Subpart B—Physicians and Other Practitioners

2. Section 414.92 is amended by revising paragraph (c)(2)(ii) to read as follows:

§ 414.92 Electronic Prescribing Incentive Program.

* * * * *

(c) * * *

(2) * * *

(ii) *Significant hardship exception.* CMS may, on a case-by-case basis, exempt an eligible professional (or in the case of a group practice under paragraph (e) of this section, a group practice) from the application of the payment adjustment under paragraph (c)(2) of this section if, CMS determines, subject to annual renewal, that compliance with the requirement for being a successful electronic prescriber would result in a significant hardship. Eligible professionals (or, in the case of a group practice under paragraph (e) of this section, a group practice) may request consideration for a significant hardship exemption from the 2012 eRx payment adjustment if one of the following circumstances apply:

(A) The practice is located in a rural area without high speed Internet access.

(B) The practice is located in an area without sufficient available pharmacies for electronic prescribing.

(C) Registration to participate in the Medicare or Medicaid EHR Incentive Program and adoption of certified EHR technology.

(D) Inability to electronically prescribe due to local, State or Federal law or regulation.

(E) Limited prescribing activity.

(F) Insufficient opportunities to report the electronic prescribing measure due to limitation's of the measure's denominator.

* * * * *

(Catalog of Federal Domestic Assistance Program No. 93.773, Medicare—Hospital Insurance; and Program No. 93.774, Medicare—Supplementary Medical Insurance Program)

Dated: April 28, 2011.

Donald M. Berwick,

Administrator, Centers for Medicare & Medicaid Services.

Approved: May 4, 2011.

Kathleen Sebelius,

Secretary, Department of Health and Human Services.

[FR Doc. 2011–13463 Filed 5–26–11; 11:15 am]

BILLING CODE 4120–01–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Parts 223 and 224

[Docket No. 100903415–1286–02]

RIN 0648–XW96

Endangered and Threatened Wildlife and Plants; Endangered Species Act Listing Determination for Atlantic Bluefin Tuna

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

ACTION: Notice of a listing determination and availability of a status review document.

SUMMARY: After we, NMFS, received a petition to list Atlantic bluefin tuna (*Thunnus thynnus*) as threatened or endangered under the Endangered Species Act (ESA), we established a status review team (SRT) to conduct a review of the status of Atlantic bluefin tuna. We have reviewed the SRT's status review report (SRR) and other available scientific and commercial information and have determined that listing Atlantic bluefin tuna as threatened or endangered under the ESA is not warranted at this time. We also announce the availability of the SRR.

DATES: This finding is made as of May 27, 2011.

ADDRESSES: The Atlantic bluefin tuna status review report and list of references are available by submitting a request to the Assistant Regional Administrator, Protected Resources Division, Northeast Region, NMFS, 55 Great Republic Way, Gloucester, MA 01930. The status review report and other reference materials regarding this determination can also be obtained via the Internet at: *http://www.nero.noaa.gov/prot_res/CandidateSpeciesProgram/cs.htm.*

FOR FURTHER INFORMATION CONTACT: Kim Damon-Randall, NMFS Northeast Regional Office, (978) 282–8485; or Marta Nammack, NMFS, Office of Protected Resources (301) 713–1401.

SUPPLEMENTARY INFORMATION:

Background

On May 24, 2010, the National Marine Fisheries Service (NMFS) received a petition from the Center for Biological Diversity (CBD) (hereafter referred to as the Petitioner), requesting that we list the entire species of Atlantic bluefin tuna (*Thunnus thynnus*) or in the alternative, an Atlantic bluefin tuna distinct population segment (DPS) consisting of one or more subpopulations in United States waters, as endangered or threatened under the ESA, and designate critical habitat for the species. The petition contains information on the species, including the taxonomy; historical and current distribution; physical and biological characteristics of its habitat and ecosystem relationships; population status and trends; and factors contributing to the species' decline. The Petitioners also included information regarding possible DPSs of Atlantic bluefin tuna. The petition addresses the five factors identified in section 4(a)(1) of the ESA as they pertain to Atlantic bluefin tuna: (A) Current or threatened habitat destruction or modification or curtailment of habitat or range; (B) overutilization for commercial purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; and (E) other natural or man-made factors affecting the species' continued existence.

On September 21, 2010, we determined that the petition presented substantial information indicating that the petitioned action may be warranted and published a positive 90-day finding in the **Federal Register** (FR) (75 FR 57431). Following our positive 90-day finding, we convened an Atlantic bluefin tuna status review team (SRT) to review the status of the species.

In order to conduct a comprehensive review, we asked the SRT to assess the species' status and degree of threat to the species with regard to the factors provided in Section 4(a)(1) of the ESA without making a recommendation regarding listing. The SRT was provided a copy of the petition and all information submitted in response to the data request in the FR notice announcing the 90-day finding. In order to provide the SRT with all available information, we invited several Atlantic bluefin tuna experts to present information on the life history, genetics, and habitat used by Atlantic bluefin tuna to the SRT.

We also hosted five listening sessions with Atlantic bluefin tuna fishermen. These sessions were held in Maine, Massachusetts, New Jersey, North Carolina, and Mississippi. Those with information relevant to the discussion topics for the sessions were also encouraged to submit information via mail or electronic mail. The SRT reviewed all this information during its consideration and analysis of potential threats to the species. The SRR is a summary of the information assembled by the SRT and incorporates the best scientific and commercial data available (*e.g.,* fisheries data that are available to assist in assessing the status of the species). In addition, the SRT summarized current conservation and research efforts that may yield protection, and drew scientific conclusions about the status of Atlantic bluefin tuna throughout its range.

The SRT completed a draft SRR in March 2011. As part of the full evaluation of the status of Atlantic bluefin tuna under the ESA, we requested that the Center for Independent Experts (CIE) select three independent experts to peer review the SRR. The reviewers were asked to provide written summaries of their comments to ensure that the content of the SRR is factually supported and based on the best available data, and the methodology and conclusions are scientifically valid. Prior to finalizing the SRR, the SRT considered and incorporated, as appropriate, the peer reviewers' comments. The final SRR was submitted to us on May 20, 2011.

Range

Atlantic bluefin tuna are highly migratory pelagic fish that range across most of the North Atlantic and its adjacent seas, particularly the Mediterranean Sea. They are the only large pelagic fish living permanently in temperate Atlantic waters (Bard *et al.,* 1998, as cited in Fromentin and Fonteneau, 2001). In the Atlantic Ocean and adjacent seas, they can range from Newfoundland south to Brazil in the western Atlantic, and in the eastern Atlantic from Norway south to western Africa (Wilson *et al.,* 2005).

Habitat and Migration

Atlantic bluefin tuna are epipelagic and typically oceanic; however, they do come close to shore seasonally (Collette and Nauen, 1983). They often occur over the continental shelf and in embayments, especially during the summer months when they feed actively on herring, mackerel, and squids in the North Atlantic. Larger individuals move into higher latitudes than smaller fish. Surface temperatures where large Atlantic bluefin tuna have been found offshore in the northwest Atlantic range between 6.4 and 28.8 °C, whereas smaller Atlantic bluefin tuna are generally found in warmer surface water ranging from 15 to 17 °C (Collette and Klein-MacPhee, 2002). In general, Atlantic bluefin tuna occupy surface waters around 24 °C in the Western Atlantic (Block *et al.,* 2005; Teo *et al.,* 2007) and in the Eastern Atlantic/Mediterranean, generally around 20.5 to 21.5 °C (Royer *et al.,* 2004) and above 24 °C for spawning (Mather *et al.,* 1995; Schaefer, 2001; Garcia *et al.,* 2005).

Archival tagging and tracking information have confirmed that Atlantic bluefin tuna are endothermic (*i.e.,* able to endure cold as well as warm temperatures while maintaining a stable internal body temperature). It was once thought that Atlantic bluefin tuna preferentially occupy surface and subsurface waters of the coastal and open-sea areas; however, data from archival tagging and ultrasonic telemetry indicate that they frequently dive to depths of 500 m to 1,000 m (Lutcavage *et al.,* 2000). While they do dive frequently to deeper depths, they generally spend most of their time in waters less than 500 m, and often much shallower.

As stated previously, Atlantic bluefin tuna are highly migratory; however, they do display homing behavior and spawning site fidelity in both the Gulf of Mexico and the Mediterranean Sea, and these two areas constitute the two primary spawning areas identified to date. Larvae have, however, been documented outside of the Gulf of Mexico in the western Atlantic, and the possibility of additional spawning areas cannot be discounted (McGowan and Richards, 1989).

It appears that larvae are generally retained in the Gulf of Mexico until June, and schools of young-of-the-year (YOY) begin migrating to juvenile habitats (McGowan and Richards, 1989) thought to be located over the continental shelf around 34°N and 41°W in the summer, and further offshore in the winter. They have also been identified from the Dry Tortugas area in June and July (McGowan and Richards, 1989; ICCAT, 1997). Juveniles migrate to nursery areas located between Cape Hatteras, North Carolina and Cape Cod, Massachusetts (Mather *et al.,* 1995).

Atlantic bluefin tuna have not been observed spawning (Richards, 1991); however, recent work has identified putative breeding behaviors by Atlantic bluefin tuna while in the Gulf of Mexico (Teo *et al.,* 2007). Presumed Atlantic bluefin tuna breeding behaviors were associated with bathymetry (continental slope waters), sea surface temperature (moderate), eddy kinetic energy (moderate), surface chlorophyll (low concentrations), and surface wind speed (moderate) (Teo *et al.,* 2007).

Western Atlantic

Essential fish habitat (EFH) is defined under the Magnuson-Stevens Act as waters, aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; and the substrate, sediment, hard bottom, structures underlying the waters, and associated biological communities that are necessary to fish for spawning, breeding, feeding, or growth to maturity, representing the species full life cycle.

For western Atlantic bluefin tuna, EFH was defined in the Final Amendment 1 to the Consolidated Highly Migratory Species Fishery Management Plan (NMFS Amendment 1, 2009). Atlantic bluefin tuna EFH for spawning, eggs, and larvae was defined as following the 100 m depth contour in the Gulf of Mexico to the Exclusive Economic Zone (EEZ), and continuing to the mid-east coast of Florida. For juveniles sized less than 231 cm fork length (FL), EFH was defined as waters off North Carolina, south of Cape Hatteras to Cape Cod. For adult sizes equal to or greater than 231 cm FL, it was defined as pelagic waters of the central Gulf of Mexico and the mid-east coast of Florida, North Carolina from Cape Lookout to Cape Hatteras, and New England from Connecticut to the mid-coast of Maine.

