DEPARTMENT OF COMMERCE

National Ocean and Atmospheric Administration

50 CFR Parts 223 and 224

[Docket No. 120807313–2313–01]

RIN 0648–XC154

Endangered and Threatened Wildlife; 90-Day Finding on Petitions To List the Northeastern Pacific Ocean Distinct Population Segment of Great White Shark as Threatened or Endangered Under the Endangered Species Act

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

ACTION: 90-day petition finding, request for information, and initiation of status review.

SUMMARY: We, NMFS, announce a 90-day finding on two petitions received to list the northeastern Pacific Ocean population of great white shark (*Carcharodon carcharias*) as a threatened or endangered distinct population segment (DPS) under the Endangered Species Act (ESA) and to designate critical habitat concurrently with the listing. We find that the petitions and information in our files present substantial scientific or commercial information indicating that the petitioned action may be warranted. We will conduct a status review of the species to determine if the petitioned action is warranted. To ensure that the status review is comprehensive, we are soliciting scientific and commercial information pertaining to this species from any interested party.

DATES: Information and comments on the subject action must be received by November 27, 2012.

ADDRESSES: You may submit comments, information, or data, identified by ''NOAA–NMFS–2012–0176'' by any one of the following methods:

- *Electronic Submissions:* Submit all electronic comments via the Federal eRulemaking Portal *http://www.regulations.gov*. To submit comments via the e-Rulemaking Portal, first click the ''submit a comment'' icon, then enter ''NOAA–NMFS–2012–0176'' in the keyword search. Locate the document you wish to comment on from the resulting list and click on the ''Submit a Comment'' icon on the right of that line.
- *Mail or hand-delivery:* Protected Resources Division, Southwest Region, NMFS, 501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802–4213.

Instructions: All comments received are a part of the public record and may be posted to *http://www.regulations.gov* without change. All personally identifiable information (for example, name, address, etc.) voluntarily submitted by the commenter may be publicly accessible. Do not submit confidential business information or other information you wish to protect from public disclosure. NMFS will accept anonymous comments. Attachments to electronic comments will be accepted in Microsoft Word, Excel, Corel WordPerfect, or Adobe PDF file formats only.

FOR FURTHER INFORMATION CONTACT: Craig Wingert, NMFS, Southwest Region, (562) 980–4021; or Marta Nammack, NMFS, Office of Protected Resources, (301) 427–8469.

SUPPLEMENTARY INFORMATION:

Background

On June 25, 2012, we received a petition from WildEarth Guardians to list the northeastern Pacific Ocean DPS of great white shark (*Carcharodon carcharias*) as threatened or endangered under the ESA. The petitioners also requested that critical habitat be designated for this DPS under the ESA. On August 13, 2012, we received a second petition, filed jointly by Oceana, Center for Biological Diversity (CBD), and Shark Stewards, to list the northeastern Pacific Ocean DPS of white shark (another common name for the great white shark) under the ESA and designate critical habitat. Both petitions bring forth much of the same or related factual information on the biology and ecology of great white sharks, and raise several identical or similar issues related to potential factors affecting this species. As a result, we are considering both petitions simultaneously in this 90-day finding. Copies of the petitions are available upon request (see **ADDRESSES,** above).

ESA Statutory, Regulatory, and Policy Provisions and Evaluation Framework

Section 4(b)(3)(A) of the ESA of 1973, as amended (16 U.S.C. 1531 *et seq.*), requires, to the maximum extent practicable, that within 90 days of receipt of a petition to list a species as threatened or endangered, the Secretary of Commerce make a finding on whether that petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted, and to promptly publish such finding in the **Federal Register** (16 U.S.C. 1533(b)(3)(A)). When it is found that substantial scientific or commercial information in a petition indicates the petitioned action may be warranted (a ''positive 90-day finding''), we are required to promptly commence a review of the status of the species concerned during which we will conduct a comprehensive review of the best available scientific and commercial information. In such cases, we conclude the status review with a finding published in the **Federal Register** as to whether or not the petitioned action is warranted within 12 months of receipt of the petition. Because the finding at the 12-month stage is based on a thorough review of the available information, as compared to the more limited scope of review at the 90-day stage, a ''may be warranted'' finding does not prejudge the outcome of the status review.

Under the ESA, a listing determination may address a species, which is defined to also include any subspecies and, for vertebrate species, any DPS which interbreeds when mature (16 U.S.C. 1532(16)). A joint NMFS-U.S. Fish and Wildlife Service (USFWS) (jointly, ''the Services'') policy clarifies the agencies' interpretation of the phrase ''distinct population segment'' for the purposes of listing, delisting, and reclassifying a species under the ESA (61 FR 4722; February 7, 1996). A species, subspecies, or DPS is ''endangered'' if it is in danger of extinction throughout all or a significant portion of its range, and ''threatened'' if it is likely to become endangered within the foreseeable future throughout all or a significant portion of its range (16 U.S.C. 1532(6) and (20)). Pursuant to the ESA and our implementing regulations, we determine whether species are threatened or endangered based on any one or a combination of the following factors: (1) The present or threatened destruction, modification, or curtailment of its habitat or range; (2) overutilization for commercial, recreational, scientific, or educational purposes; (3) disease or predation; (4) the inadequacy of existing regulatory mechanisms; and (5) any other natural or manmade factors affecting the species' continued existence (16 U.S.C. 1533(a)(1), 50 CFR 424.11(c)).

