• Is not an economically significant regulatory action based on health or safety risks subject to Executive Order 13045 (62 FR 19885, April 23, 1997);
• Is not a significant regulatory action subject to Executive Order 13211 (66 FR 28355, May 22, 2001);
• Is not subject to requirements of Section 12(d) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C. 272 note) because application of those requirements would be inconsistent with the CAA; and
• Does not provide EPA with the discretionary authority to address, as appropriate, disproportionate human health or environmental effects, using practicable and legally permissible methods, under Executive Order 12898 (59 FR 7629, February 16, 1994).

In addition, this rule does not have tribal implications as specified by Executive Order 13175 (65 FR 67249, November 9, 2000), because the SIP is not approved to apply in Indian country located in the state, and EPA notes that it will not impose substantial direct costs on tribal governments or preempt tribal law.

List of Subjects in 40 CFR Part 52

Environmental protection, Air pollution control, Carbon monoxide, Incorporation by reference, Intergovernmental relations, Lead, Nitrogen dioxide, Ozone, Particulate matter, Reporting and recordkeeping requirements, Sulfur oxides, Volatile organic compounds.

Dated: December 10, 2014.

Becky Weber,

Acting Regional Administrator, Region 7.

For the reasons stated in the preamble, the Environmental Protection Agency proposes to amend 40 CFR part 52 as set forth below:

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

■ 1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et. seq.*

Subpart AA—Missouri

■ 2. In § 52.1320, the table in paragraph (c) is amended by removing the entry ''10–5.380'' and adding the entry ''10–5.381'' to read as follows:

§ 52.1320 Identification of Plan.

* * * * *

(c) * * *

EPA-APPROVED MISSOURI REGULATIONS

Missouri citation	Title	State effective date	EPA approval date	Explanation
		Missouri Department of Natural Resources		
*	*	*	*	*
		Chapter 5—Air Quality Standards and Air Pollution Control Regulations for the St. Louis Metropolitan Area		
*	*	*	*	*
10–5.381	On-Board Diagnostics Motor Vehicle Emissions Inspection.	12/30/12	12/29/14 [*Insert* ***Federal Register*** *citation*].	
*	*	*	*	*

* * * * *

[FR Doc. 2014–29869 Filed 12–24–14; 8:45 am]

BILLING CODE 6560–50–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 224

[Docket No. 130808698–4999–02]

RIN 0648–XC809

Endangered and Threatened Wildlife and Plants; Notice of 12-Month Finding on Petitions To List the Pinto Abalone as Threatened or Endangered Under the Endangered Species Act (ESA)

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

ACTION: Notice of 12-month finding and availability of a status review report.

SUMMARY: We, NMFS, announce a 12-month finding on two petitions to list the pinto abalone (*Haliotis kamtschatkana*) as threatened or endangered under the Endangered Species Act (ESA). We have completed a comprehensive status review of the pinto abalone in response to these petitions. Based on the best scientific and commercial information available, we have determined that the species does not warrant listing at this time. We conclude that the pinto abalone is not currently in danger of extinction throughout all or a significant portion of its range and is not likely to become so within the foreseeable future. The species will remain on the NMFS Species of Concern list, with one revision to apply the Species of Concern status throughout the species' range (Alaska to Mexico). We also announce the availability of the pinto abalone status review report.

DATES: This finding was made on December 29, 2014.

ADDRESSES: The pinto abalone status review report is available electronically at: *http://www.westcoast.fisheries.noaa.gov/*. You may also receive a copy by submitting a request to the Protected Resources Division, West Coast Region, NMFS, 501 West Ocean Blvd., Suite 4200, Long Beach, CA 90802–4213, Attention: Pinto Abalone 12-month Finding.

FOR FURTHER INFORMATION CONTACT: Melissa Neuman, NMFS, West Coast Region (562) 980–4115; or Lisa Manning, NMFS, Office of Protected Resources (301) 427–8466.

SUPPLEMENTARY INFORMATION:

Background

The pinto abalone (*Haliotis kamtschatkana*) was added to the National Marine Fisheries Service's (NMFS') ''Species of Concern'' list on April 15, 2004 (69 FR 19975). On July 1, 2013, the National Marine Fisheries Service (NMFS) received a petition from the Natural Resources Defense Council (NRDC) requesting that the pinto abalone be listed as threatened or endangered under the Endangered Species Act (ESA) and that critical habitat be designated for the species. On August 5, 2013, we received a second petition, filed by the Center for Biological Diversity (CBD) to list the pinto abalone under the ESA and designate critical habitat. On November 18, 2013, NMFS determined that the petitions presented substantial information indicating that the petitioned action may be warranted for pinto abalone (a ''positive 90-day finding'') and published the finding in the **Federal Register** (78 FR 69033), pursuant to 50 CFR 424.14.

In the fall of 2013, we assembled a Status Review Team (SRT) to compile and review the best available information, assess the extinction risk and threats facing the species, and produce an ESA status review report for pinto abalone. The status review report (NMFS 2014) provides a thorough account of pinto abalone biology and natural history, and an assessment of demographic risks, threats and limiting factors, and overall extinction risk for the species. The status review report was subjected to independent peer review as required by the Office of Management and Budget Final Information Quality Bulletin for Peer Review (M–05–03; December 16, 2004). The key background information and findings of the status review report are summarized below.