It is believed that there are certain features of the Atlantic bluefin tuna larval habitat in the Gulf of Mexico which determine growth and survival rates and that these features show variability from year to year, perhaps accounting for a significant portion of the fluctuation in yearly recruitment success (McGowan and Richards, 1989). The habitat requirements for larval success are not known, but larvae are collected within narrow ranges of temperature and salinity; approximately 26 °C and salinities of 36 parts per thousand (ppt). Along the coast of the southeastern United States, onshore meanders of the Gulf Stream can produce upwelling of nutrient rich water along the shelf edge. In addition, compression of the isotherms on the edge of the Gulf Stream can form a stable region which, together with upwelling nutrients, provides an area favorable to maximum growth and retention of food for the larvae (McGowan and Richards, 1989).

Additionally, NMFS Amendment 1 designated a Habitat Area of Particular Concern (HAPC) for bluefin tuna. The bluefin tuna HAPC is located west of 86 ° W and seaward of the 100 m isobath, extending from the 100 m isobath to the EEZ. The area includes a majority of the locations where Atlantic bluefin tuna larval collections have been documented, overlaps with adult and larval Atlantic bluefin tuna EFH, and incorporates portions of an area identified as a primary spawning location by Teo *et al.* (2007). The Gulf of Mexico is believed to be the primary spawning area for western Atlantic bluefin tuna, and the HAPC designation highlights the importance of the area for Atlantic bluefin tuna spawning. It may also provide added conservation benefits if steps are taken to reduce impacts from development activities through the consultation process.

Eastern Atlantic

The best known spawning areas for the eastern Atlantic bluefin tuna are southwest of the Balearic Sea, the central and southern Tyrrhenian Sea, the central Mediterranean Sea southwest of Malta, and the eastern Mediterranean Sea in the south Aegean to the area north of Cyprus, particularly the area between Anamur and Mersin in the Levantine Sea. Important spatial changes in some of the most relevant spawning areas have been noticed in the last 10 years, particularly in the south Tyrrhenian and central Mediterranean. Most of the available information reports a major presence of bluefin tuna along the coasts of Croatia, south Adriatic Sea, western Ionian Sea, Tyrrhenian Sea, all the northwestern Mediterranean coast, in some areas of Morocco and Tunisia, in a few Aegean areas, and in the Levantine Sea (between Anamur and Mersin).

Areas where juveniles concentrate have been noticed to change from year to year. Juveniles are mostly present in feeding aggregations or schools during fall, from September to December. Mature specimens have been reported from most of the Mediterranean areas, with the only exceptions being the Gulf of Lions and the northern Adriatic Sea. Larvae have also been found in most of the Mediterranean surface waters, with a major concentration in areas where gyres and fronts are present, particularly in the second part of summer.

Young-of-the-year (YOY) Atlantic bluefin tuna have been found mostly in coastal areas over the continental shelf, whenever preferred prey is present. Tagging data showed that Atlantic bluefin tuna movement within the Mediterranean Sea is often limited, particularly for individuals tagged in the eastern regions of the basin. Movements of Atlantic bluefin tuna tagged in the central and western Mediterranean Sea were more pronounced than those tagged in the eastern portion. Seasonal prey abundance drives the concentration of both young and adult specimens in those Mediterranean Sea areas not used for reproduction (*e.g.* Ligurian Sea, north-central Adriatic Sea). Many larger individuals (> 150 kg) move out of the Mediterranean, and their movement patterns and displacement distance seem to be related to size and the exploitation of feeding grounds outside the Mediterranean Sea (Wurtz, 2010), while some are resident year round.

Consideration as a Species Under the ESA

According to Section 3 of the ESA, the term "species" includes "any subspecies of fish or wildlife or plants, and any distinct population segment of any species of vertebrate fish or wildlife that interbreeds when mature." Congress included the term "distinct population segment" in the 1978 amendments to the ESA. On February 7, 1996, the U.S. Fish and Wildlife Service and NMFS (jointly referred to as the Services) adopted a policy to clarify their interpretation of the phrase "distinct population segment" for the purpose of listing, delisting, and reclassifying species (61 FR 4721). The policy described two criteria a population segment must meet in order to be considered a DPS (61 FR 4721):

1. It must be discrete in relation to the remainder of the species to which it belongs; and
2. It must be significant to the species to which it belongs.

Determining if a population is discrete requires either one of the following conditions:

1. It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, 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.

If a population is deemed discrete, then the population segment is evaluated in terms of significance, which may include, but is not limited to, the following:

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 the 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 historic range; or
4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

If a population segment is deemed discrete and significant, then it qualifies as a DPS.

Discreteness

Rooker *et al.* (2008) analyzed the chemical composition of otoliths (*e.g.,* fish ear bones) from Atlantic bluefin tuna that were 12 to 18 months of age and that were caught between 1999 and 2004 in both the eastern (Mediterranean Sea/eastern Atlantic Ocean) and western (Gulf of Mexico/eastern coast of the United States) nurseries. These authors found that otolith composition was distinct between yearlings from the two different nursery areas, and that the chemical signature was significantly different for yearlings from the eastern nursery in five of the years (all except 2001) (Rooker *et al.,* 2008).

Dickhut *et al.* (2009) used organochlorine and polychlorinated biphenyl (PCB) tracers from Atlantic bluefin tuna foraging grounds to determine the rate of mixing of different size classes between the eastern and western stocks. Their results indicated that mixing of juvenile Atlantic bluefin tuna from the eastern to the western foraging grounds could be as high as 80 percent for certain age classes and that juveniles from the Mediterranean Sea may migrate to western Atlantic foraging grounds as early as age 1 (Dickhut *et al.,* 2009). However, this study also indicated that medium to giant sized Atlantic bluefin tuna entering the Gulf of Mexico breeding grounds showed PCB ratios similar to that of the western Atlantic young-of-the-year (YOY), which suggests little or no mixing on the spawning grounds in the Gulf of Mexico, as these fish have been foraging in the western Atlantic rather than foraging grounds used by Mediterranean bluefin tuna (Dickhut *et al.,* 2009).

Carlsson *et al.* (2006) conducted analyses of 320 YOY Atlantic bluefin tuna to evaluate the hypothesis that 2 separate spawning grounds exist for the western and eastern stocks—Gulf of Mexico and Mediterranean Sea, respectively. In this study, Carlsson *et al.* (2006) conducted a microsatellite analysis of 8 loci and examined the mitochondrial DNA control region and found significant genetic differentiation among YOY fish captured in the Gulf of Mexico spawning grounds versus those captured in the Mediterranean spawning area. Their results support a high degree of spawning site fidelity, and thus, they noted that the recognition of genetically distinct populations requires independent management of the stocks of this species (Carlsson *et al.,* 2006).

Riccioni *et al.* (2010) indicated that genetic analyses and microchemical signatures from otoliths strongly support the existence of two distinct primary spawning areas for Atlantic bluefin tuna (the Mediterranean and Gulf of Mexico). These authors noted that significant genetic divergence was found between these two spawning stocks using microsatellite (Carlsson *et al.,* 2007) and mitochondrial DNA analyses (Boustany *et al.,* 2008), and they also indicated that there are high rates of spawning site fidelity of 95.8 percent and 99.3 percent for the Mediterranean Sea and Gulf of Mexico, respectively (Rooker *et al.,* 2008; Block *et al.,* 2005).

The best available information indicates that fish from the Mediterranean stock, while making some trans-Atlantic migrations, return to the Mediterranean to spawn while fish from the Gulf of Mexico stock return to the Gulf of Mexico to spawn. This separation between the stocks is supported by the aforementioned genetic analyses which indicate significant genetic differentiation between the two stocks as described above. In addition, the results of the otolith microchemistry analyses indicate that natal homing or spawning site fidelity does occur, and the study by Dickhut *et al.* (2009) using organochlorine and PCB tracers also indicate that there is little to no mixing on the spawning grounds. Furthermore, according to Rooker *et al.* (2008), the rates of spawning site fidelity are 95.8 percent and 99.3 percent for the Mediterranean Sea and Gulf of Mexico, respectively. Thus, the two populations in the North Atlantic are discrete.

The available data further suggest that the eastern Atlantic stock exhibits genetic differentiation, spatial separation during spawning as a result of spawning site fidelity/natal homing, and differences in behavior (*e.g.,* some resident fish in the eastern Mediterranean versus non-resident/migratory fish in the western Mediterranean) with different spawning areas in the western and eastern Mediterranean. According to Reeb (2010), the eastern and western basins of the Mediterranean exhibit differences in temperature, circulation patterns, and salinity, and the basins are considered oceanographically to be separated by the straits of Sicily and Messina. Thus, even though Atlantic bluefin tuna are highly migratory, the areas that they home to in order to spawn may possess unique characteristics. All of this evidence combined with the recent evidence suggesting a separate spawning area in the eastern Mediterranean and genetic analyses which demonstrate significant genetic differences between western and eastern Mediterranean fish and between the Mediterranean and Gulf of Mexico spawning areas led Fromentin (2009) to hypothesize that Atlantic bluefin tuna are comprised of at least three sub-populations: (1) A highly migratory stock over all of the North Atlantic that spawns in western and central Mediterranean areas; (2) a more resident stock in the Mediterranean which spawns in the central and eastern Mediterranean; and (3) a more resident stock in the West Atlantic which spawns in the Gulf of Mexico. As such, two discrete populations may exist within the larger eastern Mediterranean population. While there is some evidence which indicates that there may be other, discrete spawning areas outside of the Gulf of Mexico, the locations of these areas have not been confirmed or fully described at this time.

Using the best available information, the SRT concluded that the western Atlantic and the eastern Atlantic populations are discrete from each other. Within the eastern Atlantic, the available information suggests that there may be two discrete populations of Atlantic bluefin tuna; however, the data are inconclusive regarding the Mediterranean at this time.

Significance

If a population is deemed discrete, then the population segment is evaluated in terms of significance. The western Atlantic population has been determined to be a discrete population from the two possible Mediterranean populations as described above. Consequently, it is necessary to assess the biological and ecological significance of each discrete population as described in the Services' DPS policy.

Several studies have documented that Atlantic bluefin tuna in the Mediterranean appear to prefer sea surface temperatures above 24 °C for spawning (Mather *et al.,* 1995; Schaefer, 2001; Garcia *et al.,* 2005), and in the Gulf of Mexico, Teo *et al.* (2007) noted that they prefer areas with surface temperatures between 24 and 27 °C. Since adult Atlantic bluefin tuna are present in the Gulf of Mexico as early as winter but are not usually in spawning condition until mid-April (Block *et al.,* 2001), an environmental cue such as temperature or photoperiod may trigger spawning (Muhling *et al.,* 2010).