ESA implementing regulations define ''substantial information'' in the context of reviewing a petition to list, delist, or reclassify a species as the amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted (50 CFR 424.14(b)). In evaluating whether substantial information is contained in a petition, the Secretary must consider whether the petition: (1) Clearly indicates the administrative measure recommended

and gives the scientific and any common name of the species involved; (2) contains detailed narrative justification for the recommended measure, describing, based on available information, past and present numbers and distribution of the species involved and any threats faced by the species; (3) provides information regarding the status of the species over all or a significant portion of its range; and (4) is accompanied by the appropriate supporting documentation in the form of bibliographic references, reprints of pertinent publications, copies of reports or letters from authorities, and maps (50 CFR 424.14(b)(2)).

Judicial decisions have clarified the appropriate scope and limitations of the Services' review of petitions at the 90-day finding stage, in making a determination that a petitioned action ''may be'' warranted. As a general matter, these decisions hold that a petition need not establish a ''strong likelihood'' or a ''high probability'' that a species is either threatened or endangered to support a positive 90-day finding.

We evaluate the petitioners' request based upon the information in the petition including its references and the information readily available in our files. We do not conduct additional research and we do not solicit information from parties outside the agency to help us in evaluating the petition. We will accept the petitioners' sources and characterizations of the information presented if they appear to be based on accepted scientific principles, unless we have specific information in our files indicating the petition's information is incorrect, unreliable, obsolete, or otherwise irrelevant to the requested action. Information that is susceptible to more than one interpretation or that is contradicted by other available information will not be dismissed at the 90-day finding stage, so long as it is reliable and a reasonable person would conclude it supports the petitioners' assertions. In other words, conclusive information indicating the species may meet the ESA's requirements for listing is not required to make a positive 90-day finding. We will not conclude that a lack of specific information negates a positive 90-day finding if a reasonable person would conclude that the uncertainty from the lack of information suggests an extinction risk of concern for the species at issue.

To make a 90-day finding on a petition to list a species, we evaluate whether the petition presents substantial scientific or commercial information indicating the subject species may be either threatened or endangered, as defined by the ESA. First, we evaluate whether the information presented in the petition, along with the information readily available in our files, indicates that the petitioned entity constitutes a ''species'' eligible for listing under the ESA. Next, we evaluate whether the information indicates that the species faces an extinction risk that is cause for concern; this may be indicated in information expressly discussing the species' status and trends, or in information describing impacts and threats to the species. We evaluate any information on specific demographic factors pertinent to evaluating extinction risk for the species (e.g., population abundance and trends, productivity, spatial structure, age structure, sex ratio, diversity, current and historical range, habitat integrity or fragmentation), and the potential contribution of identified demographic risks to extinction risk for the species. We then evaluate the potential links between these demographic risks and the causative impacts and threats identified in section 4(a)(1).

Information presented on impacts or threats should be specific to the species and should reasonably suggest that one or more of these factors may be operative threats that act or have acted on the species to the point that it may warrant protection under the ESA. Broad statements about generalized threats to the species, or identification of factors that could negatively impact a species, do not constitute substantial information indicating that listing may be warranted. We look for information indicating that not only is the particular species exposed to a factor, but that the species may be responding in a negative fashion; then we assess the potential significance of that negative response.

Many petitions identify risk classifications made by non-governmental organizations, such as the International Union on the Conservation of Nature (IUCN), the American Fisheries Society, or NatureServe, as evidence of extinction risk for a species. Risk classifications by other organizations or made under other Federal or state statutes may be informative, but the classification alone does not provide the rationale for a positive 90-day finding under the ESA. For example, as explained by NatureServe, their assessments of a species' conservation status do ''not constitute a recommendation by NatureServe for listing under the U.S. Endangered Species Act'' because NatureServe assessments ''have different criteria, evidence requirements, purposes and taxonomic coverage than government lists of endangered and threatened species, and therefore these two types of lists should not be expected to coincide'' (*http://www.natureserve.org/prodServices/statusAssessment.jsp*). Thus, when a petition cites such classifications, we will evaluate the source of information that the classification is based upon in light of the standards on extinction risk and impacts or threats discussed above.

Distribution and Life History of the Great White Shark

The great white shark (also known as ''white shark'') is a circumglobal species that resides primarily in temperate and sub-tropical waters (Compagno *et al.,* 1997; Domeier and Nasby-Lucas, 2006; Domeier *et al.,* 2012). White sharks commonly inhabit coastal and continental shelf waters, although they have been observed entering marine bays, estuaries, lagoons, and harbors (Compagno *et al.,* 1997). Recent studies suggest that these sharks also spend considerable amount of time in open ocean habitats thousands of kilometers from shore (Domeier, 2012). Areas likely to attract adult white sharks include coastal waters adjacent to pinniped colonies or haulout sites, as these are favored prey species (Klimley *et al.,* 1996; Hussey *et al.,* 2012). Known prey of white sharks also includes a wide range of other species from smaller demersal fish, such as rockfish, to giant pelagic species, such as tuna and swordfish, as well as sea turtles, seabirds, cetaceans, and other species of sharks (Fergusson, 1996; Long and Jones, 1996; Wilson and Patyten, 2008; IUCN, 2009; Santana-Morales *et al.,* 2012). White sharks are recognized as apex predators throughout the oceanic and coastal marine environments where they occur, and may play an important role in ecosystem balance and population control for a number of other marine species (Myers *et al.,* 2007; Wilson and Patyten, 2008). White sharks demonstrate the ability to undertake transoceanic migrations to specific locations in patterns that appear to be predictable (Boustany *et al.,* 2002; Jorgensen *et al.,* 2010; Chapple *et al.,* 2011; Domeier, 2012).