Species Description

The pinto abalone is a marine gastropod of the genus *Haliotis.* It is one of seven species of abalone native to the west coast of North America and occurs in both rocky intertidal and subtidal habitats from Baja California to Alaska (Geiger 1999). Like all abalone, pinto abalone are benthic, occurring on hard substrate, relatively sedentary, and generally herbivorous, feeding on attached or drifting algal material. The shell is scallop-edged, multi-colored (mottled red and/or green), and characterized by irregular lumps, with three to seven open respiratory pores that are slightly raised above the shell's surface and paralleling a deep groove (Stevick 2010). The pinto abalone's muscular foot is tan and is used to adhere to hard substrate and for locomotion. The epipodium (the circular fringe of skin around the foot) and tentacles are mottled yellow to dark tan with vertical banding patterns. The maximum recorded shell length for pinto abalone is 190 mm (see status review report). The maximum age is not known, but estimated longevity of at least 15–20 years is reasonable for pinto abalone (Shepherd *et al.* 2000, cited in Committee on the Status of Endangered Wildlife in Canada (COSEWIC) 2009)

Distribution

Of the seven species of abalone found along the west coast of North America (Geiger 1999), pinto abalone have the broadest latitudinal range, extending from Salisbury Sound, Sitka Island, Alaska to Bahia Tortugas, Baja California, Mexico (Campbell 2000), and are the predominant abalone found in Washington and Alaska, and in British Columbia, Canada. Other than a few observations on the Oregon coast, we are not aware of any records of pinto abalone along the outer coast of Washington from Neah Bay to Cape Mendocino in California, indicating a gap in the species distribution (Geiger 2000 and 2004 (ABMAP: *http://www.vetigastropoda.com/ABMAP/NEPacific.html*)).

Two subspecies of pinto abalone have been recognized by taxonomists, based on differences in shell shape and pattern (McLean 1966). The northern form (*Haliotis kamtschatkana kamtschatkana*) is generally distributed from Alaska south to Point Conception, California. The southern form, or ''threaded abalone'' (*Haliotis kamtschatkana assimilis*) is generally distributed from central California to Turtle Bay in Baja California, Mexico (Geiger 1999). As discussed below under ''the Species Question'' section of this notice, recent evidence suggests that the two subspecies overlap throughout their range, with examples of the northern form observed in Baja California and examples of the southern form in British Columbia and Washington.

Population Structure and Genetics

We are aware of only one published assessment of population structure in *H. kamtschatkana* to date, conducted by Withler *et al.* (2001). The assessment estimated variation at 12 microsatellite loci for abalone sampled at 18 sites located throughout coastal British Columbia and at one site in Sitka Sound, Alaska. The results indicated a lack of differentiation among sites and suggest historically high gene flow among populations within the region from British Columbia to Alaska. This study is limited in that it only examines populations in one part of the species range and uses one set of microsatellite loci; however, it represents the best available information to date regarding population structure.

Other studies have examined whether there is a genetic basis for the delineation of two subspecies, which has been based entirely on differences in shell morphology. Studies thus far have examined the portions of the mitochondrial genes cytochrome oxidase subunit one (COI) and cytochrome b (Cyt b), as well as the reproductive proteins lysin and VERL (vitelline envelope receptor for lysin), and have found no genetic differentiation between the two purported subspecies (Gruenthal and Burton 2005, Straus 2010, Supernault *et al.* 2010, Schwenke and Park, unpublished data cited in the status review report). We discuss this further in the section of this notice titled ''the Species Question.''

Habitat

Pinto abalone are generally found in rocky intertidal and subtidal habitats with ample algal cover. The specific depth ranges and habitats occupied vary across the species range, as described below. The species occurs in areas with little freshwater influence (salinity ≥ 30 parts per thousand), and can tolerate wide ranges in temperature, from 2 to 24 degrees Celsius, based on laboratory experiments (Paul and Paul 1998).

In the northern part of its range (*e.g.,* Alaska to Washington), the species occurs in shallower habitats ranging from the lower intertidal to 20m deep relative to mean lower low water (MLLW); they are most commonly found from the intertidal to 10m deep relative to MLLW (Rothaus *et al.* 2008). In Alaska, pinto abalone are primarily found in the lower intertidal and subtidal surge zones on the outer coast of Southeast Alaska, as well as in the Inside Passage of southern Southeast Alaska (Alaska Department of Fish and Game (ADF&G) comments to NMFS, 17 January 2014). In British Columbia, pinto abalone occur on rocky intertidal and subtidal habitats within areas ranging from sheltered bays to exposed coastlines (COSEWIC 2009). In Washington, the recorded depth range of pinto abalone is 3 to 20 m deep relative to MLLW. Occupied habitats vary with respect to exposure and contain hard substrate (bedrock and boulders/cobble) with ample quantities of benthic diatoms and micro- and macro-algae.

In the southern part of the range, pinto abalone occur in deeper subtidal waters from approximately 12 to 40 m deep relative to MLLW (Geiger and Owen 2012) and are commonly found on open rock surfaces. Distribution in areas along the Southern California mainland is patchy and may be correlated with substrate type, relief, algal composition, and the presence of intermittent sand channels that may accumulate drift kelp (an important food source). Pinto abalone appear to prefer flat rock over uneven rock, low relief with scattered rock and boulders over high relief habitats, and areas with *Pelagophycus porra, Laminaria farlowii, Agarum fimbriatum, Pterygophora californica,* and coralline algae (articulated and crustose) (unpublished data from Bill Hagey *et al.* and Melissa Neuman *et al.,* cited in the status review report). A recent study reported that in Mexico, *H. k. assimilis* and *H. sorenseni* occurred at depths ranging from 11 to 25 m (relative to MLLW), with the majority found between 13 to 15 m and 19 to 21 m deep, although this may reflect a bias toward the depths that were visited most frequently (Boch *et al.* 2014).

Movement

Little is known about movement patterns of larval or juvenile pinto abalone anywhere in their range. The planktonic larval stage is short (approximately 5–6 days; Olsen 1984, cited in Sloan and Breen 1988), and thus dispersal is likely to be limited and almost certainly determined primarily by patterns of water movement in nearshore habitats near spawning sites. Larval settlement and metamorphosis in pinto abalone is likely to be associated with chemical cues present in crustose red algae, as has been found for red abalone (*H. rufescens*) (Morse and Morse 1984). Small juvenile (<10 mm) pinto abalone are difficult to find in the field, but are occasionally observed under boulders and on smooth bedrock or boulders that are bare or encrusted with coralline algae, mostly at deeper depths (*e.g.,* −5 to −15 m) than adults are typically found (Breen 1980a). Other grazers (*e.g.,* sea urchins, chitons, limpets, and adult abalone) may be important in maintaining encrusting coralline algae (Sloan and Breen 1988).

