to provide important ecological functions throughout its life-cycle?
- Without that portion, would the abundance of the remainder of the species be so low that it would be at risk due to demographic stochasticity?

Productivity

- Without that portion, would the average population growth rate of the remainder of the species be below replacement such that it would be at moderate or high risk of satisfying the abundance conditions described above?
- Without that portion, would the average population growth rate of the remainder of the species be below replacement such that it is unable to exploit requisite habitats/niches/etc. or at risk due to depensatory processes during any life-history stage?
- Without that portion, would the remainder of the species exhibit trends or shifts in demographic or reproductive traits that portend declines in the per capita growth rate, which pose a risk of satisfying any of the preceding conditions?

Spatial Distribution

- Will the loss of one or more of the portions significantly increase the risk of extinction to the species as a whole by making the species more vulnerable to catastrophic events such as storms, disease or temperature anomalies?
- Will connectivity between portions of the species' range be maintained if a portion is lost (*e.g.,* does the loss of one portion of the range of the species create isolated groups or populations?)?
- Are there particular habitat types that the species occupies that are only found in certain portions of the species' range? If so, would these habitat types be accessible if a portion or portions of the range of the species are lost?
- Are threats to the species concentrated in particular portions of the species' range and if so, do these threats pose an increased risk of extinction to those portions' persistence?

Diversity

- Will unique genetic diversity be lost if a portion of the range of the species is lost?
- Does the loss of this genetic diversity pose an increased risk of extinction to the species?

As described more fully in the status review report and below, the workshop participants individually answered ''no'' to all of the abundance, productivity and diversity questions related to whether the Northwest Atlantic or the Northeast Atlantic portion represent a significant portion of the species' range. One workshop participant answered ''yes'' to two spatial distribution questions.

Given estimates of 1.8 billion animals in Northwest Atlantic waters, which represent 30–40 percent of the overall population, loss of the Northwest Atlantic population would have a large impact on the species rangewide, but would not put the species at a moderate or high risk of extinction because of the remaining large population size and wide geographic distribution. When considering productivity, the group noted that the average growth rate for the species does not depend on the growth rate in the Northwest Atlantic and vice versa for the Northeast Atlantic and that the areas do not exhibit source-sink dynamics. There was no evidence that without either area the average population growth rate of the remainder of the species would drop below replacement, resulting in the population being unable to exploit requisite habitat, nor was there any evidence that the remainder of the species would be at risk due to depensatory processes. Regarding shifts in demographic or reproductive traits, the group could not identify evidence that a decline in the Northwest Atlantic would result in a decline in the Northeast Atlantic. Given the large spatial distribution of the thorny skate and the foreseeable future of 40 years, the group could not identify a stochastic event that could impact the entire Northwest Atlantic or Northeast Atlantic distribution of the thorny skate. There is no information to suggest that loss of any portion would severely fragment and isolate the species to the point where individuals would be precluded from moving to suitable habitats or have an increased vulnerability to threats. The loss of either the Northwest Atlantic population or the Northeast Atlantic population would result in the loss of connectivity rangewide, given that it is a continuous population. However, loss of the Northwest Atlantic population would not affect spatial connectivity of the Northeast Atlantic population and vice versa. Some genetic differentiation is present between the Northwest and Northeast Atlantic, but the central portion of the range appears to bridge diversity between these two areas. This is likely made possible by the continuous distribution and depth range of the species. There is no substantial evidence to indicate that the loss of genetic diversity from one portion of the species' range would result in the remaining populations lacking enough genetic diversity to allow for adaptations to changing environmental conditions. Based on the best available genetic research, thorny skates have the highest genetic diversity out of 15 studied skate species (Lynghammar *et al.,* 2014), and the highest diversity occurs in waters near Iceland and Greenland. Due to the genetic diversity present in thorny skates across the species' range, loss of either the Northeast Atlantic population or Northwest Atlantic population would not present a significant increase in the extinction risk to the species.