Great white sharks are distinguished by their stout spindle-shaped body, moderately long and bluntly conical snout, five long gill slits, large falcate first dorsal fin with free rear tip located over the pectoral inner margins, pivoting second dorsal and anal fins, white ventral body color, and lack of any secondary keels on the base of the caudal fin. The teeth are large, flat, and triangular shaped, with blade-like serrations, although teeth in the rear of

the mouth get progressively smaller and sometimes lack serration, especially in younger sharks (Compagno *et al.,* 1997; FAO, 2012). The maximum size of this species has not been established, but has been estimated at about 6 m (19 ft), and possibly up to 6.4 m (21 ft), or more (Cailliet *et al.,* 1985; Wilson and Patyten, 2008; IUCN, 2009). Estimated weight of the largest individuals is nearly 3,000 kg (6,600 lbs) (Cailliet *et al.,* 1985; Anderson *et al.,* 2011).

Available information on the general life history pattern of white sharks suggests that females mature at about 12–14 years of age, and about 4–5 m (13–16 ft) in length. Males mature at 9–10 years old, and about 3.5–4.1 m (11.5–13.5 ft) in length (Compagno *et al.,* 1997). It is believed that females give birth at 2 or 3-year intervals to litters of 2–10 pups that are 1–1.5 m (3.3–4.9 ft) in length after a 12–22 month gestation (Francis, 1996; Wilson and Patyten, 2008; Domeier, 2012). Embryos are oophagus, meaning they consume and store yolk in their stomachs (Francis, 1996; Uchida *et al.,* 1996), and viviparous (live) birth of pups likely occurs sometime between May and October (Domeier, 2012). Specific knowledge of pup survival rates is not available, but is estimated to be low (CITES, 2004).

Primary concentrations of white sharks occur in South Africa, Australia and New Zealand, and the northeastern Pacific Ocean, with other white sharks observed in the north Atlantic and the Mediterranean (Boustany *et al.,* 2002; Domeier and Nasby-Lucas, 2006; Weng *et al.,* 2007; Jorgensen *et al.,* 2010). Genetic and migration studies provide evidence that these may represent separate populations (Jorgensen *et al.,* 2010). Mitochondrial DNA suggests at least three matrilineal populations: South Africa/northwest Atlantic; southwest Pacific; and northeastern Pacific (Gubili *et al.,* 2012). Although the southwestern Pacific and northeastern Pacific populations could potentially interbreed, the genetic sampling indicates that these two populations are largely reproductively isolated. It has been suggested that the northeastern Pacific population was founded by relatively few sharks within the last 200,000 years, and hasn't mixed with other shark populations near Australia or South Africa since (Hance, 2009; Jorgensen *et al.,* 2010).

White sharks in the northeastern Pacific Ocean have been observed from Baja California to the Bering Sea (Kato, 1965; COSEWIC, 2006) and offshore out to Hawaii. Using satellite and acoustic telemetry, researchers have followed movements of white sharks in the northeastern Pacific Ocean and discovered patterns of site fidelity and repeated homing in structured seasonal migrations, including fixed destinations, schedules, and routes (Boustany *et al.,* 2002; Jorgensen *et al.,* 2010). As a result, three core areas have been identified in the central and northeastern Pacific: (1) North American shelf waters; (2) slope and offshore waters of Hawaii; and (3) an area between the North American coast and Hawaii termed the ''white shark café'' or Shared Offshore Foraging Area (SOFA) (Jorgensen *et al.,* 2010; Anderson *et al.,* 2011; Domeier, 2012). Each winter, great white sharks leave coastal aggregation sites off of central California (Farallon Islands/Año Nuevo/Point Reyes) and migrate 2000–5000 km offshore to subtropical and tropical pelagic habitats, returning to coastal aggregation sites in late summer. Site fidelity in North American coastal hotspots has also been documented using photo-identification (Jorgensen *et al.,* 2010; Chapple *et al.,* 2011; Sosa-Nishizaki *et al.,* 2012). Guadalupe Island, located 250 miles off the coast of Baja California, Mexico, is also a preferred aggregation site for adults (Sosa-Nishizaki *et al.,* 2012). Adult males annually migrate from preferred aggregation sites to the SOFA/white shark café. Females have been observed to migrate biennially between preferred aggregation sites and the area surrounding the SOFA/white shark café, usually after males have returned to coastal aggregation sites (Domeier, 2012).

The coastal areas of southern California and Baja California, Mexico, appear to be important nursery areas hosting large concentrations of young-of-the-year (YOY) and juvenile great white sharks (Dewar *et al.* 2004; Weng *et al.,* 2007; Galván-Magaña *et al.,* 2011; Domeier, 2012; Santana-Morales *et al.,* 2012). Information gained from the records of white shark bycatch in California and Baja fisheries, including gillnet, seine-net, and hook and line fisheries (Lowe *et al.,* 2012; Santana-Morales *et al.,* 2012), along with relatively consistent reporting of juvenile white shark observations along the southern California coast, lend support to the assertion that this area is important developmental habitat for white sharks before they mature into larger adults. Estimates of abundance have not been available historically, but recent studies have suggested the population size at two known aggregation sites (Farallon Islands/Central California and Guadalupe Island) in the northeastern Pacific Ocean is around 340 sub-adults and adults (Chapple *et al.,* 2011; Sosa-Nishizaki *et al.,* 2012).