To our knowledge there is no published information on direct observations of movement behavior of small (<20 mm) juvenile pinto abalone in the field. However, distribution patterns of juveniles and adults indicate an ontogenetic shift in habitat use, with small juveniles (<10 mm shell length) occupying highly cryptic habitats in deeper waters and migrating to shallower depths and more exposed habitats as they increase in size (Sloan and Breen 1988). This shift may be associated with changes in diet (Sloan and Breen 1988) and predation risk (Griffiths and Gosselin 2004) with size.

Movement generally decreases as individuals grow in size and age. Tagging studies and observational surveys conducted in British Columbia indicate that although adult pinto abalone have the ability to move several meters a day and tens of meters in a year, they typically exhibit minimal movement, likely staying within close proximity to their settlement habitat (Sloan and Breen 1988). Laboratory and field observations indicate that individuals tend to be more active at night (Sloan and Breen 1988) and during the spawning season (spring through summer months). Observations of spawning behavior in the wild (Breen and Adkins 1980a) and in the laboratory (Quayle 1971) indicate that pinto abalone form aggregations, stack on top of each other, and migrate to the highest point available during spawning events. The reason for this behavior is unknown, but may serve to increase fertilization rates by aggregating spawners and increasing the chances for the eggs to encounter sperm (which tend to be in the water column) before they land on the bottom (Sloan and Breen 1988).

Diet

After a short 5–6 day lecithotrophic (non-feeding) larval phase (Olsen 1984, cited in Sloan and Breen 1988), juveniles settle and immediately begin feeding (Morse 1984; Morse and Morse 1984, cited in Sloan and Breen 1988). Laboratory observations and gut content analyses of hatchery-reared juveniles show that post-metamorphic juveniles graze on minute benthic diatoms, microalgae, and bacteria associated with encrusting coralline algae and rock surfaces (Olsen 1984, Norman-Boudreau *et al.* 1986, cited in Sloan and Breen 1988). Juveniles may also feed on the crustose coralline algae itself (Garland *et al.* 1985, cited in Sloan and Breen 1988). These observations are consistent with the microhabitats within which small juveniles are found in the wild (smooth or crustose coralline encrusted bedrock and boulders) (Breen 1980a).

Juveniles shift to feeding on macroalgae as they grow in size and age. Adults have been observed to feed directly on attached macroalgae (Sloan and Breen 1988), but drift macroalgae is believed to be the primary food resource (Breen 1980a). Laboratory studies indicate that adults prefer *Macrocystis* and *Nereocystis,* but will feed on diatoms and brown, red, and green algae, including *Laminaria, Pterygophora,* and *Costaria* (Paul *et al.* 1977; unpublished data by Breen and unpublished student reports by P. Gee and J. Lee, Simon Fraser University, cited in Sloan and Breen 1988). Adults avoided *Fucus distichus* and *Agarum cribrosum* (Paul *et al.* 1977; unpublished student reports by P. Gee and J. Lee, Simon Fraser University, cited in Sloan and Breen 1988). Diet composition likely varies by location within the species range, depending on what is available.

Reproduction and Spawning Density

Although size at maturity can vary by location (depending on factors such as water temperature and food availability and quality), pinto abalone become emergent and are generally reproductively mature at a size of about 50 mm shell length (SL) (about 2–5 years in age), with all abalone mature at a size of about 70 mm SL (Leighton 1959, Ault 1985, Campbell *et al.* 1992). Pinto abalone have separate sexes and are ‘‘broadcast’’ spawners. Gametes from both parents are released into the water, and fertilization is entirely external. Resulting embryos and larvae are minute and defenseless, receive no parental care or protection, and are subject to a broad array of physical and biological sources of mortality. Like other species with a broadcast-spawning reproductive strategy, abalone produce large numbers of gametes (*e.g.,* millions of eggs or sperm per individual per year) to overcome high mortality in early life stages and survive across generations. As broadcast spawners, pinto abalone are also subject to selection for other reproductive traits, such as spatial and temporal synchrony in spawning and mechanisms to increase the probability of fertilization.

An important factor in successful reproduction is the density of spawning adults. A reduction in adult density could result in increased growth, survival, and gamete production due to decreased intraspecific competition; however, for broadcast spawners, these advantages may be countered by decreases in the rate of successful fertilization if individuals are sparsely distributed (Levitan 1995, Levitan and Sewell 1998, Gascoigne and Lipcius 2004). A critical distance of 1 m has been identified for abalone species; that is, it is estimated that individuals of the opposite sex need to be within 1 m of one another to increase the chances of successful fertilization (Babcock and Keesing 1999). Evidence for critical adult density thresholds below which recruitment failure occurs has been found for broadcast-spawning species across a broad taxonomic range, and a few estimates have been developed for abalone species. Babcock and Keesing (1999) estimated critical density thresholds at 0.15–0.20 per square meter (sq m) for *Haliotis laevigata* Donovan, 1808. Shepherd *et al.* (2001) and Shepherd and Rodda (2001) noted that these density thresholds can vary according to coastal topography. For example, coastal topography can create larval retention areas where threshold density may be lower than in areas where larvae are more easily dispersed. Neuman *et al.* (2010) reviewed recruitment patterns in three long-term data sets for black abalone (*H. cracherodii*) in California. In each case, recruitment failed when declining population densities fell below 0.34 per sq m.

Critical density thresholds have not been estimated for pinto abalone, but evidence suggests that the aggregative nature of the species may facilitate successful reproduction despite low overall mean densities. In 2009, Seamone and Boulding (2011) studied aggregation characteristics during the spawning season at three sites in Barkley Sound, BC. Mean densities at the study sites were 0.12, 0.48, and 0.64 abalone per sq m. Based on critical density thresholds estimated for other abalone species, recruitment failure would be expected at the site with a density of 0.12 per sq m. However, Seamone and Boulding (2011) found that the mean distance between individual pinto abalone at all three study sites was significantly less than 1.0 m, indicating aggregation. These aggregations were independent of sex, and therefore, the probability of encountering an individual of the opposite sex increased with increasing overall mean density. Nonetheless, pinto abalone at all three sites were sufficiently aggregated during the spawning season to potentially increase fertilization rates and compensate for low densities.