Muhling *et al.* (2010) also indicated that Atlantic bluefin tuna larvae are generally absent from continental shelf areas with low surface temperatures and salinities at the beginning of the spawning period. They theorized that Atlantic bluefin tuna may avoid spawning in these areas as they are typically high in chlorophyll concentrations and, therefore, contain dense phytoplankton blooms which support high concentrations of zooplankton. While the high concentrations of zooplankton provide a source of larval prey, they attract other planktonic predators (Bakun, 2006). According to Muhling *et al.* (2010), larval tuna have specialized diets, often feeding on pelagic tunicates found in oligotrophic open ocean areas (Sommer and Stibor, 2002, as cited in Muhling *et al.,* 2010). Thus, these authors concluded that larval tuna in the Gulf of Mexico may be adapted to survive in nutrient poor waters. Muhling *et al.* (2010) concluded that favorable habitat for Atlantic bluefin tuna larvae in the Gulf of Mexico consists of areas of moderately warm water temperatures outside of the loop current, loop current eddies, and outside of continental shelf waters that contain cooler water with higher chlorophyll concentrations (Muhling *et al.,* 2010).

Oray and Karakulak (2005) described the spawning area surveyed in the northern Levantine Sea as containing waters with sea surface temperatures between 21.8 to 29.3 °C, salinity from 34.9 to 38.8 ppt, and depths between 63 to 2,448 m. Oray and Karakulak (2005) indicate that larval Atlantic bluefin tuna were found in areas with physical oceanographic features such as cyclonic eddies, which may indicate that the main larval populations are within these cyclonic eddies and that the tuna spawning site is within close proximity to the area in which the larvae were observed. According to Oray and Karakulak (2005), the optimal seawater temperatures in the Atlantic bluefin tuna spawning area in the northern Levantine Sea are between 23 to 25 °C, which generally occur early in June, whereas optimum temperatures for spawning in the western Mediterranean generally occur later, toward the end of June.

Garcia *et al.* (2005) characterized the Atlantic bluefin tuna spawning habitat off the Balearic Archipelago. These authors noted that Atlantic bluefin tuna larval abundance is associated with surface water temperatures between 24 and 25 °C in areas of inflowing Atlantic waters or transitional areas with Atlantic waters mixing with Mediterranean waters and that generally possess hydrographic features such as fronts and gyres (Garcia *et al.,* 2005).

According to Garcia *et al.* (2005), significant concentrations of Atlantic bluefin tuna larvae were found off the Mallorca channel in an area with frontal formations and south of Minorca where an anticyclonic gyre was observed. Garcia *et al.* (2005) note that these frontal structures and gyres may play an important role in providing concentrated prey resources for larval fish, which may in turn constitute an important part of the diet of larval Atlantic bluefin tuna. Low and isolated larval concentrations were observed in Mediterranean water masses north of the islands (Garcia *et al.,* 2005). The strong eastward current that flows from Ibiza towards Minorca may act as a transport mechanism for larvae (Garcia *et al.,* 2005). The area near Mallorca and the Ibiza channels is generally characterized by low concentrations of chlorophyll *a,* which is primarily due to the major influence of the nutrient poor water masses originating from the Atlantic (Garcia *et al.,* 2005).

While spawning areas for Atlantic bluefin tuna may at times be stressful environments, Atlantic bluefin tuna migrate long distances to reach the particular areas in which they spawn (Block *et al.,* 2001), and homing fidelity to these sites is high. Muhling *et al.* (2010) concluded that adults are targeting specific areas and oceanographic features in order to maximize larval survival. Consequently, the spawning areas in the Gulf of Mexico and Mediterranean are unique ecologically and possess the features (*e.g.,* appropriate water conditions such as temperatures, depths, salinities, and chlorophyll concentrations, hydrography) that are necessary for maximizing bluefin tuna spawning success for each population.

As noted previously, Atlantic bluefin tuna exhibit strong natal homing or spawning site fidelity. Therefore, it is unlikely individuals from the Mediterranean would spawn in the Gulf of Mexico, or that individuals from the Gulf of Mexico population would spawn in the Mediterranean. Thus, if one of the discrete populations was to be extirpated, it would represent a significant gap in the range of the taxon, in that either the Gulf of Mexico or the Mediterranean Sea would no longer support Atlantic bluefin tuna.

As presented above and as noted in the discreteness discussion, Atlantic bluefin tuna that spawn in the Gulf of Mexico and in the Mediterranean utilize unique ecological areas for spawning. There is information presented above that indicates that these areas possess unique features or characteristics to which larval tuna may be adapted. Also, some authors indicated that natal homing may be the result of behavior learned from older fish in the population and thus, the loss of a spawning group or of the mature fish could result in the permanent loss of a spawning area, and this area would most likely not be re-colonized by fish from another spawning group. This would represent a significant gap in the range of the taxon.

There is some evidence suggesting that there may be two discrete populations within the Mediterranean, but the SRT is unable to determine the significance of these populations to the species as a whole. While the two Mediterranean populations may be discrete, the SRT does not have enough information to conclude that they are significant, by themselves, to Atlantic bluefin tuna.

Based on the best available information, the SRT concluded that the western Atlantic and eastern Atlantic/Mediterranean populations represent two DPSs of Atlantic bluefin tuna. We agree with the SRT's DPS delineation, and refer to these DPSs as the western Atlantic DPS and eastern Atlantic/Mediterranean DPS of Atlantic bluefin tuna. The information presented in the remainder of this finding, therefore, pertains to the status of the western Atlantic and eastern Atlantic/Mediterranean DPSs of Atlantic bluefin tuna.

ICCAT Stock Assessment Summary for Atlantic Bluefin Tuna

Atlantic bluefin tuna are managed domestically by NMFS' Highly Migratory Species (HMS) Management Division and internationally by the International Commission for the Conservation of Atlantic Tunas (ICCAT). ICCAT manages the western Atlantic and eastern Atlantic/Mediterranean DPSs as two separate stocks (eastern and western stocks), separated by the 45 ° W meridian. In recent years, stock assessments for Atlantic bluefin tuna have been conducted approximately every 2 years by the Standing Committee on Research and Statistics (SCRS). The most recent ICCAT stock assessment was conducted by SCRS in 2010. Models and methodologies employed by ICCAT during the stock assessments were used by the SRT to develop an extinction risk analysis; therefore, a description of the models, methods, and results is provided in the SRR, and significant conclusions are summarized below.

Abundance of the Western Atlantic DPS of Atlantic Bluefin Tuna

According to the ICCAT SCRS stock assessment in 2010, the total catch for the western Atlantic peaked at 18,671 t (16,938.05 mt) in 1964, with catches dropping sharply thereafter with the collapse of the Atlantic bluefin tuna longline fishery off Brazil in 1967 and the decline in purse seine catches. Catch increased again to average over 5,000 t (4,535.92 mt) in the 1970s due to the expansion of the Japanese longline fleet into the northwest Atlantic and Gulf of Mexico, and an increase in purse seine effort targeting larger fish for the sashimi market.

Since 1982, the total catch for the western Atlantic including discards has generally been relatively stable due to the imposition of quotas by ICCAT. However, following a total catch level of 3,319 t (3,010.95 mt) in 2002 (the highest since 1981), total catch in the western Atlantic declined steadily to a level of 1,638 t (1,485.97 mt) in 2007 (the lowest level since 1982), before rising to 1,935 t (1,755.4 mt) in 2009, which was near the total allowable catch (TAC). The decline prior to 2007 was primarily due to considerable reductions in catch levels for U.S. fisheries. The major harvesters of western Atlantic bluefin tuna are Canada, Japan, and the United States.

Safina and Klinger (2008) summarized ICCAT management regulations and catch history for the western Atlantic stock; however, it was not a quantitative assessment of the stock. Due to the timing of publication, the authors were only able to consider catch data through 2006, and there have been changes to the western Atlantic bluefin tuna fishery since then. MacKenzie *et al.* (2009) projected a similar collapse; however due to timing of publication, they were also only considering catch data through 2006. The 2006 U.S. catches of Atlantic bluefin tuna were the lowest in recent history; however, since then, the U.S. fishery has seen increasing catches, and the U.S. base quota was fully realized in 2009 and 2010. MacKenzie *et al.* (2009) projected that by 2011, the adult population of Atlantic bluefin tuna would be 75 percent lower than the population in 2005. Furthermore, Safina and Klinger (2008) stated that “these trends [in U.S. catches] suggest U.S. bluefin may approach widespread commercial unavailability as early as 2008”; however, the results of the ICCAT 2010 bluefin tuna stock assessment (as described in more detail below) and the catch statistics submitted to ICCAT clearly refute these assertions.

The base case assessment is consistent with previous analyses in that spawning stock biomass (SSB) declined dramatically between the early 1970s and early 1990s. Since then, SSB was estimated to have fluctuated between 21 and 29 percent of the 1970 level, but with a gradual increase in recent years from the low of 21 percent in 2003 to 29 percent in 2009. Thus, the stock has undergone substantial declines since historic highs were reported in the 1970s. The stock has experienced different levels of fishing mortality over time, depending on the size of fish targeted by various fleets. Fishing mortality on spawners (ages 9 and older) declined markedly after 2003. The estimates of recruitment (age 1) are very high for the early 1970s, but are much lower for the years since, with the exception of a strong year-class documented in 2003.

There are two alternative spawner-recruit hypotheses for the western stock: the two-line (low recruitment potential scenario) and the Beverton and Holt spawner-recruit formulation (high recruitment potential scenario). Under the low recruitment scenario, average levels of observed recruitment are based on levels from 1976–2006 (85,000 recruits) while in the high recruitment scenario, recruitment levels increase as the stock rebuilds (MSY level of 270,000 recruits). SCRS has indicated that it does not have strong evidence to favor either scenario over the other and notes that both are reasonable (but not extreme) lower and upper bounds on rebuilding potential. Both of these models take into account multiple variables affecting abundance, including fishing mortality, recruitment and vulnerabilities, and terminal ages. During the 2010 stock assessment, the SCRS re-examined the two alternative spawner-recruit hypotheses explored in several prior assessments. Stock status was determined under both scenarios for the base model from 1970 to 2009. The results under the two-line (low recruitment potential) scenario suggested that the stock has not been overfished since 1970, and that overfishing has not occurred since 1983. The results under the Beverton-Holt (high recruitment potential) scenario suggested that the stock has been overfished since 1970, and the fishing mortality rates (F) have been above fishing at maximum sustainable yield (F_{MSY}), except for the years 1985, 1986, and 2007 to 2009. The low recruitment scenario is the more optimistic scenario because the result is that the stock biomass is above the rebuilding goal. Under the high recruitment scenario, rebuilding cannot be met by the end of ICCAT's 20-year rebuilding period. However, it is important to note that this change in the perception of current stock status (to not overfished, no overfishing occurring) under the low recruitment scenario is largely the result of applying a new growth curve rather than the result of management measures under the rebuilding plan.