Analysis of the Petitions and Information Readily Available in NMFS Files

The two petitions request the same action, to list the northeastern Pacific Ocean (NEP) DPS of great white shark (or white shark) as endangered or threatened under the ESA and to designate critical habitat for the DPS. Therefore, we evaluated the information provided in both petitions and readily available in our files to determine if the petitions presented substantial scientific or commercial information indicating that the petitioned action may be warranted. Both petitions contain information on the species, including the taxonomy, species description, geographic distribution, habitat, population status and trends, and factors contributing to the species' decline. Both petitions state that a primary threat to the NEP population of white shark is exploitation by fishing (historical and current) and bycatch in fisheries. Both petitions also assert that the lack of adequate regulatory protection worldwide, bioaccumulation of contaminants, and habitat degradation, as well as the species' biological constraints, increase the susceptibility of the NEP population of white shark to extinction.

According to both petitions, the NEP population of white shark qualifies as a DPS because the NEP population is both discrete and significant, as defined under the Services' DPS policy (61 FR 4722; February 7, 1996). The WildEarth Guardians petition asserts that all of the five causal factors in section 4(a)(1) of the ESA are adversely affecting the continued existence of the NEP population, whereas the Oceana *et al.* petition does not discuss disease and predation as a factor that is adversely affecting the NEP population. In the following sections, we analyze the information presented by the petitions and in our files on the qualification of the NEP population of white shark as a DPS and the specific ESA section 4(a)(1) factors affecting the population's risk of extinction.

Qualification of Northeastern Pacific Ocean Population as a DPS

Both petitions assert that the NEP population of white shark qualifies as a DPS, because it is both a discrete and significant population segment of the species, as defined in the NMFS and USFWS policy on DPSs (61 FR 4722; February 7, 1996). First, the petitions state that the NEP population is discrete based on both genetic and spatial

separation from other populations of white shark. Genetic analyses indicate that the NEP population of white sharks is similar to and descended from the Australian/New Zealand (ANZ) population (Jorgensen *et al.,* 2010; Gubili *et al.,* 2012). The NEP population was likely established during the Late Pleistocene, from a limited number of founders from the ANZ population, but has since had little gene flow with the ANZ population (Jorgensen *et al.,* 2010). Thus, although the two populations can interbreed, they are thought to be largely reproductively isolated (Jorgensen *et al.,* 2010).

In addition to genetic separation, the NEP population is geographically separated from other populations, adheres to predictable seasonal migratory routes, and exhibits strong site fidelity within the NEP. As discussed above, white sharks in the NEP population range from Baja California to the Bering Sea, and out to Hawaii. Tagged white sharks from the NEP population consistently used three core areas within the northeastern and central Pacific ocean: (a) The coastal shelf waters of North America (primarily from central California to Baja California); (b) the slope and offshore waters of the Hawaiian archipelago; and (c) offshore waters between California and Hawaii, including an offshore habitat approximately halfway between California and Hawaii referred to as the SOFA/white shark café, used primarily by adults (Boustany *et al.,* 2002; Jorgensen *et al.,* 2010; Domeier, 2012). The individuals followed seasonal migratory patterns, generally moving offshore starting in winter and returning to the California and Baja California coast in the late summer (Jorgensen *et al.,* 2010; Domeier, 2012). Tagged individuals from the NEP population did not show any straying or spatial overlap with the ANZ population (Jorgensen *et al.,* 2010). YOY and juvenile white sharks also stay within the geographic boundaries of the NEP population, likely using nearshore, shallow waters of the Southern California Bight and Baja California as nursery habitats, with adults likely aggregating at sites off central California and at Guadalupe Island (off Baja California) to mate (Domeier, 2012). Thus, the available information on migratory behavior and habitat use indicates that the NEP population is geographically separated from other white shark populations.

Second, the petitions state that the NEP population is discrete because of 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 (i.e., the inadequacy of existing regulatory mechanisms as a factor to consider in determining whether a species is endangered or threatened). The petitions state that a large portion of the NEP population's habitat is within U.S. waters, highlighting the importance of U.S. protections for the species. The petitions also argue that the NEP population is discrete because it ranges internationally into waters with differing management regimes, particularly when occupying offshore habitats and visiting aggregation sites off Baja California, where it may be subject to exploitation by non-U.S. entities. However, the Services' DPS policy states that a population may be considered discrete if it is separated from other populations by international boundaries within which significant differences in regulatory mechanisms exist. That the NEP population crosses these international boundaries actually argues against considering this population as discrete from other white shark populations. Thus, the NEP population is not considered discrete based on this factor. Nevertheless, the information available in the petitions and in our files provides evidence suggesting the NEP population may be discrete based on both genetic and spatial separation from other populations.

Both petitions make the case that the NEP population is significant to the taxon. As described above, the NEP population does not appear to overlap spatially with other populations (Jorgensen *et al.,* 2010; Domeier, 2012; Gubili *et al.,* 2012). The petitions reason that loss of this population would result in a significant gap in the range of the species because it is unlikely, given the geographic separation of the NEP population from other populations, that sharks from other populations would expand their distribution into the NEP's current habitats. The petitions also state that the NEP population is genetically differentiated from other white shark populations, as described above. In addition, the Oceana *et al.* petition contends that the NEP population occupies an ecological setting that is unique to this species, because they are the only population to occupy coastal waters off California and the SOFA. Overall, the information available in the petitions and in our files suggests that the NEP population of white shark may be significant to the species. The Oceana *et al.* petition also argues that great white sharks play an important ecological role that is essential for the health of the NEP ecosystem, as a top predator that regulates prey populations (e.g., fish, other sharks, and pinnipeds). We do not comment on the merit of this statement, but note that in determining whether a discrete population segment is significant, the NMFS and USFWS policy focuses on the biological and ecological significance of the population segment to the taxon, not to the ecosystem.