Populations at the San Juan Islands Archipelago in Washington do appear to be experiencing recruitment failure (Rothaus *et al.* 2008). There, the mean density of emergent abalone has declined from 0.18 per sq m in 1992 to 0.01 per sq m in 2013 (Rothaus *et al.* 2008, Washington Department of Fish and Wildlife (WDFW) 2014), and the percentage of emergent juveniles (<90mm SL) has also declined from 31.9 percent in 1979 to 7.1 percent in 2013 (WDFW 2014). However, there is evidence of recent recruitment events in all other areas throughout the species' range, despite low densities that are, in most areas, below the critical density thresholds that have been estimated for other abalone species (*i.e.,* 0.15 to 0.34 adults per sq m).

In Alaska, density data are not available but ADF&G has observed mixed age classes in some areas in Southeast Alaska, including juveniles, indicating recent recruitment (pers. comm. with S. Walker, ADF&G, cited in status review report). In British Columbia, recurring and recent recruitment has been observed in several areas. Mean adult densities at index sites have declined since the fishery closed in 1990, from 0.41 to 0.23 per sq m between 1989 and 2006 along the Central Coast and from 0.27 to 0.15 per sq m between 1990 and 2007 at Haida Gwaii (COSEWIC 2009). However, observations of small, immature pinto abalone (<70 mm SL) indicate that recruitment has been occurring despite low densities. In fact, densities of immature pinto abalone have increased, from 0.14 to 0.18 per sq m between 1989 and 2006 along the Central Coast and from 0.20 to 0.27 per sq m between 1990 and 2007 at Haida Gwaii (COSEWIC 2009). The 2011 surveys along the Central Coast and 2012 surveys at Haida Gwaii show increases in both immature and mature pinto abalone densities, with overall densities at most of the sites meeting or exceeding the short-term recovery goal of 0.32 per sq m established by Department of Fisheries and Oceans Canada (DFO) (2007) (pers. comm. with J. Lessard, DFO, on 24 April 2014). The most recent data for other areas in British Columbia indicate that mean densities of emergent abalone (all sizes) vary greatly from 0.0098 per sq m on the south coast of Vancouver Island in 2005 (DFO 2007) to 0.15 per sq m at the Broken Group Islands in Barkley Sound in the early 2000s (Tomascik and Holmes 2003). Tomascik and Holmes (2003) noted evidence of recruitment, with juveniles making up 42 percent of the sampled population.

In northern California, mean densities exceeded the critical density thresholds estimated for other abalone species (Babcock and Keesing 1999, Neuman *et al.* 2010) in Sonoma County (data from 2007–2012) and in Mendocino County (data from 2007–2013) at survey sites deeper than 10 m (unpublished data, L. Rogers-Bennett, California Department of Fish and Wildlife (CDFW), 24 April 2014). In addition, smaller size classes of pinto abalone (15 to 49mm SL) were well represented at the Mendocino County sites, indicating recent recruitment (unpublished data, L. Rogers-Bennett, CDFW, 24 April 2014). In southern California, data from directed pinto abalone surveys as well as opportunistic observations while surveying other abalone species show low densities, ranging from 0.0002 per sq m at San Miguel Island to 0.0286 per sq m at Point Loma in 2006–2012 (unpublished data, I. Taniguchi, CDFW, 24 April 2014) and from 0 to 0.15 per sq m off San Diego in pinto abalone surveys conducted in 2014 (unpublished data, A. Bird, CSUF). Observations of small pinto abalone at Santa Cruz Island, Point Loma, and at several other sites off San Diego indicate recent recruitment events occurring despite low mean densities. In Mexico, density data are generally not available except for a recent survey conducted in 2012 on the El Rosario Coast (Boch *et al.* 2014). The estimated density of pinto abalone was 0.0139 per sq m (NMFS 2014), with the majority being small abalone 40–80mm SL, indicating that recent recruitment has occurred (Boch *et al.* 2014).

Overall, although the available data indicate that mean densities of pinto abalone in most areas are presently below the critical density thresholds (as estimated for other abalone species), recurring and/or recent recruitment events continue to be observed in areas throughout the species' range. The ''Abundance'' section of this notice provides more detail regarding pinto abalone abundance and trends. We note that abalone appear to experience natural fluctuations in abundance and reproductive success, which may be partly driven by environmental variables. For example, Breen (1986) presents several examples of natural declines and recovery in unfished stocks of pinto abalone and other abalone species. Thus, we might expect population abundance and recruitment levels to vary from year to year and across longer time frames.

Larval Dispersal

Effective methods for marking and direct tracking of larval movements do not exist (*e.g.,* McShane *et al.* 1988). As a result, larval dispersal distances are estimated using indirect methods, including (a) examination of spatial relationships of newly recruited cohorts to known aggregations of breeding adults (Prince *et al.* 1988); (b) the use of molecular tools to evaluate the relatedness of adult populations and newly recruited cohorts (Hamm and Burton 2000, Chambers *et al.* 2006); and (c) the use of objects such as drift cards or drift bottles as surrogates for larvae and collecting data on recovery times and locations (*e.g.,* Tegner and Butler 1985, Chambers *et al.* 2005, Hurn *et al.* 2005). Each of these methods includes biases and sources of error that must be considered when interpreting the results.

Because specific studies for pinto abalone are limited, we look to the information that is available regarding dispersal distances for other abalone species. Studies using the three methods discussed above give consistent results indicating limited larval dispersal distances in abalone species, including *Haliotis cracherodii, rubra,* and *rufescens* (Prince *et al.* 1987 and 1988, McShane *et al.* 1988, McShane 1992, Hamm and Burton 2000, Chambers *et al.* 2005 and 2006, Gruenthal 2007, Gruenthal *et al.* 2007). Given that most abalone larvae are in the plankton for a period of about 3–10 days before settlement and metamorphosis (*e.g.,* McShane 1992), it seems clear that abalone in general have limited capacity for dispersal over distances beyond a few kilometers and are able to do so only rarely. Available information on the genetic structure of pinto abalone populations suggests that long-distance dispersal events occur frequently enough to maintain high gene flow among populations over distances of at least 1000 km (Withler *et al.* 2001).