ICCAT estimated the status of the western Atlantic stock in 2009 as well as status trajectories for the two recruitment levels. Using MSY-related benchmarks, ICCAT determined that the western Atlantic stock is not overfished and is not undergoing overfishing under the low recruitment potential scenario. However, under the Beverton-Holt recruitment hypothesis (high recruitment potential scenario), the stock remains overfished and overfishing is occurring. It was noted, however, that the assessment did not capture the full degree of uncertainty in the assessments and projections. Based on earlier work, the estimates of stock status can be expected to vary considerably depending on the type of data used to estimate mixing (conventional tagging or isotope signature samples) and modeling assumptions made. Improved knowledge of maturity at age will also affect the perception of changes in stock size. Finally, the lack of representative samples of otoliths requires determining the catch at age from length samples, which is imprecise for larger Atlantic bluefin tuna.

The results of the 2010 stock assessment for western Atlantic bluefin tuna were strongly influenced by a new growth curve (Restrepo *et al.,* 2010). The new growth curve assigns older ages to fish larger than 120 cm. As a result, the age structure of the catch included a higher proportion of older fish, which implied that the stock was subjected to a lower fishing mortality than previously estimated. Under the low recruitment potential scenario, therefore, SSB was now estimated to have greater than a 60 percent chance of being above the level that will support MSY, and overfishing is not occurring. SSB remained low relative to the level at MSY under the high recruitment potential scenario. The fishing mortality rate under the high recruitment potential scenario indicated overfishing was still occurring.

Under both scenarios, the SSB trend shows an increase in the last few years of the time series considered. The SCRS also noted the strength of the 2003 year class, the largest since 1974, although it also acknowledged that the recruitment estimated by the model for subsequent year classes appears to be the lowest on record and, therefore, these subsequent year classes may be a cause of concern. However, anecdotal information from U.S. recreational and commercial fishermen pointed to a perceived high abundance of small Atlantic bluefin tuna in U.S. waters in 2010.

The SCRS noted that the productivity of both the western Atlantic bluefin tuna and western Atlantic bluefin tuna fisheries is linked to the eastern Atlantic/Mediterranean stock. There is very strong evidence that eastern DPS fish contribute to the catches that occur along the eastern seaboard of North America, particularly in the Mid-Atlantic Bight. Consequently, improvements to the stock status in the eastern DPS, which result in increases to the number of eastern fish in the Mid-Atlantic Bight fishery, could reduce the proportion of the TAC that comes from western DPS fish. Therefore, management actions taken in the eastern Atlantic and Mediterranean are likely to influence the recovery in the western Atlantic, because even small rates of mixing from the eastern Atlantic/Mediterranean to the western Atlantic can have significant effects on the western Atlantic due to the fact that the eastern Atlantic/Mediterranean resource is much larger than that of the western Atlantic (*i.e.,* approximately 10 times the size).

Abundance of the Eastern Atlantic/Mediterranean DPS of Atlantic Bluefin Tuna

Reported catches in the eastern Atlantic/Mediterranean peaked at over 50,000 t (45,359.24 mt) in 1996 and then decreased substantially, stabilizing around TAC levels established by ICCAT. Both the increase and the subsequent decrease in declared production occurred mainly for the Mediterranean. Available information showed that catches of Atlantic bluefin tuna from the eastern Atlantic/Mediterranean were seriously under-reported from 1998 to 2007. In addition, farming activities in the Mediterranean since 1997 significantly changed the fishing strategy of purse seiners and resulted in a deterioration of Atlantic bluefin tuna catch at size (CAS) data reported to ICCAT. This is because Atlantic bluefin tuna size samples were obtained only at the time of harvest from the farms and not at the time of capture. The 2008 and 2009 reported catch was reviewed by the SCRS during the Atlantic bluefin tuna data preparatory meeting. The SCRS indicated that the reporting of catches significantly improved in those 2 years. However, the SCRS also indicated that some misreporting could still have been taking place. The assessment for the eastern stock used data for the period 1950–2009. Historically, illegal, unreported and unregulated fishing resulted in catch levels far exceeding the TAC levels mandated by ICCAT in the east. The United States has been looking closely at eastern bluefin tuna compliance and IUU issues over the years. Indications over the last two years are that progress has been made to address non-compliance and IUU issues, and catches over the last two years appear to be in line with agreed limits based on the monthly catch reports and SCRS information. Recruitment at the start of the time series varied between 2 and 3 million fish, dropped to around 1 million fish during the 1960s, followed by a steady increase toward maximum values in the 1990s and early 2000s while recruits dropped steeply in the last years. However, the recent levels are known to be less reliable because of the lack of data to estimate them. SCRS also notes that the potential decline in the recruitment in the most recent years is not in agreement with scientific information from aerial surveys carried out in the Mediterranean Sea (Bonhommeau *et al.,* 2009).

Final SSB estimates differed slightly between the model runs that were used. The SSB peaked over 300,000 t (272,155.42 mt) in the late 1950s and early 1970s, followed by a decline. One model run indicated that the SSB continued to decline slightly to about 150,000 t (136,077.71 mt), while the other indicated that biomass increased slightly during the late 2000s to about 200,000 t (181,436.95 mt). Considering both runs, the analyses indicated that recent (2007–2009) SSB is about 57 percent of the highest estimated SSB levels (1957–1959).

Significant Portion of Its Range and Foreseeable Future

The ESA defines an "endangered species" as "any species which is in danger of extinction throughout all or a significant portion of its range," while a "threatened species" is defined as "any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." The phrase "throughout all or a significant portion of its range" is neither defined nor explained in the ESA, and a final policy on how to interpret this language has not been developed by NMFS.

As previously noted, Atlantic bluefin tuna are highly migratory pelagic fish that range across most of the North Atlantic and its adjacent seas, particularly the Mediterranean Sea. Although the Atlantic bluefin tuna DPSs are described or defined by the location of their spawning grounds, they use the Atlantic Ocean and adjacent seas for various life stages and migrations for foraging, nursery grounds, and spawning. If a DPS was threatened or endangered in a spawning area, it would be threatened or endangered throughout its range (and not only in the spawning area) because a species cannot survive if individuals cannot spawn. Therefore, any determination we would make on the status of the DPSs would be based on the status of the DPSs throughout their ranges.

During a meeting to discuss the SRR, the SRT also considered the foreseeable future for Atlantic bluefin tuna and estimated the mean generation time for both the eastern Atlantic/Mediterranean DPS and western Atlantic DPS. For the purpose of the SRR, the mean generation time was determined to be 17 years for the western Atlantic DPS and 19 years for the eastern Atlantic/Mediterranean DPS. Mean generation time was computed as the fecundity-weighted average age of the spawning population at equilibrium in the absence of fishing, where the values for the age at maturity and natural mortality rate associated with the eastern and western DPSs were set to those used by the SCRS (and average weight was used as a proxy for fecundity). The mean generation time was similar for the two stocks because the younger age of maturity assumed for the eastern stock (which would imply a younger generation time) is mitigated by the lower natural mortality rate assumed for spawning age fish (which implies an older generation time). The SRT also reasoned that it will take a generation time to fully realize the impacts of various management measures, and thus, determined that approximately 17 to 19 years is a reasonable timeframe to define the foreseeable future for Atlantic bluefin tuna. Further support for this timeframe is provided in the 1998 rebuilding plan, as this was based on a mean generation time of 20 years (K. Blankenbeker, 2010, Pers. comm.). Additionally, projections through ICCAT have been estimated for 20 years for the western Atlantic. Because of ICCAT negotiations that can result in changes to annual quotas, we cannot estimate abundance beyond 20 years with any degree of confidence.

As described above, section 4(a)(1) of the ESA and NMFS implementing regulations (50 CFR 424) state that we must determine whether a species is endangered or threatened because of any one or a combination of the following factors: (A) Current or threatened habitat destruction or modification or curtailment of habitat or range; (B) overutilization for commercial, recreational, scientific, or educational purposes; (C) disease or predation; (D) inadequacy of existing regulatory mechanisms; and (E) other natural or man-made factors affecting the species' continued existence. This section briefly summarizes the findings regarding these factors. Additional details can be found in the SRR.

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

The Gulf of Mexico is believed to possess certain features for Atlantic bluefin tuna larval habitat which determine growth and survival rates of Atlantic bluefin tuna and can be variable from year to year (McGowan and Richards, 1989). The Gulf Stream can produce upwelling of nutrient rich waters along the shelf edge, which may provide an area favorable to maximum growth and retention of food for the larvae (McGowan and Richards, 1989).

The Mediterranean Sea is a basin with unique characteristics, being a semi-enclosed sea connected to the Atlantic Ocean through the narrow Strait of Gibraltar, to the Red Sea by the man-made Suez Canal and to the smaller enclosed Black Sea via the narrow Bosphorus Strait. The Mediterranean Sea exchanges water, salt, heat, and other properties with the North Atlantic Ocean, and is thus an important factor affecting global water formation processes and variability, and subsequently, the stability of the global thermohaline state of equilibrium (Wurtz, 2010).

There are a variety of past, present, and reasonably foreseeable future actions that have the potential to affect Atlantic bluefin tuna habitat. They range, among other things, from coastal development and associated coastal runoff and non-point source pollution in coastal areas to outer continental shelf (OCS) oil and gas development, and global climate change. Since most Atlantic bluefin tuna habitat is comprised of open ocean environments occurring over broad geographic ranges, large-scale impacts such as global climate change that affect ocean temperatures, currents, and potentially food chain dynamics, likely pose the greatest threat to Atlantic bluefin tuna habitat. Anecdotal information suggests that such changes may be occurring and influencing the distribution and habitat usage patterns of Atlantic bluefin tuna as well as other highly migratory species (HMS) and non-HMS fish stocks. Ocean temperature changes of a few degrees can disrupt upwelling currents that reduce or eliminate the nutrients necessary for phytoplankton and thereby, could have potential repercussions throughout the food chain. As a result, changes in migratory patterns may be the first indication that large scale shifts in oceanic habitats may be occurring. Some have pointed to the shift in availability of Atlantic bluefin tuna from fishing grounds off North Carolina to waters off Canada during the winter months as evidence of changes in oceanographic conditions that may be affecting historical distribution patterns. Although the evidence is still lacking, causative factors in the shift include preferences for cooler water temperatures and prey availability. A recent report by the Conservation Law Foundation indicated that low food availability had reduced growth rates in larval cod and haddock and that rising sea surface temperatures had the potential to further reduce productivity for these and other fish stocks off the New England coast (Bandura and Vucson, 2006).

Wetland loss is a cumulative impact that results from activities related to coastal development: Residential and industrial construction, dredging and dredge spoil placement, port development, marinas and recreational boating, sewage treatment and disposal, industrial wastewater and solid waste disposal, ocean disposal, marine mining, and aquaculture. In the late 1970s and early 1980s, the United States was losing wetlands at an estimated rate of 300,000 acres (1,214 sq km) per year. The Clean Water Act and state wetland protection programs helped decrease wetland losses to 117,000 acres (473 sq km) per year between 1985 and 1995. Estimates of wetlands loss vary according to the different agencies. The U.S. Department of Agriculture attributes 57 percent of wetland loss to development, 20 percent to agriculture, 13 percent to deepwater habitat, and 10 percent to forest land, rangeland, and other uses. Of the wetlands lost to uplands between 1985 and 1995, the FWS estimates that 79 percent of wetlands were lost to upland agriculture. Urban development and other types of land use activities were responsible for 6 percent and 15 percent of wetland loss, respectively.