The petitioners identified the U.S. population as a potential DPS. As noted above, this portion does not qualify as a DPS. We considered whether U.S. waters could be a significant portion of the species' range. However, due to the workshop participants individual expert opinions related to abundance, productivity, spatial distribution, and diversity questions for the larger Northwest Atlantic and Northeast Atlantic populations and our findings that neither of these constitute a significant portion of the species' range, and given the United States represents only a small portion of the global range of the thorny skate, there is little evidence for concluding that the U.S. population is significant to the entire species under the SPR policy. Furthermore, there is no indication that loss of the U.S. portion of the species' range would result in a moderate or high extinction risk to the global species. As was mentioned previously, the available population and trend data do not indicate that past declines in the United States have affected global populations of thorny skate. Thus, the United States population would not qualify as ''significant'' under the SPR Policy. Likewise, there is no substantial evidence to indicate that the loss of genetic diversity from one portion of the species' range would result in the remaining populations lacking enough genetic diversity to allow for adaptations to changing environmental conditions. Similarly, there is no information to suggest that loss of any portion would severely fragment and isolate the species to the point where individuals would be precluded from moving to suitable habitats or have an increased vulnerability to threats. In other words, loss of any portion of its range would not likely isolate the species to the point where the remaining populations would be at risk of extinction from demographic processes.

In summary, areas exhibiting source-sink dynamics, which could affect the survival of the species, were not evident in any part of the thorny skate's range. There is also no evidence of a portion that encompasses aspects that are important to specific life history stages, but another portion that does not, where loss of the former portion would severely impact the growth, reproduction, or survival of the entire species. In other words, the viability of the species does not appear to depend on the productivity of the population or the environmental characteristics in any one portion. It is important to note that the overall distribution of the thorny skate is still uncertain. As better data become available, the species' distribution (and potentially significant portions of its range) will become better resolved. However, at this time, there is no evidence to suggest that any specific portion of the species' range has increased importance over another with respect to the species' survival. We reviewed the individual workshop participants' expert opinions and application of the SPR policy. We conclude that under the SPR policy, the preliminary determination that a portion of the species' range may be both significant and endangered or threatened has not been met. Therefore, listing the thorny skate based on it being threatened or endangered in a significant portion of its range is not warranted under the SPR policy.

Final Determination

Section 4(b)(1) of the ESA requires that listing determinations be based solely on the best scientific and commercial data available after conducting a review of the status of the species and taking into account those efforts, if any, being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species. We have independently reviewed the best available scientific and commercial information, including the petition, information submitted in response to the 90-day finding (80 FR 65175; October 28, 2015), the status review report (NMFS 2017), and other published and unpublished information cited herein, and we have consulted with species experts and individuals familiar with the thorny skate. We identified no DPSs of the thorny skate and therefore considered the species rangewide. We considered each of the section 4(a)(1) factors to determine whether any one of the factors contributed significantly to the extinction risk of the species. We also considered the combination of those factors to determine whether they collectively contributed significantly to extinction risk. As previously explained, we could not identify any portion of the species' range that met both criteria of the SPR policy. Therefore, our determination set forth below is based on a synthesis and integration of the foregoing information, factors and considerations, and their effects on the status of the species throughout its range.

We conclude that the thorny skate is not in danger of extinction, nor is it likely to become so in the foreseeable future throughout all or a significant portion of its range. We summarize the factors supporting this conclusion as follows: (1) The species is broadly distributed over a large geographic range within the North Atlantic Ocean, with no barrier to dispersal; (2) genetic data indicate that populations are not isolated and that the species has high genetic diversity, (3) while the species possesses life history characteristics that increase its vulnerability to overutilization, overfishing is not currently occurring within the range; (4) the best available information indicates that abundance and biomass has stabilized rangewide and on the edge of the range in U.S. waters; (5) current thorny skate populations are numerous in many areas and the area occupied is increasing; (6) while the current population size has declined from historical numbers, the population size is sufficient to maintain population viability into the foreseeable future and consists of at least millions of individuals; (7) a main threat to the species is fishery-related mortality from incidental catch (bycatch); however, there are strict management measures in place to minimize this threat throughout the species' range, and these measures appear to be effective in addressing this threat as evidenced by stabilizing numbers of thorny skates; (8) there is no evidence that disease or predation is contributing to increasing the risk of extinction; and (9) there is no evidence that the species is currently suffering from depensatory processes (such as reduced likelihood of finding a mate or mate choice or diminished fertilization and recruitment success) or is at risk of extinction due to environmental variation or anthropogenic perturbations.

Since the thorny skate is not in danger of extinction throughout all or a significant portion of its range or likely to become so within the foreseeable future, it does not meet the definition of a threatened species or an endangered species. Therefore, the thorny skate does not warrant listing as threatened or endangered at this time.

Thorny skates in the Atlantic Ocean from West Greenland to New York were identified as a NMFS ''species of concern'' in 2006. A species of concern is one for which we have concerns regarding status and threats but for which insufficient information is available to indicate a need to list the species under the ESA. In identifying species of concern, we consider demographic and genetic diversity concerns; abundance and productivity; distribution; life history characteristics and threats to the species. Given the information presented in the status review report and the findings of this listing determination, we are removing the thorny skate from the ''species of concern'' list.