Larval Settlement and Recruitment

Studies on abalone settlement cues suggest that availability of crustose coralline algae in appropriate habitats may be significant to the success of the larval recruitment process in pinto abalone (Morse and Morse 1984, Morse 1990, Morse 1992). Crustose coralline algae is ubiquitous in rocky benthic habitats along the west coast of North America, but an understanding of the processes that sustain these algal populations has not been established to our knowledge. Field observations along the British Columbia coast indicate differential distribution of juveniles and adults, with juveniles observed at deeper depths, suggesting that settlement of larvae occurs in deeper habitats (Sloan and Breen 1988). Thus, settlement may be influenced by other environmental factors in addition to the presence of crustose coralline algae.

Recruitment is defined here as the appearance in one or more locations of measurable numbers of new post-metamorphic individuals. Prince *et al.* (1987, 1988), McShane *et al.* (1988), and McShane (1992) have presented evidence that recruitment of abalone is most likely to occur in relatively close spatial proximity to aggregations of breeding adults, at least in part a consequence of the relatively short duration of the planktonic larval phase. Other data suggest that abalone recruitment may be influenced by distribution of breeding adults, densities of adults on a local scale, availability of benthic recruitment substrata that provide appropriate chemical cues for settlement and metamorphosis of larvae, regional and local flow regimes that control larval dispersal from natal sites, and possibly predation and starvation of larvae (Strathmann 1985, McShane *et al.* 1988, McShane 1992).

As discussed above (see ''Reproduction and Spawning Density'' section of this notice), data from index site surveys indicate that populations in Washington are experiencing recruitment failure, whereas populations in areas throughout the rest of the species' range have had successful recruitment despite continued declines and low overall densities in most areas. A study by Zhang *et al.* (2007) estimating stock recruitment relationships for populations at Haida Gwaii and along the Central Coast found that poaching, rather than lack of recruitment, is an important factor limiting recovery in British Columbia. This is corroborated by preliminary results from 2011 and 2012 surveys in these areas, showing an increase in population densities that is most likely due to reduced poaching within these areas (pers. comm. with Joanne Lessard, DFO, on 24 April 2014). There is also evidence of recent recruitment events in northern California (unpublished data, L. Rogers-Bennett, CDFW, 24 April 2014), southern California (unpublished data, I. Taniguchi, CDFW, 24 April 2014; unpublished data, A. Bird, CSUF, and E. Parnell, UCSD/Scripps, cited in status review report), and Mexico (Boch *et al.* 2014) from surveys targeting pinto abalone as well as opportunistic observations on surveys for other abalone species. ADF&G has observed mixed age classes in some areas in Southeast Alaska, including juveniles (S. Walker, pers. comm., cited in status review report).

We note that the cryptic nature of juvenile pinto abalone make the detection of recruitment events difficult. Small juveniles (< 10 mm SL) have occasionally been observed under boulders and on smooth bedrock or boulders that are bare or encrusted with coralline algae (Breen 1980a). Juveniles tend to occupy highly cryptic habitats in deeper waters compared to adults (Sloan and Breen 1988). In surveys along the coast of British Columbia, only 60 percent of juveniles 10–70 mm in size were exposed, compared to 90 percent of individuals 70–90 mm size and almost all individuals greater than 90 mm in size (Boutillier *et al.* 1985, cited in Sloan and Breen 1988). Thus, recruitment events may be occurring but going undetected in regions that are not surveyed on a regular, consistent basis.

Growth

Because young post-metamorphic abalone are often cryptic in coloration and habitat use, direct measurements of growth rate in the field are difficult. As a result, much of the information available on growth in pinto abalone come from lab studies and growth models.

Available data on pinto abalone growth in captive settings suggest that young animals reach sizes of about 22 mm SL (range 8–32 mm SL) in their first year (Olsen 1984), then grow at rates of approximately 18 mm per year for the next several years (Sloan and Breen 1988). Growth begins to slow at lengths of about 50 mm SL, corresponding to the onset of sexual maturity. Growth appears to vary based on many factors besides age, including location, water temperature, season, food availability and quality, and exposure to wave action. The maximum recorded shell lengths for pinto abalone are 165 mm (Breen 1980a) and 190 mm (see status review report).

Mortality

The status review report provides a detailed review of mortality in abalone, taken largely from Shepherd and Breen's (1992) review. We summarize the information here. Early life stages of abalone, particularly the larval stages, likely experience high mortality rates even in pristine settings. For larval stages, factors contributing to mortality include inappropriate oceanographic conditions (*e.g.,* temperature, salinity) and habitats as well as predation. Little is known regarding mortality for newly-metamorphosed and small (<40–50 mm shell length) abalone, but habitat disturbances and predation may contribute to mortality (see status review report).

Larger, emergent abalone (>40–50 mm shell length) face mortality from human removal, disease, predation, variation in food supply, physical disturbance, and pollution. Human removal of pinto abalone occurs through commercial, recreational, and subsistence harvest; purposeful illegal harvest; and accidental lethal injury. We discuss fisheries harvest of pinto abalone for commercial, recreational, and subsistence purposes in more detail under the ''Abundance'' section of this notice. Predation by sea otters has been highlighted as an important factor contributing to the continued decline of pinto abalone populations in places like Alaska where sea otter populations are increasing (ADF&G comments to NMFS, 17 January 2014). Other sources of natural mortality include diseases such as withering syndrome, ganglioneuritis (and the related amyotrophia), vibriosis, and shell deformities (sabellidosis). These sources of mortality and their impact on the species are discussed in more detail in the ''Summary of Factors

Affecting the Species'' section later in this document.