Based on the above analysis, we conclude that the information in the two petitions and in our files suggests that the NEP population of white shark may qualify as a DPS under the discreteness and significance requirements.

The Present or Threatened Destruction, Modification, or Curtailment of the Species' Habitat or Range

Both petitions assert that habitat degradation, largely associated with increasing human activity, poses a threat to the NEP population of white shark, although the two petitions focus on different sources of habitat degradation. The Oceana *et al.* petition briefly mentions that pollutant discharge can degrade coastal aggregation and nursery habitats, whereas the WildEarth Guardians petition goes into more detail on this potential threat. The WildEarth Guardians petition cites urban stormwater runoff and point source discharge as important sources of pollutants (e.g., pesticides, fertilizers, trace metals, synthetic organic compounds, petroleum, and pathogens) into the Southern California Bight (DiGiacomo *et al.,* 2004). The petition states that these pollutants threaten predators like white sharks, primarily through effects on their prey. For example, historical discharges of organochlorines, such as DDT and PCBs, into the Southern California Bight have resulted in high levels of these contaminants in local populations of pinnipeds (Blasius and Goodmanlowe, 2008), one of the prey resources for white sharks. Both petitions cite a recent finding that young white sharks sampled off California have high levels of mercury, DDT, PCBs, and chlordanes that could result in physiological impairment (Mull *et al.,* 2012). The WildEarth Guardians petition briefly states that water quality in areas off Mexico where the NEP population occurs may also be affected by contaminants (Parks Watch, 2004).

The WildEarth Guardians petition also suggests that the concentration of marine debris in the North Pacific Gyre (the ''Great Pacific Garbage Patch'') may

have deleterious effects on offshore habitats, including the SOFA. The main concern expressed in the petition is the concentration of plastic of various sizes in the ''Garbage Patch'' (Algalita, 2009) which could be ingested by white sharks in the area either directly or ingested by their prey. The petition also suggests that accumulation of persistent organic pollutants on the plastic (Algalita, 2009) may pose another threat to the health of white sharks. We note, however, that it appears to be unclear exactly what the adults (primarily males) are preying on in the SOFA (Jorgensen *et al.,* 2010; Domeier, 2012) because the area is devoid of the small marine mammals typically preyed upon by adult white sharks (Domeier, 2012). Adults in the SOFA may be feeding on squid or other species that target squid (Domeier, 2012). Without specific information about the extent to which adults in the SOFA are feeding and what they are feeding on, it is difficult to evaluate the potential effects of plastic marine debris on the NEP population's feeding habitat and prey resources.

The Oceana *et al.* petition focuses on two sources of habitat degradation: (1) Decreased prey resources due to human exploitation; and (2) the effects of ocean acidification on the California Current ecosystem. The WildEarth Guardians petition briefly mentions that fisheries activities in coastal areas may deplete important prey resources for the NEP population (CITES, 2004). The Oceana *et al.* petition provides more detail, stating that human exploitation depleted populations of pinnipeds, an important prey resource for adult white sharks. The petition contends that although pinniped populations are currently increasing, they were depleted for a long period of time and remain below historical levels. We note that the most recent stock assessments estimate that harbor seals may be at carrying capacity (NMFS, 2011a) and that northern elephant seals have almost reached their carrying capacity for pups per year (NMFS, 2007). Population trends have generally been increasing since the 1980s or earlier for harbor seals, California sea lions, and northern elephant seals in California (NMFS, 2007; 2011a; 2011b). Thus, although these prey resources may have been limited in the past when pinniped populations were at historical lows, the populations have been increasing over the last 30 years or more and may not currently be limiting. For example, an increased frequency of observed shark attacks on prey off the South Farallon Islands from 1983 to 1993 indicated a potential increase in the white shark population at the islands, which may be explained by increased recruitment of younger white sharks supported by the increase and stabilization of pinniped prey resources over the 1970s and 1980s (Pyle *et al.,* 1996). Further analysis is needed to evaluate what effect changes in pinniped populations have had on the status of white shark populations over time. The petition also states that there have been and continue to be major commercial fisheries for most of the other prey resources supporting various life stages of white sharks (e.g., fish species, crustaceans, cephalopods; Klimley, 1985; Ellis and McCosker, 1995). Again, further analysis is needed to specifically evaluate the impacts of these fisheries on prey resources for white sharks.

The Oceana *et al.* petition also contends that the effects of ocean acidification could have negative impacts on the marine food web within the California Current ecosystem, including on the NEP population of white shark. The petition cites a model simulation study which predicts that by 2050, the oceanic uptake of increased atmospheric CO_2 will lower the pH and the saturation state of aragonite (a mineral form of calcium carbonate, used by calcifying organisms) in nearshore waters of the California Current system to levels well below the natural range for this area (Gruber *et al.,* 2012). The petition states that these effects of ocean acidification will have negative impacts on fish species, referencing recent studies showing that high CO_2 and low pH levels impair olfactory responses and homing ability in clownfish (Munday *et al.,* 2009) and can lead to cardiac failure in some fish species (Ishimatsu *et al.,* 2004). The petition readily admits, however, that the severity of effects on specific species is uncertain. Some fish species may experience metabolic responses to elevated CO_2 levels at the cellular level, but are able to compensate for those responses at the whole animal level, making them less sensitive to the effects of ocean acidification (Portner, 2008). In addition, extrapolating specific effects at the species levels to the overall ecosystem (e.g., effects on prey availability and predator-prey interactions for top predators like white sharks) is highly uncertain. The petition also states that ocean acidification can potentially affect marine mammals and other marine life by reducing the sound absorption of seawater and allowing sound to travel further (Hester *et al.,* 2008). However, the petition does not explain what the potential effects on marine mammals and other marine life may be or how any such effects relate to the degradation of white shark habitat (e.g., the availability or abundance of prey resources). The available information is not sufficient to determine if ocean acidification may be threatening the habitat of the NEP population of white shark such that listing may be warranted.