Nutrient enrichment has become a major cumulative problem for many coastal waters. Nutrient loading results from the individual activities of coastal development, non-point source pollution, marinas and recreational boating, sewage treatment and disposal, industrial wastewater and solid waste disposal, ocean disposal, agriculture, and aquaculture. Excess nutrients from land based activities accumulate in the soil, pollute the atmosphere, pollute ground water, or move into streams and coastal waters. Nutrient inputs are known to have a direct effect on water quality. For example, in extreme conditions, excess nutrients can stimulate excessive algal blooms or dinoflagellate growth that can lead to increased turbidity, decreased dissolved oxygen, and changes in community structure, a condition known as eutrophication.

In addition to the direct cumulative effects incurred by development activities, inshore and coastal habitats are also jeopardized by persistent increases in certain chemical discharges. The combination of incremental losses of wetland habitat, changes in hydrology, and nutrient and chemical inputs produced over time can be extremely harmful to marine and estuarine biota, resulting in diseases and declines in the abundance and quality of the affected resources.

One of the major activities with the potential to impact Atlantic bluefin tuna habitat is oil and gas development on the OCS. Anecdotal information suggests that some recreational fishermen may target various fish species, including HMS, in the vicinity of oil platforms due to increased abundance and availability near platforms. The apparent increase in abundance of several species may be due to increased prey availability resulting from various fish and invertebrate communities that are attracted or attach directly to the structures and submerged pilings. While the apparent increase in abundance of fish near oil platforms may appear to be beneficial, little is known about the long-term environmental impacts of changes caused by these structures to fish communities, including potential changes to migratory patterns, spawning behavior, and development of early life stages. Currently, there is debate about whether the positive effects of the structures in attracting fish communities would be reduced by removal of the platforms when they are decommissioned.

As of 2009, there were approximately 4,000 oil and gas platforms in the Gulf of Mexico and fewer than 100 in the Atlantic. Most of the platforms were in waters shallower than 1,000 feet (305 m); however, there are ongoing efforts to expand oil drilling to deeper areas of the Gulf. Approximately 72 percent of the Gulf of Mexico's oil production comes from wells drilled in 1,000 feet (305 m) of water or greater (MMS, 2008(b)). Eight new deepwater discoveries were announced by oil and gas operators in 2007, with the deepest in 7,400 ft (2,256 m) of water (MMS, 2008(a)). Many of the shallower sites and most of the deepwater sites fall within habitats used by HMS, particularly by Atlantic bluefin tuna. Many of the deeper sites are also located within the HAPC for Atlantic bluefin tuna.

In the Atlantic, ten oil and gas lease sales were held between 1976 and 1983. Fifty-one wells were drilled in the Atlantic OCS; five Continental Offshore Stratigraphic Test wells between 1975 and 1979, and 46 industry wells between 1977 and 1984. Five wells off New Jersey had successful drillstem tests of natural gas and/or condensate. These five wells were abandoned as non-commercial.

In addition to the oil and gas wells, several liquefied natural gas (LNG) facilities have been proposed in the Gulf of Mexico. For LNG facilities, a major environmental concern is the saltwater intake system used to heat LNG and regasify it before piping it to shore. LNG facilities sometimes have open loop, once through heating systems known as open rack vaporizers, which require large amounts of sea water to heat LNG. As described in a draft environmental impact statement (DEIS) for an LNG project in the Gulf of Mexico, the use of the sea water intake system would subject early life stages of marine species to entrainment, impingement, thermal shock, and water chemistry changes, potentially causing the annual mortality of hundreds of billions of zooplankton, including fish and shellfish eggs and larvae. Depending on the location of the facility, this could have an adverse effect on habitat for Atlantic bluefin tuna or other HMS species. Closed loop systems are currently being used in the United States to regasify LNG and are proposed for multiple onshore and offshore LNG terminals throughout the nation, with the notable exception of the offshore waters of the Gulf of Mexico. These systems, which do not rely on an external saltwater intake source, and thus, do not require large amounts of seawater, have considerably lower impacts on fish eggs, larvae, and zooplankton than open loop systems.

For oil platforms, there are direct and indirect impacts to the environment such as disturbance created by the activity of drilling, associated pollution from drilling activities, discharge of wastes associated with offshore exploration and development, operational wastes from drilling muds and cuttings, potential for oil spills, and potential for catastrophic spills caused by accidents, such as the Deepwater Horizon (DWH) oil spill in 2010 (described below), or hurricanes and alteration of food webs created by the submerged portions of the oil platform, which attract various invertebrate and fish communities.

The potential effect of the DWH oil spill on the future abundance of western Atlantic bluefin tuna was evaluated by comparing the projections made by the SCRS (SCRS, 2010) to similar projections that assume the number of yearlings (1-year-old-fish) in 2011 will be reduced by 20 percent. The 20 percent value was based on the recent report by the European Space Agency that suggested 20% of the surface was oiled. However, this value does not reflect subsurface oil investigations and are ongoing on its potential distribution and impacts.

The SRT noted that another study (SEFSC, 2011, pers. comm.) suggested that considerably less than 20 percent of the spawning habitat for the western Atlantic DPS was affected by the spill. Moreover, if some larvae survived their encounter with oil and associated toxicants, or if density dependent processes are involved in the mortality of Atlantic bluefin tuna after the larval phase, then a 20 percent loss of spawning habitat might result in something less than a 20 percent reduction in the expected number of yearlings. However, factors such as the distribution of oil below the surface and the advection of larvae into the spill area after spawning are not well known. Accordingly, the SRT regarded 20 percent as a reasonable upper bound for the mortality rate of Atlantic bluefin tuna larvae owing to the spill event.

The effect of the DWH spill on bluefin tuna is an area of focus of NOAA's Natural Resources Damage Assessment (NRDA) team. That team is conducting targeted analyses on the effects of the spill on tuna, but most of those analyses are not yet available. The SRT coordinated with the NRDA team, and we have incorporated its information into the decision making process. The NRDA scientists provided plots of the paths of 12 satellite-tagged bluefin tuna that entered the Gulf of Mexico between 2008 and 2010. The NRDA scientists also reported on the progress of other work (*e.g.,* physiological effect of toxicants), but the work was not yet at a stage that could be considered by the SRT.

In summary, independent projections with two different types of models show that a 20 percent reduction in the 2010 year-class will likely result in less than a 4 percent reduction in future spawning biomass. However, if a significant fraction of adult Atlantic bluefin tuna were killed or rendered impotent by the spill, then subsequent year-classes might also be reduced, leading to greater reductions in SSB than estimated above. For example, if 20 percent of the adults were also killed in 2010, then the SSB would be immediately reduced by 20 percent, which might lead to additional reductions in the 2011 and subsequent year-classes (relative to what they would have been in the absence of the spill). The reduction in the 2010, 2011, and subsequent year classes would, in turn, lead to reductions in future SSB levels (9 years later as they begin to mature). To date, however, there is no evidence to suggest that any portion of adults were immediately affected although studies are ongoing that may give more information on possible long term impacts. The results from several electronic tagging studies confirm that some Atlantic bluefin tuna have historically spent at least a portion of their time in the waters in the vicinity of the spill area, but the exact fraction is difficult to quantify because of the uncertainties associated with inferring tracks and the rather low number of samples. All of the electronically-tagged bluefin tuna that were known to have spent time in the Gulf of Mexico during the actual spill event (8 fish) survived long after leaving the Gulf of Mexico.

Given that it is not possible to determine the level of impact on adults from the DWH oil spill at this time, scientists at the SEFSC re-ran the extinction risk models assuming spill-induced mortality rates of 20 percent for larvae and from 5 to 50 percent for adults. The short-term (10 year) risk of extinction was negligible for all levels of mortality examined. The long-term risk (*e.g.,* projected to 2100) did not exceed 5 percent except under the high recruitment scenario when adult mortality rates exceeded 15 percent. Using the latest information, including the 2010 larval survey, SEFSC scientists developed a worst-case scenario for larval mortality of 15 percent (their best estimate was about 7 percent). Accordingly, adult mortality rates of 15 percent also represent a worst-case scenario because it implies the same proportion of adults encountered oil as the larvae and that all of those “oiled” adults subsequently died. Thus, it appears that adult mortality rates would have to be extremely high in order to incur a substantial risk of extinction.

Because the information on larval and adult mortality from the DWH oil spill is not certain, NOAA used the best available science to model “worst case scenarios.” From these model projections, we were able to determine that although it is not possible to accurately determine the level of effect at this time, even if the oil spill had the highest level of effect currently viewed as scientifically plausible, the species would not warrant listing at this time. While we cannot wait for the targeted analyses being conducted in the NRDA process, we intend to revisit this decision no later than 2013 once the NRDA analyses have been concluded to determine whether the DWH oil spill altered the condition of the species. Additionally, new stock assessments will be conducted for bluefin tuna in 2012 and will be available in the fall, and new compliance reports will be available from ICCAT. Thus, this information will be considered as well.

Summary and Evaluation of Factor A

Currently, there are numerous potential coastal habitat threats as identified above (*e.g.,* dredging, mining, navigation); however, the ones of most significance for Atlantic bluefin tuna are offshore (*e.g.,* petroleum, LNG). While these could represent potential future threats to the species, at this time, these activities are not negatively affecting Atlantic bluefin tuna, and the SRT concluded, and we concur that they do not represent a substantial risk to the long-term persistence of the species. In the future, should offshore effects such as petroleum and LNG be proposed, the EFH and HAPC process would provide a mechanism by which those impacts could be addressed.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Fishing for Atlantic bluefin tuna has occurred in the Mediterranean since the 7th millennium BC (Desse and Desse-Berset, 1994, in Fromentin and Powers, 2005). According to Fromentin and Ravier (2005) and Porch (2005), the development of the sushi-sashimi market during the 1980s made fishing for Atlantic bluefin tuna significantly more profitable than it was in earlier times, and this resulted in a considerable increase in the efficiency and capacity of fisheries during this time. The increased profitability associated with these new technologies resulted in the rapid development of new and powerful fleets in the Mediterranean countries, and the expansion of effort which exploited fish in the Mediterranean and North Atlantic Japanese longline fisheries also expanded in the Central North Atlantic, adding pressure on Atlantic bluefin tuna stocks (Fromentin and Powers, 2005).