Abundance

There are two types of data that can be examined to provide a better understanding of variation in pinto abalone abundance over time: fishery-dependent and fishery-independent data. Due to the general lack of formal data, we also include observations reported by individuals or groups of people. We summarize the available information by region (Alaska, British Columbia, Washington, Oregon, California, and Mexico), because both species abundance and the level of information available vary by geographic region. The status review report provides a more detailed account of the available information for each region.

Alaska

Several fisheries for pinto abalone have existed in Alaska, including a commercial fishery and sport fishery (both of which are now closed) and personal use and subsistence fisheries (both of which are still in operation). Data are not available on the number of pinto abalone taken in the fisheries, but trends in commercial fisheries harvest levels indicate a decline in pinto abalone, with harvest in Southeast Alaska falling from a peak of 378,685 lbs in 1979/1980 to a low of 14,352 lbs in 1995/1996 (the fishery closed in 1995; Rumble and Hebert 2011). Between the 1993/1994 season and 1994/1995 season, harvest per unit effort for the fishery was estimated to have declined by 64 percent (Rumble and Hebert 2011).

Commercial harvest of pinto abalone in Southeast Alaska began in the 1960s with a significant increase in effort and harvest in the late 1970s and early 1980s, followed by a steep decline in catch in the late 1980s and 1990s (Rumble and Hebert 2011). The increase in effort can be attributed in large part to an increase in value from less than one dollar per pound in the early 1970s to greater than six dollars per pound in 1993–1994 (Woodby *et al.* 2000). Harvest peaked at 378,685 pounds in 1979–1980, followed by a decline in harvest that was likely due in part to declines in pinto abalone abundance as well as changes in regulations to limit the fishery, including harvest limits and area and seasonal closures (Rumble and Hebert 2011). The commercial fishery for pinto abalone was closed in 1995 and remains closed (Woodby *et al.* 2000). Commercial harvest was primarily conducted using scuba or hookah dive gear in the subtidal zone, though pinto abalone can be picked by hand in the intertidal zone during extreme low tides (Rumble and Hebert 2011).

Data from the subsistence abalone fishery are available from 1972 to 1997 and indicate a significant decline (98 percent decrease) in the subsistence harvest from an average of 350–397 pinto abalone per household in 1972 to an average of 3–9 pinto abalone per household in 1997 (Bowers *et al.* 2011). Subsistence harvest of pinto abalone in Alaska is believed to remain low (ADF&G comments to NMFS on 17 January 2014). In 2012, the Alaska Board of Fisheries reduced the daily bag limit for subsistence harvest to 5 abalone, with no closed season and no annual limit (Bowers *et al.* 2011). Prior to 2012, the daily bag limit for subsistence harvest was 50 abalone. The minimum size limit is 3.5 inches and legal harvest methods include snorkel equipment, abalone irons, or collection by hand. Scuba and hookah diving for subsistence abalone harvest has been prohibited since 1996.

Abalone harvest has also occurred in the sport abalone fishery (for non-residents) and personal use abalone fishery (for state residents), but data on trends in harvest are not available. In the sport fishery, the daily bag limit was 5 abalone per day (minimum size: 3.5 inches), with no closed season. Scuba and hookah gear were allowed until 1996. The Alaska Board of Fisheries closed the sport abalone fishery in 2012 and it remains closed to present. In the personal use abalone fishery, the daily bag limit was 50 abalone per person (except in one area around Sitka where the daily bag limit was 20 abalone per person), with a minimum size limit of 3.5 inches and no closed season. In 2012, the Alaska Board of Fisheries reduced the daily bag limit to 5 abalone per person. Scuba and hookah diving were allowed until 1996. The personal use abalone fishery remains open, but harvest is believed to be low (ADF&G comments to NMFS on 17 January 2014).

There are limited fishery-independent data on pinto abalone populations in Alaska. No long-term monitoring of pinto abalone populations in Alaska has been conducted. However, observations of pinto abalone have been made by ADF&G biologists while conducting dive surveys to monitor other benthic invertebrate species for management purposes. From 1996 to 2000, about 125 to almost 250 pinto abalone were observed per year during red sea urchin dive surveys; in 2001, the number observed dropped to about 50 pinto abalone, and in 2002–2011, fewer than 20 pinto abalone were observed per year (ADF&G comments to NMFS, 17 January 2014). These observations suggest a continued decline in pinto abalone populations since closure of the commercial fishery. ADF&G noted an increase in empty abalone shells observed on red sea urchin survey transects in Southeast Alaska between 2001 and 2012 (pers. comm. with K. Hebert, ADF&G). These observations are coincident with increased sea otter abundance in Southeast Alaska and suggest that sea otters are having an impact on pinto abalone abundance where the two species overlap (pers. comm. with K. Hebert, ADF&G). The one exception to this observed pattern is in Sitka Sound, where sea otters and a small population of pinto abalone appear to co-exist (pers. comm. with K. Hebert, ADF&G). ADF&G has observed mixed age classes in some areas in Southeast Alaska, including juveniles (S. Walker, pers. comm.).

British Columbia

Although also limited, data are available from both fishery-dependent and fishery-independent sources regarding the abundance of pinto abalone in British Columbia, making this region relatively data rich compared to other regions of the coast. The available data indicate a decline in pinto abalone populations during and even after closure of abalone fisheries, with signs of increases in abundance in the past five years attributed to a reduction in poaching.

Harvest of pinto abalone has a long history in British Columbia. Pinto abalone were harvested in commercial, recreational, and traditional First Nations food, social, and ceremonial fisheries. Prior to the advent of scuba gear around 1960, abalone harvest by First Nations and recreational fishers occurred primarily at low tide by shore picking (Farlinger and Campbell 1992), although some First Nations used a two-pronged spear to take abalone as deep as 2 m below the lowest tide (Jones 2000). After the advent of scuba gear, the recreational fishery became widespread along the coast (Farlinger and Campbell 1992). No landing statistics are available for either the First Nations or recreational fisheries (Sloan and Breen 1988, Farlinger and Campbell 1992). However, during the recreational fishery in 1983, McElderry and Richards (1984) estimated that scuba divers in the Strait of Georgia collected 1,172 pinto abalone per thousand sport dives and that between 76,000 and 172,000 recreational dives occurred in that year in the Canadian portion of the Strait of Georgia.