We conclude that the information in the petitions and in our files suggests that habitat degradation associated with pollutant discharge in the Southern California Bight may be impacting the health of the NEP population of white shark. Human exploitation may have impacted prey resources (e.g., pinnipeds and fish and invertebrate species) in the past; however, further analyses are needed to evaluate the recent and current impacts on prey resources. In addition, the information provided on the effects of marine debris in the North Pacific Gyre or ocean acidification is insufficient to evaluate whether these factors may be threatening the habitat of the NEP population of white shark such that listing may be warranted.

Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Information from both petitions suggests that a primary threat to the NEP population of white shark is from fisheries. The petitions cite information on the effects of fisheries on white sharks worldwide and within the NEP. White sharks are harvested in targeted fisheries and as bycatch and are highly prized for their teeth, jaws, and fins. White sharks are primarily caught incidentally in commercial fisheries using longlines, setlines, gillnets, trawls, fish traps, and other gear (Compagno, 2001; Fowler *et al.,* 2005; Lowe *et al.,* 2012; Santana-Morales *et al.,* 2012). The curious nature of white sharks makes them more vulnerable to incidental capture, and their high value and negative reputation may contribute to the killing of incidentally caught individuals rather than being released alive (Fowler *et al.,* 2005). CITES (2004a) estimated that low to mid hundreds of white sharks are killed annually as bycatch within each major region of the species' range. Targeted sport and commercial fisheries for white sharks also exist worldwide. Targeted sports fisheries may either kill or release sharks alive, but post-release mortality is unknown. It is estimated that tens to low hundreds of white sharks are killed in sports fisheries worldwide each year (CITES, 2004). Targeted commercial fisheries for white sharks are thought to be uncommon and opportunistic when

aggregations are found, but the species' site fidelity and tendency to aggregate in predictable areas make it vulnerable to over-exploitation (CITES, 2004). Targeted commercial fisheries worldwide may also kill tens to low hundreds of white sharks each year (CITES, 2004).

In the NEP Ocean, there is little commercial fishing activity in the SOFA, providing a potential refuge from incidental capture for individuals when they occupy this offshore area (Domeier, 2012). However, the lack of international laws to protect great white sharks in international waters is a potential threat to the species (Domeier, 2012; discussed further under ''Inadequacy of existing regulatory mechanisms''). White sharks are most vulnerable to fisheries capture when occupying nearshore aggregation or nursery habitats, especially YOY and juvenile stages (Domeier, 2012). Off California, there have been no directed fisheries for white sharks, but incidental and targeted catch has occurred (Lowe *et al.,* 2012). An analysis of fishery-dependent catch records for the Southern California Bight from 1936 to 2009 found that the majority of the reported white shark captures (where size was indicated) were of YOY sharks (60 percent), followed by juveniles (32 percent) and subadults/adults (8 percent); however, the proportion of YOY sharks in the reported catch increased to 77 percent after the nearshore gillnet ban was implemented in 1994 (Lowe *et al.,* 2012). Commercial entangling nets (81 percent) and recreational hook-and-line fishing (8 percent) accounted for the majority of the reported white shark captures (Lowe *et al.,* 2012). The number of reported white shark captures in commercial entangling nets has been 20 or less from 1985 through 2009, except in 1985 when 25 captures were reported (Lowe *et al.,* 2012). The analysis suggests that the effects of incidental capture in gillnet fisheries off California have decreased compared to historical effects. As gillnet fishing effort decreased from the mid-1980s to mid-1990s, so did reports of white shark captures (Lowe *et al.,* 2012). However, although gillnet fishing effort remained stable or decreased from the mid-1990s through 2009, reports of white shark captures increased from 2005 through 2009 (Lowe *et al.,* 2012). Increases in the number of reported captures in the gillnet fisheries since 2005, despite stable or decreased effort, may be the result of increased reporting of captures and/or an increase in the abundance of white sharks due to the nearshore gillnet ban and changes in offshore gillnet regulations (Lowe *et al.,* 2012). Also, data from the Monterey Bay Aquarium's Juvenile White Shark Tagging Program indicate that YOY and juvenile white sharks have relatively high post-release survival after being caught in gillnet gear (Lowe *et al.,* 2012).

Incidental catch of white sharks also continues to occur off Baja California. Incidental catch of 111 great white sharks was reported from 1999 through 2010, consisting of YOY (79.8 percent) and juvenile (20.2 percent) sharks (Santana-Morales *et al.,* 2012). Incidental catch primarily occurred in bottom gillnet gear (74.7 percent), but also in drift gillnet (18 percent) and artisanal seine net (4.5 percent) gear (Santana-Morales *et al.,* 2012).

The petitions assert that the continued incidental catch of white sharks poses a threat to the species, because the removal of just a few individuals could have a substantive effect on the local population (Pyle *et al.,* 1996; Chapple, 2011). The petitions also highlight the high value of white shark teeth, jaws, and fins as trophies, curios, and food, stating that this provides a strong monetary incentive to capture and keep white sharks (Clarke, 2004; Shivji *et al.,* 2005; Clarke *et al.,* 2006).