The development and redistribution of all the fisheries resulted in rapid increases in yields since the 1980s, especially in the Mediterranean Sea. Eastern Atlantic and Mediterranean catches reached an historical peak of over 50,000 mt during the mid-1990s. Catches in the West Atlantic, including discards, have been relatively stable since the imposition of quotas in 1982. However, total western Atlantic catch declined steadily from the high of 2002 until 2007, primarily due to considerable reductions in catches by U.S. fisheries. Two plausible explanations for this situation were considered by the SCRS: (1) Availability of fish to the U.S. fishery was abnormally low, and/or (2) the overall size of the population in the western Atlantic declined substantially from the levels of recent years. SCRS noted in its 2010 stock assessment report that there is no overwhelming evidence to favor one explanation over the other but that the base case assessment implicitly favors the idea of changes in regional availability by virtue of the estimated increase in SSB. The decrease indicated by the U.S. catch rate of large fish was matched by the increase in several other large fish indices. In 2009, the United States harvested its national base quota.

In U.S. fisheries, bluefin tuna are caught with purse seines, handgear (rod and reel, handline, and harpoon), and pelagic longlines. As of October 2010, there were over 32,000 permitted vessels that may participate in the Atlantic tuna fisheries (NMFS, 2010). All owners/operators of vessels (commercial, charter/headboat, or recreational) fishing for regulated Atlantic tunas (Atlantic bluefin, bigeye, albacore, yellowfin and skipjack tunas) in the management area must obtain an Atlantic tunas permit or an Atlantic HMS vessel permit. Commercial categories are monitored by a census of landing cards, whereas the recreational catch is monitored primarily by a survey, although the states of Maryland and North Carolina have implemented recreational census bluefin tuna tagging programs as well. Commercial fisheries are focused on 'large medium' (73 in (185 cm) to less than 81 in (206 cm) curved fork length (CFL)) and 'giant' (81 in (206 cm) CFL or greater) Atlantic bluefin tuna, while recreational fisheries are focused on 'large school/small medium' Atlantic bluefin tuna (47 in (119 cm) to less than 73 in (185 cm) CFL), with allowances for 'school' (27 in (68 cm) to less than 47 in (119 cm) CFL), 'large medium', and 'giant' Atlantic bluefin tuna. Recreational fisheries are carried out by private vessels fishing in the Angling category, and vessels for hire fishing under the Charter/Headboat category.

There are numerous scientific studies on Atlantic bluefin tuna, the largest of which is being coordinated by ICCAT's SCRS—the Atlantic wide Grande Bluefin Tuna Year Program (GBYP). It has multiple objectives, including improving the understanding of key biological and ecological processes, basic data collection (including information from farms, observers, and VMS), provision of scientific advice on stock status through improved modeling of key biological processes (including growth and stock-recruitment and mixing between various areas), and developing and using biologically realistic operating models for more rigorous management option testing. Research undertaken to date through the ICCAT program, or in coordination with it by scientists from ICCAT's membership, has been either non-lethal (*i.e.,* aerial surveys) or has been intended to be non-lethal (*i.e.,* tagging programs), although mortalities, while minimal, do sometimes occur after a tagging event.

Other types of research (*i.e.,* microconstituent analysis, organochlorine tracer analysis, genetic analysis) primarily rely on samples taken from fish harvested in commercial fishing operations or from historical collections. Larval surveys, such as those conducted by the United States, and activities to monitor YOY do harvest Atlantic bluefin tuna specifically for research purposes, but the mortality caused by these activities is low. With respect to collections for education, this activity is minor and relies largely on products obtained from other activities, such as commercial fishing. Where it does cause Atlantic bluefin tuna mortalities directly, such as the collection of YOY, it is minor. Furthermore, there was no information to suggest that a substantial live aquarium trade in Atlantic bluefin tuna exists.

Summary and Evaluation of Factor B

Current impacts from commercial, recreational, scientific or educational purposes do not represent a substantial risk to the long-term persistence of the species. Atlantic bluefin tuna fisheries are closely managed by various regulatory mechanisms, and current TAC levels are projected to result in increased population levels of the DPSs as long as there is a high degree of compliance. In addition, scientific collections or collections for educational purposes described above do not seem to be significantly affecting the status of Atlantic bluefin tuna, and are not likely to significantly affect the long-term persistence of Atlantic bluefin tuna now or into the future.

C. Predation and Disease

As large apex predators, Atlantic bluefin tuna are not heavily preyed upon. However, predators such as killer whales (*Orcinus orca*) and pilot whales (*Globicephala* spp.), and several shark species such as white sharks (*Carcharodon carcharias*), shortfin mako (*Isurus oxyrinchus*), and longfin mako (*Isurus paucus*) (Nortarbartolo di Sciara, 1987; Collette and Klein-MacPhee, 2002; de Stephanis, 2004; Fromentin and Powers, 2005) may prey on Atlantic bluefin tuna. Juvenile Atlantic bluefin tuna may also be preyed upon by bluefish (*Pomatomus saltatrix*) and seabirds (Fishwatch, NMFS, 2010).

Little information exists on diseases in Atlantic bluefin tuna. Most of the available disease information for this species, Pacific bluefin tuna (*Thunnus orientalis*), and southern bluefin tuna (*Thunnus maccoyii*) comes from studies on fish reared in net pens prior to harvesting for the market (Munday *et al.,* 2003; Bullard *et al.,* 2004; Oraic and Zrncic, 2005; Mladineo *et al.,* 2006; Hayward *et al.,* 2007).

Peric (2002) reported lesions consistent with pasteurellosis (*Photobacterium damsel piscicida*) after examining carcasses of 25 harvested Atlantic bluefin tuna. Lesions were similar to those seen in sparids with chronic pasteurellosis. As the causative organism, pasteurellosis does not survive for long outside the host, and prevalence is reported to be very low in Atlantic bluefin tuna (Munday *et al.,* 2003). However, high mortalities of Atlantic bluefin tuna reared in Adriatic Sea cages occurred during winter 2003 and spring 2004. Based on the results of bacteriological, serological, and histological analysis, Mladineo *et al.* (2006) concluded that pasteurellosis was the causative agent of the mortalities, which was the first outbreak of this kind in reared tuna. Putative tuberculosis was reported in a single specimen of Atlantic bluefin tuna (Biavati and Manera, 1991, as reported by Munday *et al.,* 2003), but the cause is unknown.

Summary and Evaluation for Factor C

Adult Atlantic bluefin tuna are not likely affected to any large degree by predation by large whales and other large predators, nor are they likely to be affected to any large degree by diseases caused by viruses, bacteria, protozoans, metazoans, or microalgae. Most of the information on diseases in tunas comes from studies on cultured tuna, and the culture environment introduces stresses to the fish; therefore, even if studies indicated that cultured Atlantic bluefin tuna were highly susceptible to diseases and suffered high mortality rates, it is not possible to infer from these data that wild Atlantic bluefin tuna experience the same diseases and mortality rates. The best available scientific and commercial information indicates that threats to Atlantic bluefin tuna from predation and disease do not significantly affect the long-term persistence of Atlantic bluefin tuna now or into the future.

D. Existing Regulatory Authorities, Laws and Policies

Since 1982, Atlantic bluefin tuna have been separated into two management units or stocks (western Atlantic and eastern Atlantic/Mediterranean), which coincide with the two DPSs identified in the SRR. ICCAT has established various conservation and management measures for both stocks over the years, most often in those years where new stock assessments have been completed by SCRS, as these inform management decisions. ICCAT, however, is free to adopt or alter conservation and management measures even in years where no new stock assessment has been conducted, and it has occasionally done so. In addition to the stock assessment meetings (which have been held recently about every 2 years), the SCRS reports on fishery trends each year. These metrics can include catch, effort and size trends, as well as updated abundance indices (such as standardized catch rate trends by age category and larval survey results), and trends can provide information on threats to the stock even during non-assessment years.

In light of the connection between the two stocks and fisheries, SCRS has advised that robust management is needed for both stocks to ensure effective conservation. Recognizing that management could potentially benefit from an improved understanding of bluefin tuna stock structure and mixing, ICCAT and its members have taken a number of steps to improve information in this area. Pending the outcome of ongoing research on stock structure and mixing, ICCAT has actively looked at management strategies that can take better account of mixing. In that regard, ICCAT has had a measure in place intended to limit catches in the central North Atlantic, an area with high mixing rates, since 2003. Catches from this area are now significantly reduced from previous levels. In addition, ICCAT has adopted the requirement that parties cannot shift effort across the 45 degree management boundary separating the two stocks of bluefin tuna.

The western Atlantic bluefin tuna fishery in the United States is managed under the dual authority of the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act) and the Atlantic Tunas Convention Act (ATCA). ATCA authorizes the Secretary of Commerce to implement the binding recommendations of ICCAT. As the United States implements legislation for ICCAT, ATCA also requires that the United States implement binding recommendations adopted by that organization, as necessary and appropriate; stipulates that the United States may not promulgate a regulation that has the effect of increasing or decreasing any allocation or quota of fish or fishing mortality allocated by ICCAT; and establishes a number of procedural requirements.

At the 2010 ICCAT meeting, a measure was adopted for the western Atlantic stock that, among other things, reduced the TAC from 1,800 t (1,632.93 mt) to 1,750 t (1,587.57 mt) for both the 2011 and 2012 fishing seasons—a 2.8-percent reduction overall. Under the low recruitment potential scenario, the new TAC has a 99-percent probability of maintaining the fishing mortality of western Atlantic bluefin tuna below the fishing mortality associated with MSY and a 95-percent probability of maintaining the stock above the biomass that will support MSY through the end of the rebuilding period. Combining the results of the high and low recruitment potential scenarios, the TAC has a 54-percent probability of ending overfishing within 2 years and a 48-percent probability of rebuilding the stock to the B_{msy} level by the end of the rebuilding period. Under the high recruitment potential scenario, the TAC has an 8-percent probability of ending overfishing within 2 years and a zero-percent chance of rebuilding the stock to the B_{msy} level by the end of the rebuilding period. It is important to note that, under any scenario, the agreed TAC is expected to support continued stock growth if compliance with agreed rules remains strong. For the western Atlantic bluefin tuna fishery, compliance with ICCAT measures has typically been high.

In addition to a new TAC, the measure includes an emergency clause similar to the one added in 2009 to the eastern Atlantic/Mediterranean bluefin tuna recommendation. It specified that if SCRS detects a serious threat of stock collapse, ICCAT shall suspend all Atlantic bluefin tuna fisheries in the western Atlantic for the following year. The recommendation further calls on ICCAT members to contribute to ICCAT's Atlantic-wide Bluefin Tuna Research Program, including the enhancement of biological sampling. Consistent with past practice, the provisions contained in previous conservation and management recommendations were retained, including the prohibition on directed fishing for Atlantic bluefin tuna in the Gulf of Mexico and minimum size requirements.

Finally, the measure includes a request to SCRS to provide additional information in the future that might be helpful to management—including with respect to spawning grounds and the size selectivity of the fishery. The next western Atlantic bluefin tuna stock assessment is scheduled for 2012, and management measures will be reconsidered at that time, taking into consideration the scientific advice provided by SCRS.