The commercial abalone fishery began in British Columbia as early as 1889 as a small, local, and sporadic fishery (Mowat 1890), but expanded significantly in the 1970s when landings increased to nearly 60 metric tons (mt) in 1972 and then to 273 mt in 1976 (Federenko and Sprout 1982). Commercial landings peaked at over 480 and 400 mt in 1977 and 1978, but dropped to about 200 mt in 1979 when a quota was put in place for the first time. Landings leveled out to between 44 and 47 mt under quota management and numerous other management actions taken following 1977 (Sloan and Breen 1988). Reasons for the increase in abalone harvest in the 1970's include the advent of scuba and dry-diving suits, allowing more diver submergence time; the advent of on-board boat freezers; emergence of a market in Japan for pinto abalone; tripling of the price per pound between 1972 and 1976 to over three Canadian dollars per pound; restricted access to salmon and herring fisheries; and unrestricted access to the abalone fishery prior to 1977 (Sloan and Breen 1988, Farlinger and Campbell 1992). All pinto abalone fisheries in British Columbia were closed in December 1990 due to observed declines and overall low population levels (Egli and Lessard 2011) and remain closed to date.

Breen (1986) estimated that at the beginning of 1976 the abalone stock stood at 1,800 mt in areas that were open to harvest (closed areas (Fedorenko and Sprout 1982): Juan Perez Sound, Lower Johnstone Strait, Strait of Georgia, and Strait of Juan de Fuca). By the end of 1980, the stock size had been reduced to an estimated 450 mt (Breen 1986). The SRT attempted to estimate the number of individual pinto abalone landed each year from 1952–1990 in the commercial fishery, based on landed biomass and the predicted mean weight of legal-sized northern abalone (≥ 90 mm from 1952–1976 and ≥ 100 mm after 1976). An estimated 2.5 million abalone were harvested in 1977, with at least a million abalone harvested each year from 1976 to 1979 and over 240,000 harvested each year during the last decade of the fishery (see status review report). Most of the commercial harvest occurred at Haida Gwaii (formerly known as the Queen Charlotte Islands) and along the North Coast (Sloan and Breen 1988, Egli and Lessard 2011).

Fishery-independent data for pinto abalone in British Columbia primarily consist of data from index site surveys conducted by the DFO since 1978, although some data exist for the period prior to the 1970s (*i.e.,* prior to when the fishery expanded significantly). Surveys from the early 1900's indicate pinto abalone were present in sufficient numbers for harvesting around Haida Gwaii and in Queen Charlotte Sound (Thompson 1914). Exploratory surveys conducted in the same areas in 1955 found few pinto abalone in southeastern Haida Gwaii, and many areas with no abalone, indicating a decline in the region's population (Quayle 1962, Sloan and Breen 1988). In contrast, surveys conducted in 1978 in the same area found few sites with no abalone and an estimated density of 0.58 legal-sized abalone per sq m with an overall mean density of 2.5 abalone per sq m (Breen and Adkins 1979, Sloan and Breen 1988). Breen (1986) attributed these differences between surveys in 1914, 1955, and 1978 to natural variation in pinto abalone abundance, rather than to differences in survey methods or observer experience. Pinto abalone were previously not thought to occur in the Strait of Georgia (formerly known as the Gulf of Georgia) (Thompson 1914), but have since been found there, though relatively scarce compared to other areas in British Columbia and only at depths of 7m or greater (Quayle 1962, Sloan and Breen 1988).

DFO index site surveys for pinto abalone have been conducted every 4–5 years since 1978, providing valuable time series and size frequency data. Surveys at Haida Gwaii and along the North and Central Coast began in 1978, and on the West Coast of Vancouver Island, Queen Charlotte Strait, and the Strait of Georgia in 2003 and 2004. The status review report summarizes the best available data on pinto abalone abundance and trends from these surveys. The data indicate that although recruitment is occurring, the density of mature adults (defined as pinto abalone ≥ 100 mm SL for the purposes of the index site surveys) has been declining, either due to a high rate of juvenile mortality before they reach maturity or due to a high rate of adult mortality that is offsetting juvenile survival (COSEWIC 2009). Densities of immature abalone have increased by 29 percent at the Central Coast sites since 1989 and by 35 percent at the Haida Gwaii sites since 1990, whereas densities of mature abalone have declined by about 44 percent since 1990 (the year the abalone fisheries closed) (COSEWIC 2009).

Overall, the survey data from 1978 to 2009 indicate that mature abalone densities declined by 88–89 percent and total abalone densities have declined by 81–83 percent at the Central Coast and Haida Gwaii sites (COSEWIC 2009). However, preliminary results from more recent surveys in 2011 and 2012 indicate signs of increasing populations, potentially due to reductions in illegal take. In 2009, abalone were found at 41 percent of the 34 sites surveyed in Queen Charlotte Strait, with an overall density of 0.109 per sq m and a mature abalone density of 0.072 per sq m (Lessard and Egli 2011). These densities were four times greater than the densities found in 2004 and indicate that abalone populations in Queen Charlotte Strait are stable (Lessard and Egli 2011). Results from the 2011 surveys along the Central Coast show an increase in the mean density of abalone (all sizes) and a decrease in the estimated mortality rate between 2006 and 2011 (pers. comm. with J. Lessard, DFO, on 24 April 2014). The density of mature abalone (≥ 70 mm shell length) was at or above the short-term recovery objective of 0.32 abalone per sq m (as defined in DFO's 2007 Recovery Strategy for pinto abalone) at 6 of the 8 index survey sites and above the long-term goal of one abalone per sq m at one site (pers. comm. with J. Lessard, DFO, on 24 April 2014). Similarly, results from the 2012 surveys at Haida Gwaii indicate an increase in the mean density of both immature and mature abalone and a decrease in the estimated mortality rate between 2007 and 2012, as well as densities of mature abalone (≥ 70 mm shell length) at or above the recovery objective of 0.32 abalone per sq m at 5 of the 9 index survey sites (pers. comm. with Joanne Lessard, DFO, on 24 April 2014). Evidence of successful juvenile recruitment throughout the years and these recent increases in adult abundance and density indicate that removing or reducing illegal harvest to minimal levels would likely allow populations to rebuild. However, with the continued spread of sea otters in the region, populations are not expected to return to levels observed during the 1970s when sea otters were absent from the region (COSEWIC 2009).