We conclude that the petitions and information in our files present evidence that fisheries impacts continue to affect white shark populations worldwide and in the NEP, primarily due to incidental capture in fisheries and the potential for the high value of great white shark teeth, jaws, and fins to promote keeping incidentally caught individuals rather than releasing them back into the water. This information suggests that fisheries impacts may be affecting the continued existence of the NEP population of white shark. To further evaluate these effects, more information is needed on fisheries impacts specifically within the range of the NEP population, particularly on the capture of white sharks in fisheries in offshore waters and the lethal and sublethal effects of catch and release.

Disease or Predation

The WildEarth Guardians petition asserts that the addition of mercury, organochlorine contaminants, and other pollutants to the ocean and the effects of these pollutants on the NEP population of white sharks may be categorized as disease. The petition does not provide any additional information to support that disease is a factor affecting the NEP population's continued existence such that listing may be warranted. Thus, the available information is insufficient to evaluate if disease may be affecting the continued existence of the NEP population of white shark. The petition more appropriately discusses pollutants and their effects on the NEP population under the habitat degradation and ''other natural or manmade'' factors.

Inadequacy of Existing Regulatory Mechanisms

The petitions assert that the inadequacy of existing Federal, state, or international regulatory mechanisms require that the NEP population of white shark be listed under the ESA. The petitions contend that although Federal, state, and international regulations exist to protect white sharks from targeted capture in some areas, these regulations are insufficient because white sharks in the NEP population are still vulnerable to incidental capture throughout its range, and to exploitation when in international waters. In addition, the WildEarth Guardians petition states that existing regulations do not protect the NEP population's habitat and health from threats such as habitat degradation, pollution, and overfishing of prey resources.

Within the United States, Federal and state regulations to protect white sharks vary. Currently, the retention of white sharks in U.S. Federal waters in the Pacific Ocean is prohibited under the Highly Migratory Species Fishery Management Plan. In California, targeted capture of white sharks is prohibited, but incidentally caught white sharks may be retained under a permit from the California Department of Fish and Game for scientific or educational purposes (14 CCR § 28.06). In Oregon, all white sharks must be released immediately if caught (ODFW, 2012). Washington and Hawaii do not have specific fisheries regulations for white shark. However, both Hawaii and California passed bans making it unlawful to possess, sell, offer for sale, trade, or distribute shark fins, which may provide some protection for white sharks. The petitions argue that despite these protections, the continued incidental capture and mortality of even small numbers of white sharks in U.S. waters, particularly off California, can have a large impact on the local population, citing a study off the Farallon Islands in which the removal of four white sharks from the area in 1982 resulted in significantly fewer sightings of shark attacks on pinnipeds than expected in 1983 to 1985 (Pyle *et al.,* 1996). The petitions also suggest that illegal fishing may be a problem in the United States, citing cases of illegal

fishing and sale of white shark teeth, jaws, and fins in 2003 (CITES, 2004).

Outside of the United States, protections for white sharks also vary. In Mexico, catch and retention of white sharks and the landing of shark fins without carcasses has been banned since 2006 (Lack and Sant, 2011), although incidental capture continues to occur (Galván-Magaña *et al.,* 2010; Santana-Morales *et al.,* 2012). In Canada, there are no specific regulations to protect white sharks, although a ban on shark finning may provide some protection (DFO, 2007). In international waters, white sharks are protected under CITES (Appendix II) and other international agreements, including the Convention on Migratory Species (Appendix I and II) and the United Nations Convention on the Law of the Sea. However, the petitions contend that these protections are not sufficient, given continued trade in white shark products due to poaching and variable enforcement of regulations (CITES, 2004; Clarke, 2004; Shivji *et al.,* 2005; Clarke *et al.,* 2006; Galván-Magaña *et al.,* 2010; Jorgensen *et al.,* 2010; Viegas, 2011).

Based on the information in the petition and in our files as discussed above, we conclude that existing regulatory mechanisms may be inadequate to address threats to the NEP population of white shark. To further evaluate the adequacy of existing regulatory mechanisms, more information is needed regarding the level of illegal fishing and poaching in U.S. and international waters.

Other Natural or Manmade Factors

The two petitions assert that other natural or manmade factors may be affecting the survival and recovery of the NEP population of white shark, including contaminant loads, negative press, life history factors, small population size, and the synergistic effects of all of the threats facing the population. Both petitions cite a study conducted in the Southern California Bight revealing mercury and organochlorines (e.g., DDT, PCBs, and chlordanes) in the tissues of juvenile white sharks at levels that may result in physiological impairment (Mull *et al.,* 2012). Young white sharks are likely bioaccumulating these contaminants (likely from historical discharges in the Southern California Bight) when feeding on prey resources in the area (Blasius and Goodmanlowe, 2008; Mull *et al.,* 2012). The WildEarth Guardian petition also cites negative media attention as a threat to white sharks, especially when shark attacks on humans occur, because this generates general paranoia and encourages targeting of the species for sport or trophy hunting (IUCN, 2009).