During its 2010 annual meeting, ICCAT adopted a new recommendation for eastern and Mediterranean Atlantic bluefin tuna. The TAC for 2011 and beyond (until changed) was set at 12,900 t (11,702.68 mt), 4.4-percent reduction from the 2010 level of 13,500 t (12,246.99 mt). This reduction is in addition to existing quota paybacks for previous overharvests by the European Union and Tunisia. Thus, the adjusted allowable catch for 2011 and 2012 is approximately 11,500 t (10,432.62 mt). Before taking into account these required reductions, the new TAC has at least a 95-percent probability that the condition of the stock will improve in the coming years and a 67-percent probability of rebuilding the stock by 2023, the end of the rebuilding period.

Summary and Evaluation for Factor D

Western Atlantic bluefin tuna are highly regulated with TAC limits generally set within the range recommended by SCRS. Greater reductions in TAC for the eastern stock were discussed to account more fully for the assessment uncertainties and to increase the probability and rate of stock growth and recovery. For both eastern and western bluefin tuna DPSs, catch levels agreed to in 2010 are expected to support continued growth and recovery of the stocks if compliance with agreed rules continues. Given the mixing between the stocks, improved stock conservation in the east can be expected to benefit the western stock as well. Based on the information above, the SRT concluded that the existing regulatory mechanisms if adequately enforced are sufficiently protective of Atlantic bluefin tuna now and into the future, and we concur with this conclusion.

E. Other Natural or Manmade Factors Affecting the Continued Existence of the Species

The SRT examined other natural or manmade factors affecting the continued existence of Atlantic bluefin tuna. Spatial distribution and movement of Atlantic bluefin tuna were previously hypothesized to be controlled by preferential ranges of temperature (ICCAT, 2006–2009); but more recently, scientists hypothesized that juveniles and adults are associated with ocean fronts, likely for purposes of foraging for prey (Humston *et al.,* 2001; ICCAT, 2006–2009). However, the complexity of Atlantic bluefin tuna distribution and behavior is unlikely to be explained by association with these fronts alone (Shick *et al.,* 2004; Royer *et al.,* 2004). Because of the relationship of Atlantic bluefin tuna to sea surface temperature, the SRT considered the impact of climate change to Atlantic bluefin tuna.

Research studies have shown that migration and movement patterns vary considerably between individuals, years, and areas (Lutcavage *et al.,* 1999; Block *et al.,* 2001; De Metrio *et al.,* 2004; ICCAT, 2006–2009). The appearance and disappearance of past fisheries (*e.g.,* Brazil during the 1960s) could be a result of changes in spatial distribution and/or migration (Fromentin and Powers, 2005; Fromentin, 2009). Rijnsdorp *et al.* (2009) hypothesized a shift in distribution in response to increased temperature associated with climate change, and similar distribution shifts for other species have also been observed (Nye *et al.,* 2009). However, without a better understanding of the processes that determine Atlantic bluefin tuna distribution, it is difficult to project a response of the species to climate change.

Rijnsdorp *et al.* (2009) further hypothesized that if the habitat for a certain life-history stage is spatially restricted (*e.g.,* spawning), the species may be more sensitive to climate change. We designated an HAPC for bluefin tuna spawning in the Gulf of Mexico in Amendment 1 to the U.S. Consolidated HMS Fishery Management Plan (NMFS, 2009). This area is the primary spawning habitat for the western stock of Atlantic bluefin tuna, although the potential for other spawning locations has also been suggested (Galuardi *et al.,* 2010). Climate-induced temperature increases could increase stress for Atlantic bluefin tuna during spawning in the Gulf of Mexico. Average ambient temperatures measured during bluefin spawning activity ranged from 23.5 to 27.3 °C (Teo *et al.,* 2007). Atlantic bluefin tuna have been found to withstand temperatures ranging from 3 to 30 °C (Block *et al.,* 2001).

Although Atlantic bluefin tuna are believed to use deep diving to thermoregulate, spawning behavior may preclude thermoregulation behavior (Teo *et al.,* 2007). Block *et al.* (2005) indicated that thermal stress appeared to be contributing to mortality of pelagic longline-caught Atlantic bluefin tuna on the Gulf of Mexico spawning grounds. If increases in ocean temperature will mirror those forecasted for air temperature by the Intergovernmental Panel on Climate Change (IPCC) (2007) (*i.e.,* + 0.20 °C per decade), and add ten decade's worth of temperature increase (*i.e.,* a total of 2.0 °C) to the temperatures reported by Teo *et al.* (2007), then Gulf of Mexico temperatures during Atlantic bluefin tuna spawning season could be estimated to reach 25.5 to 29.3 °C by the turn of the century. Muhling *et al.* (2011) modeled a variety of climate change simulations in the Gulf of Mexico to quantify potential effects of warming on the suitability of the Gulf of Mexico as a spawning ground for Atlantic bluefin tuna. Model results showed that Atlantic bluefin tuna were indeed vulnerable to climate change impacts, with increasing water temperature affecting both spawning times and locations, as well as larval growth, feeding and survival (Muhling *et al.,* 2011). Furthermore, if ambient values of abiotic factors such as salinity or pH exceed the tolerance limits for planktonic Atlantic bluefin tuna eggs and larvae, these life stages could be negatively affected physiologically.

Fabry *et al.* (2008) reviewed the potential impacts of ocean acidification on marine fauna and ecosystem processes. The information reviewed indicated that marine fish were physiologically highly tolerant of carbon dioxide. Ishimatsu *et al.* (2004) found that hatchling stages of some species appeared fairly sensitive to pH decreases on the order of 0.5 or more, but high carbon dioxide tolerance developed within a few days of hatching.

Indirect trophic level dynamics may have some impact to Atlantic bluefin tuna as a result of climate change and ocean acidification. Acidification could lead to dissolution of shallow-water carbonate sediments and could affect marine calcifying organisms, including pteropods, an important component of the plankton in many marine ecosystems (Orr *et al.,* 2005). In their review article, Walther *et al.* (2002) stated that indirect impacts on marine systems appear to be the most widespread effects of climate change. For example, the persistence of a positive vector for the North Atlantic Oscillation (NAO) modifies marine primary and secondary production (Fromentin and Planque, 1996), which could in turn affect the availability of planktonic food for fish larvae and recruitment success (Cushing, 1990). However, ICCAT scientists analyzed the association of the NAO with eastern Atlantic bluefin tuna recruitment and found no relationship (ICCAT, 2002).

Availability of nutrients could also be affected by changes in carbon dioxide, which could affect primary production, changes in species composition, and higher trophic levels (Fabry *et al.,* 2008). Kimura (2010) modeled a combination of environmental factors when considering the impact to the recruitment of juvenile Pacific bluefin tuna. For example, an increase in ocean temperature would speed the transport of larvae in the Kuroshio current, causing the larvae to arrive too quickly to cold coastal waters. When coupled with high temperatures exceeding the optimal range on the spawning grounds, larval recruitment was predicted in 2010 to decline to 36 percent of present recruitment levels (Kimura *et al.,* 2010). In addition, a long-lived species such as Atlantic bluefin tuna could have less evolutionary ability to adapt to climate change than shorter-lived species.

Chase (2002) identified squid as one of several important food sources for Atlantic bluefin tuna caught off New England. Epipelagic squid (*e.g., Illex* and *Loligo* sp.) have been found to be highly sensitive to carbon dioxide because of their unique physiology (Portner *et al.,* 2004; Seibel, 2007). Yamada and Ikeda (1999) found increased mortality for certain arthropod plankton (krill and certain copepods) with increasing exposure time and decreasing pH. Larval *Thunnus* sp. have been found to feed primarily on copepods (Catalan *et al.,* 2007; Llopiz and Cowen, 2009). As pelagic predators, Atlantic bluefin tuna are considered opportunistic, and loss of one food source may not have negative consequences. However, in the Florida straits, larval *Thunnus* sp. appeared to exhibit selective feeding behavior (Llopiz and Cowen, 2009) and thus, larvae may not be as opportunistic in feeding as adult Atlantic bluefin tuna are.

Offshore aquaculture was identified as a potential threat to Atlantic bluefin tuna by the SRT. Potential impacts resulting from offshore aquaculture could include increased nutrient loading, habitat degradation, fish escapement, competition with wild stocks, entanglement of endangered or threatened species and migratory birds, spread of pathogens, user conflicts, economic and social impacts on domestic fisheries, and navigational hazards (GMFMC, 2009); however, there is no information to indicate that offshore aquaculture is impacting Atlantic bluefin tuna.

The most recent available information indicated that there are no finfish offshore aquaculture operations in U.S. Federal waters. According to the Gulf of Mexico Fishery Management Council (GMFMC) FMP for offshore aquaculture in the Gulf of Mexico, marine aquaculture would be prohibited in Gulf of Mexico EEZ HAPCs, marine reserves, marine protected areas, Special Management Zones, permitted artificial reef areas, and coral reef areas as defined and specified in 50 CFR 622 (GMFMC, 2009). In addition, areas where marine aquaculture is prohibited in the Gulf of Mexico overlap with the spawning areas of the western Atlantic DPS, and thus, the SRT did not expect any impacts to the spawning habitat of the DPS from offshore aquaculture. The SRT was not aware of specific information pertaining to the effects of offshore aquaculture on the habitat in the eastern Atlantic/Mediterranean; however, impacts to the DPS may be similar to the potential impact resulting from offshore aquaculture as noted above.

Summary and Evaluation of Factor E

The SRT considered all other natural or manmade factors that may affect the DPSs, including climate change impacts, ocean acidification, and aquaculture/enhancement. The SRT identified several potential natural or manmade threats to Atlantic bluefin tuna, and while these could represent potential future threats to the species, at this time, the SRT determined that current and future impacts are not likely and do not represent a substantial risk to the long-term persistence of either DPS. We concur with this conclusion.

Current and Future Protective Efforts

In February 2011, a special meeting of ICCAT's Compliance Committee (COC) was held. The purpose was to reinforce the commitment of all parties to implement the eastern Atlantic bluefin tuna recommendation from the start of the 2011 season and, toward that end, to review the implementation plans (which included fishery management, inspection, and capacity reduction aspects) of eastern Atlantic bluefin tuna harvesters with a view to endorsing those plans in advance of the season.

In addition to taking action on the implementation plans, the COC adopted an allocation table specifying the allowable harvest limits by ICCAT members, which included all adjustments, and a fleet capacity table reflecting required reductions for 2011. Given input from those present at the COC intersessional, the adjusted TAC of 11,502.89 t (10,435.25 mt) should be the upper bound of realized catches. Factoring in that a few countries have indicated they will not be fishing and their combined quota level is 364.33 t (330.51 mt), actual catches may be more on the order of 11,138.56 t (10,104.73 mt)—notwithstanding any action by ICCAT to suspend one or more fisheries in 2011 due to lack of implementation plan endorsement. Any additional reductions in catch will increase the probability of rebuilding the stock by 2023.