References

A complete list of all references cited herein is available upon request (see **FOR FURTHER INFORMATION CONTACT**).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: February 21, 2017.

Alan D. Risenhoover,

Acting Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

[FR Doc. 2017–03644 Filed 2–23–17; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF242

New England Fishery Management Council (NEFMC); Public Meeting

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; public meeting.

SUMMARY: The New England Fishery Management Council (Council) is scheduling a public meeting of its NEFMC External Peer Review Management Strategy Evaluation of Atlantic Herring Acceptable Biological Catch Control Rules from to consider actions affecting New England fisheries in the exclusive economic zone (EEZ). Recommendations from this group will be brought to the full Council for formal consideration and action, if appropriate.

DATES: This meeting will be held on Monday, March 13, 2017 through Wednesday, March 15 starting at 9 a.m. all three days.

ADDRESSES: The meeting will be held at the Embassy Suites, Boston Logan Airport, 207 Porter Street, Boston, MA 02128: (617) 657–5000.

Council address: New England Fishery Management Council, 50 Water Street, Mill 2, Newburyport, MA 01950.

FOR FURTHER INFORMATION CONTACT: Thomas A. Nies, Executive Director, New England Fishery Management Council; telephone: (978) 465–0492.

SUPPLEMENTARY INFORMATION:

Agenda

The New England Fishery Management Council (Council) is conducting a peer review of the Management Strategy Evaluation (MSE) of Atlantic Herring Acceptable Biological Catch (ABC) Control Rules. Atlantic herring, predators, and economic models were developed to evaluate control rules and performance metrics. Experts have been invited by the Council to evaluate the MSE methods, data, and results. The panel will evaluate whether the MSE is sufficient for the Council to use when identifying and analyzing a range of ABC control rule alternatives in Amendment 8 to the Atlantic Herring Fishery Management Plan. This public meeting will have designated times on the agenda when public comment is welcome.

Special Accommodations

This meeting is physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aids should be directed to Thomas A. Nies, Executive Director, at (978) 465–0492, at least 5 days prior to the meeting date. This meeting will be recorded. Consistent with 16 U.S.C. 1852, a copy of the recording is available upon request.

Authority: 16 U.S.C. 1801 *et seq.*

Dated: February 21, 2017.

Tracey L. Thompson,

Acting Deputy Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2017–03642 Filed 2–23–17; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

RIN 0648–XF240

Mid-Atlantic Fishery Management Council (MAFMC); Meeting

AGENCY: National Marine Fisheries Service (NMFS), National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice; public meeting.

SUMMARY: The Scientific and Statistical Committee (SSC) of the Mid-Atlantic Fishery Management Council (Council) will hold a meeting.

DATES: The meeting will be held on Wednesday and Thursday, March 15–16, 2017, beginning at 1 p.m. on March 15 and conclude by 1 p.m. on March 16. For agenda details, see **SUPPLEMENTARY INFORMATION**.

ADDRESSES: The meeting will at the Royal Sonesta Harbor Court, 550 Light Street, Baltimore, MD 21202; telephone: (410) 234–0550.

Council address: Mid-Atlantic Fishery Management Council, 800 N. State Street, Suite 201, Dover, DE 19901; telephone: (302) 674–2331 or on their Web site at *www.mafmc.org.*

FOR FURTHER INFORMATION CONTACT: Christopher M. Moore, Ph.D., Executive Director, Mid-Atlantic Fishery Management Council, telephone: (302) 526–5255.

SUPPLEMENTARY INFORMATION: The purpose of this meeting is to make multi-year ABC recommendations for golden and blueline tilefish based on updated stock assessment information recently complied for both species. In addition, topics to be discussed include the NEFSC Ecosystem Status Report, SSC OFL CV Progress Report, MRIP Evaluation Report and establishing status determination criteria for chub mackerel.

Special Accommodations

These meetings are physically accessible to people with disabilities. Requests for sign language interpretation or other auxiliary aid should be directed to M. Jan Saunders, (302) 526–5251, at least 5 days prior to the meeting date.

Dated: February 21, 2017.

Tracey L. Thompson,

Acting Deputy Director, Office of Sustainable Fisheries, National Marine Fisheries Service.

[FR Doc. 2017–03658 Filed 2–23–17; 8:45 am]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

Proposed Information Collection; Comment Request; 3D Nation Requirements and Benefits Elevation Data Study Questionnaire

AGENCY: National Oceanic and Atmospheric Administration (NOAA), Commerce.

ACTION: Notice.