The WildEarth Guardians petition asserts that natural factors, including the species' life history characteristics and small population size, also increase the extinction risk of the NEP population of white shark, particularly when considered in combination with other threats to the species. The petition states that the species' life history characteristics (e.g., slow growth, late maturation, long-life, long generation time, small litter size, and low reproductive capacity) make it susceptible to extinction when faced with population declines and continuing threats (Withgott and Brennan, 2007). The petition also contends that the small estimated population size (e.g., approximately 340 subadults and adults in the NEP population; Chapple *et al.,* 2011; Sosa-Nishizaki *et al.,* 2012) makes the population highly susceptible to extinction due to a stochastic event (Brook *et al.,* 2008). We note, however, that this estimate of abundance is based on studies of individuals surveyed in aggregation sites off central California and Guadalupe Island, and do not include YOY and juveniles. Also, without information on the historical abundance of the NEP population, it is difficult to assess what this estimated population size means for the persistence of the population. The low estimated abundance of the population may be the result of anthropogenic pressures on the population or a naturally low carrying capacity (the NEP population is thought to have been established by a limited number of founders from the ANZ population; Jorgensen *et al.,* 2010) (Chapple *et al.,* 2011). Catch ratios of white sharks to all shark species off the U.S. west coast from 1965 (1:67) to 1983 (1:210) suggest a potential decline in abundance (Casey and Pratt, 1985, cited in Fowler *et al.,* 2005). However, recent increases in the incidental capture of white sharks in gillnet fisheries off California, despite stable or decreasing fishing effort, suggest that the population may be increasing (Lowe *et al.,* 2012). In addition, an increased frequency of observed white shark attacks on pinnipeds off the South Farallon Islands over time indicates an increase in the shark population at the islands (Pyle *et al.,* 1996; Pyle *et al.,* 2003). Thus, it is difficult at this time to determine population trends and to evaluate how the estimated size of the NEP population relates to the population's extinction risk.

Overall, the petition and information in our files suggest that effects from bioaccumulation of contaminants and negative media attention, coupled with the life history characteristics of white sharks, may be affecting the survival and recovery of the NEP population. More specific information is needed, however, to assess population trends and to evaluate the population's estimated abundance in terms of the potential effects on the population's survival and recovery.

Summary of Section 4(a)(1) Factors

We conclude that the petition presents substantial scientific or commercial information indicating that multiple section 4(a)(1) factors, as discussed above, may be causing or contributing to an increased risk of extinction for the NEP population of white shark.

Petition Finding

After reviewing the information contained in both petitions, as well as information readily available in our files, we conclude the petitions present substantial scientific information indicating the petitioned action of listing the NEP population of white shark as a threatened or endangered DPS may be warranted. Therefore, in accordance with section 4(b)(3)(A) of the ESA and NMFS' implementing regulations (50 CFR 424.14(b)(3)), we will commence a status review of the species. During the status review, we will determine whether the population identified by the petitioners meets the DPS policy's criteria, and if so, whether the population is in danger of extinction (endangered) or likely to become so within the foreseeable future (threatened) throughout all or a significant portion of its range. We now initiate this review, and thus, the northeastern Pacific Ocean population of white shark is considered to be a candidate species (50 CFR 424.15(b)). Within 12 months of the receipt of the WildEarth Guardians petition (June 25, 2013), we will make a finding as to whether listing the species as endangered or threatened is warranted as required by section 4(b)(3)(B) of the ESA. If listing the species is warranted, we will publish a proposed rule and solicit public comments before developing and publishing a final rule.

Information Solicited

To ensure that the status review is based on the best available scientific and commercial data, we are soliciting information relevant to whether the NEP Ocean population of white sharks is a DPS and whether it is threatened or endangered. Specifically, we are soliciting published and unpublished

information in the following areas: (1) Population structure information in the Pacific Ocean, such as genetics data; particularly any unpublished information; (2) migratory and behavior patterns in the NEP Ocean, particularly any unpublished information; (3) life history and ecology, particularly any unpublished information; (4) historical and current distribution and abundance of this species throughout the NEP Ocean; (5) historical and current population trends in the NEP Ocean; (6) historical and current data on commercial and recreational fisheries directed at white sharks in the NEP Ocean, including Mexican waters; (7) historical and current data on white shark bycatch and retention in commercial and recreational fisheries in the NEP Ocean, including Mexican waters; (8) data on the trade of white shark products, including fins, jaws, and teeth in the NEP Ocean, including Mexico; (9) data or other information on encounter rates with white sharks through ecotourism operations and sightings data, and long-term records of white shark attacks, wounds or scaring of marine mammals; (10) adverse impacts related to coastal habitat degradation and the health of white sharks, including, but not limited to, impacts related to discharge of pollutants, marine debris, or ocean acidification; (11) any current or planned activities that may adversely impact the species; (12) ongoing or planned efforts to protect and restore the species and their habitats; and (12) management, regulatory, and enforcement information.

We also request information on critical habitat for the NEP Ocean population of white sharks. Specifically, we request information on the physical and biological habitat features that are essential to the conservation of the species and identification of habitat areas that include these essential physical and biological features. Essential features include, but are not limited to: (1) Space for individual and population growth and for normal behavior; (2) food, water, air, light, minerals, or other nutritional or physiological requirements; (3) cover or shelter; (4) sites for reproduction and development of offspring; and (5) habitats that are protected from disturbance or are representative of the historical, geographical, and ecological distributions of the species (50 CFR 424.12). For habitat areas potentially qualifying as critical habitat, we request information describing: (1) The activities that affect the habitat areas or could be affected by the designation; and (2) the economic impacts, impacts to national security, or other relevant impacts of additional requirements of management measures likely to result from the designation.

We request that all information be accompanied by: (1) Supporting documentation such as maps, raw data with associated documentation, bibliographic references, or reprints of pertinent publications; and (2) the submitter's name, mailing address, email address, and any association, institution, or business that the person represents.

References Cited

A complete list of references is available upon request from the NMFS Southwest Regional Office (see **ADDRESSES**).

Authority

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

Dated: September 25, 2012.

Alan D. Risenhoover,

Director, Office of Sustainable Fisheries, performing the functions and duties of the Deputy Assistant Administrator for Regulatory Programs, National Marine Fisheries Service.

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