In addition, the 2010 eastern Atlantic bluefin tuna recommendation also strengthened the monitoring and control scheme, including enhanced monitoring of farming operations, further restrictions on joint fishing operations (*e.g.,* generally prohibiting joint operations between contracting parties and clarifying that each party is responsible and accountable for catches made under such operations), and requiring fishing capacity issues to be fully addressed by 2013.

Western Atlantic bluefin tuna harvesters are expected to fully implement Recommendation 10–03 by mid-June 2011. This will involve reduced quotas for the United States, Canada, and Japan for 2011 and 2012. In addition, NMFS has published a proposed rule to implement the ICCAT recommended U.S. base quota, distributing the quota among domestic quota categories consistent with the 2006 Consolidated HMS Fishery Management Plan, and to adjust the 2011 U.S. quota and subquotas to account for Atlantic bluefin tuna dead discards and unharvested 2010 quota allowed by ICCAT to be carried forward to 2011 (76 FR 13583). Furthermore, NMFS monitors the Atlantic bluefin tuna fishery and has the authority to take in-season actions such as fishery closures and retention limit adjustments to ensure available quotas are not exceeded or to enhance scientific data collection from, and fishing opportunities in, all geographic areas.

Effective May 5, 2011, NMFS requires the use of "weak hooks" by pelagic longline vessels fishing in the Gulf of Mexico. A weak hook is a circle hook that meets NMFS' current size and offset restrictions but is constructed of round wire stock that is thinner-gauge (*i.e.,* no larger than 3.65 mm in diameter) than the 16/0 circle hooks currently used in the Gulf of Mexico pelagic longline fishery. The purpose of the proposed action is to reduce pelagic longline incidental catch of bluefin tuna in the Gulf of Mexico, which is the known spawning area for the western Atlantic DPS of bluefin tuna (as described above). The action is intended to increase Atlantic bluefin tuna spawning potential and subsequent recruitment into the fishery, and could also potentially reduce negative ecological and fishing impacts on non-target or protected species.

Listing Determination

Long-term (2010–2100) projections of abundance of the two Atlantic bluefin tuna DPSs (western Atlantic and eastern Atlantic/Mediterranean) were conducted by the SRT using the protocols adopted by the ICCAT SCRS (SCRS, 2010). We have determined that a 5-percent probability of extinction in 20 years is a reasonable threshold for endangered status. The probability of extinction was projected by the SRT to be near zero for both DPSs over the 5 to 10-year horizon normally examined by the SCRS, even for catch quotas that are much larger than allowed under the current ICCAT management regulations. Even after 20 years, the probability of extinction does not exceed 5 percent unless the level of sustained catch after 2010 is 3,000 mt or more for the western Atlantic DPS, and 40,000 mt or more for the eastern Atlantic/Mediterranean DPS (the 2011 TACs for the western Atlantic and eastern Atlantic/Mediterranean DPSs are 1,750 t (1,587.57 mt) and 12,900 t (11,702.68 mt) respectively, with the adjusted quota for the eastern fishery being below 11,599 t (10,522.44 mt) in 2011 and 2012.

Several authors have suggested that populations with fewer than 500 individuals are doomed to eventual extinction due to the loss of genetic diversity (Franklin, 1980; Soule, 1980). Matsuda *et al.* (1998) used 500 mature animals as the threshold for their extinction risk assessment of southern bluefin tuna. In order to address the potential for quasi-extinction, the SRT performed a second set of analyses with the extinction threshold set at 500 spawners, rather than 2 spawners (see Tables 1 and 2 below for the results with 500 spawners and section 9.1.3 of the status review report for the tables with the results for 2 spawners).

TABLE 1—FORECASTED PROBABILITY THAT FEWER THAN 500 ADULT BLUEFIN TUNA WILL SURVIVE IN THE EAST ATLANTIC AND MEDITERRANEAN SEA BY YEAR AND CATCH LEVEL (ALL 24 SCENARIOS COMBINED). CURRENT MANAGEMENT RECOMMENDATIONS UNDER ICCAT SPECIFY A TOTAL ALLOWABLE CATCH OF 12,900 MT

[In percent]

Catch (mt)	2010	2011	2020	2030	2040	2050	2060	2100
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5,000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10,000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12,900	0.0	0.0	0.0	0.0	0.1	0.1	0.2	0.2
17,000	0.0	0.0	0.0	0.2	0.7	1.2	1.4	1.5
20,000	0.0	0.0	0.0	0.6	2.6	3.5	3.9	4.2
25,000	0.0	0.0	0.0	3.4	8.7	11.2	12.3	13.2
30,000	0.0	0.0	0.0	8.5	19.0	25.1	28.8	34.8
40,000	0.0	0.0	0.2	25.9	45.9	51.5	54.0	57.6
50,000	0.0	0.0	0.9	46.1	63.0	66.4	67.2	67.8
60,000	0.0	0.0	2.1	59.9	70.6	72.0	72.5	72.8
70,000	0.0	0.0	3.7	67.9	77.7	81.5	83.1	85.2

TABLE 2—FORECASTED PROBABILITY THAT FEWER THAN 500 ADULT BLUEFIN TUNA WILL SURVIVE IN THE WEST ATLANTIC BY YEAR AND CATCH LEVEL (ASSUMING THE HIGH AND LOW RECRUITMENT SCENARIOS ARE EQUALLY PLAUSIBLE). CURRENT MANAGEMENT RECOMMENDATIONS UNDER ICCAT SPECIFY A TOTAL ALLOWABLE CATCH OF 1,750 MT

[In Percent]

Catch (mt)	2010	2011	2020	2030	2040	2050	2060	2100
0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
1,000	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
1,250	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
1,500	0.0	0.0	0.0	0.0	0.2	0.5	0.6	0.7
1,750	0.0	0.0	0.0	0.3	0.8	1.5	1.9	2.3
2,000	0.0	0.0	0.0	1.0	3.1	3.9	5.0	5.4
2,250	0.0	0.0	0.0	2.9	7.4	10.5	12.8	14.9
2,500	0.0	0.0	0.3	5.9	16.7	23.0	26.2	29.8
2,750	0.0	0.0	0.5	11.8	30.3	39.4	45.2	55.1
3,000	0.0	0.0	1.1	21.9	46.2	58.9	67.4	79.3
3,500	0.0	0.0	3.1	49.8	78.6	88.8	93.4	95.4
4,000	0.0	0.0	8.7	76.7	95.9	97.6	98.6	98.9
5,000	0.0	0.0	35.4	97.7	99.7	99.9	99.9	99.9

The SRT determined that the probability of extinction increases substantially over the long term, due to inherent uncertainties in the assumptions made for long-term projections; however, even with these uncertainties, the risk still remains quite low for the catch levels permitted under current management even when projected out to 2100 (about 2-percent probability for the western DPS and less than 1 percent for the eastern DPS). The level of extinction risk was found to be only slightly higher when the threshold for extinction was set to 500 spawners rather than 2 spawners and projected out to 2100 (2.3-percent probability for the western DPS, and 0.2-percent probability for the eastern DPS). However, given the high inherent uncertainties in long-term projections, projections made out to 2100 cannot reliably estimate a probable risk of extinction.

One important source of uncertainty not considered in the above projections was the nature of intermixing between the eastern and western DPSs. Two-stock virtual population analyses used by SCRS (2008) to estimate the level of mixing from stock composition (otolith microcontituent) data produced estimates of spawning biomass that were similar to the levels estimated without mixing. However, similar models that estimated mixing from tagging data produced estimates of spawning biomass that were generally higher than the models without mixing, particularly for recent years. If spawning biomass is higher than estimated by the base (no-mixing) models, then the short-term extinction risk may be lower than suggested in the analyses above by virtue of the fact that any given catch level will amount to a lower percentage of the adult population. This is especially true for the western DPS where the effect of estimating mixing is most profound as discussed above. The long-term implications for extinction risk are less clear as they would involve changes in the estimated productivity of the two stocks, which have not yet been evaluated. It should be noted, however, that ICCAT (2008) considered their analyses of mixing as not reliable enough to be used as the basis for management advice because both the tagging and stock composition data were regarded as incomplete in the sense that they did not represent random samples of the overall Atlantic bluefin tuna population.

Another important source of uncertainty not addressed in the extinction risk analysis is the possible effect of adult mortality from the DWH oil spill. As noted previously, there is no evidence of adult mortality; however, it is still possible some adult mortality or impact to reproductive capacity occurred. Because the information on larval and adult mortality from the

DWH oil spill is not certain, NOAA used the best available science to model "worst case scenarios." From these model projections, it was possible to determine that if the oil spill had the highest level of effect currently viewed as scientifically plausible (*e.g.,* 15 percent mortality), the species would not warrant listing at this time.

In summary, the projections presented in the SRR suggest that the probability of extinction of either DPS is negligible within the generation time of both DPSs (generation time is equivalent to 17 to 19 years) unless the catches were nearly doubled over those allowed by current regulations. The long-term projections out to 2100 indicate that if rigorously enforced, current regulations are sufficient to avoid a significant probability of extinction (greater than 5 percent), but suggest a risk of extinction if management were to abandon the existing rebuilding plans in favor of substantially higher catches or if compliance is insufficient.

As mentioned above, the ESA defines an endangered species as any species in danger of extinction throughout all or a significant portion of its range, and a threatened species as any species likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Section 4(b)(1) of the ESA requires that the listing determination be 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 those efforts, if any, that are being made to protect such species. As stated previously, we have concluded that there are two DPSs of Atlantic bluefin tuna. We have considered the available information on the abundance of Atlantic bluefin tuna from both DPSs, and whether any one or a combination of the five ESA section 4(a)(1) factors significantly affect the long-term persistence of Atlantic bluefin tuna now or into the foreseeable future. We have reviewed the SRR, the high and low recruitment potential projections, the CIE reviewers' comments, and other available literature, and consulted with scientists, fishermen, and fishery resource managers familiar with Atlantic bluefin tuna and related research areas. After reviewing this information, we have determined that listing the eastern Atlantic/Mediterranean and western Atlantic bluefin tuna DPSs as either endangered or threatened throughout all or a significant portion of its range is not warranted at this time. Because of the remaining uncertainties regarding the effects of the DWH oil spill, we will add the bluefin tuna to our Species of Concern list (*http://www.nmfs.noaa.gov/pr/species/concern/#list*; See 69 FR 19975, April 15, 2004 for description of program). This will serve to (1) increase public awareness about the species; (2) further identify data deficiencies and uncertainties in the species' status and the threats it faces; (3) and stimulate cooperative research efforts to obtain the information necessary to evaluate the species' status and threats.

As stated previously, we also intend to revisit this decision no later than 2013 once the NRDA analyses have been concluded to determine whether the DWH oil spill altered the condition of the species.

Authority: 16 U.S.C. 1531 *et seq.*

Dated: May 26, 2011.

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