Washington

Data on abundance and trends in pinto abalone populations in Washington are limited to fishery-independent data from timed swim and index site surveys. Although estimates of recreational harvest are available, they do not provide information on trends in abundance over time. Overall, the survey data indicate that populations in Washington have declined over time, despite closure of the fisheries in 1994, and local recruitment failure may be occurring.

Fishery-dependent data for Washington are limited. Washington has never had a commercial fishery for pinto abalone. Subsistence harvest by indigenous peoples and early residents reportedly occurred, but the magnitude and extent of the fishery are not well documented (WDFW 2014). Pinto abalone were first recognized as a recreationally harvestable shellfish with a daily possession limit of 3 abalone by Washington Administrative Code (WAC) orders first published in 1959. Between 1959 and when the recreational fishery was closed in 1994, the possession limit fluctuated between 3 and 5 abalone per day and several other measures, including minimum size limits and gear restrictions, were imposed to manage the fishery.

Although recreational harvest records were not collected, some estimates of annual harvest are available from compilations of recreational sport diver interviews, returned questionnaires, diver logbook records, and information from dive clubs (Bargmann 1984, Gesselbracht 1991). In the early 1980s, approximately 91 percent of pinto abalone harvest occurred in the North Puget Sound region, including the San Juan Islands Archipelago, and the remainder occurred in the Strait of Juan de Fuca and just north of Admiralty Inlet (Bargmann 1984). Bargmann (1984) estimated that sport divers harvested 34,800 and 3,400 pinto abalone annually from the North Sound and the Strait/Admiralty regions, respectively, based on data over the period from April 1982 to March 1983. Gesselbracht (1991, cited in WDFW 2014) estimated that 40,934 pinto abalone were harvested annually, based on interviews with sport divers from September 1989 to August 1990.

Fishery-independent data are available from timed swim and index site surveys in the San Juan Islands Archipelago. Both sets of data indicate continuing declines in pinto abalone populations since the fisheries closed in 1994. From 1979–1981, WDFW conducted timed swim surveys (designed to quantify pinto abalone abundance) at 30 sites, with a mean encounter rate of about 1.1 pinto abalone per minute or 25.5 pinto abalone per dive (WDFW 2014). These were likely underestimates of pinto abalone abundance, because swim times were not adjusted for the time taken to measure abalone size (WDFW 2014). In contrast, WDFW divers encountered an average of about 1.1 abalone per dive across all 30 sites in 2010–2011, indicating a reduction in encounter rate of about 96 percent (WDFW 2014). This reduction in the encounter rate of pinto abalone per dive indicates a decline in pinto abalone density among the 30 survey sites. In 2005, Rogers-Bennett *et al.* (2007 and 2011) surveyed 10 sites in the San Juan Islands Archipelago where pinto abalone populations were abundant in the past, and found only 17 pinto abalone (range in shell length = 75–142 mm); 14 of those abalone were found at just two sites. This number was substantially lower than the number of pinto abalone found at the sites in 1979 by WDFW (Rogers-Bennett *et al.* 2011). Index site surveys show similar declines in pinto abalone densities around the San Juan Islands Archipelago. From 1992 to 2013, WDFW has conducted periodic surveys at 10 index sites, originally selected in areas known to have high pinto abalone abundance. The mean density at the 10 index sites declined from 0.18 abalone per sq m in 1992 to 0.04 abalone per sq m in 2006 (Rothaus *et al.* 2008) and 0.01 abalone per sq m in 2013 (WDFW 2014).

Recent data suggests limited recruitment is occurring in the San Juan Islands Archipelago. The proportion of emergent juvenile pinto abalone (shell length < 90mm) seen during index site surveys has declined from 31.8 percent in 1979 to 17.4 percent in 1992, and most recently to 7.1 percent in 2013 (WDFW 2014). In addition, only four emergent and three juvenile abalone were observed on 60 abalone recruitment modules deployed in August and September 2004 (Bouma *et al.* 2012). The mean size of pinto abalone has also increased by an average of 0.5 mm per year, from about 97.6 mm in 1979 (measured during timed swim surveys; n=755) to about 118.4 mm in 2013 (measured during index site surveys; n=56) (WDFW 2014). This increase indicates a trend in the populations from smaller, young abalone to a higher proportion of larger and presumably older individuals, again suggesting that little to no recruitment has occurred in recent years.

Pinto abalone have been observed in the Strait of Juan de Fuca, but no data are available regarding trends in abundance (WDFW 2014). We are also not aware of any documented observations of pinto abalone on the outer coast of Washington, south of Portage Head (located just south of Cape Flattery).

Oregon

Little information is available on pinto abalone presence along the Oregon coast. Recreational harvest of abalone is allowed in Oregon (limits: One abalone per day and five abalone per year), but the minimum size limit of 8 inches (203.2 mm) essentially excludes pinto abalone from this fishery (Oregon Department of Fish and Wildlife (ODFW) recreational shellfish regulations at *http://www.dfw.state.or.us/mrp/shellfish/regulations.asp,* accessed: 27 August 2014). Pinto abalone are believed to be naturally rare in Oregon, with only occasional shells being found (Reimers and Snow 1975). The first confirmed live pinto abalone in Oregon was observed in 2009 at Orford Reef by an urchin diver (pers. comm. with Scott Groth, ODFW, cited in NMFS 2009). The animal was about 100 mm in size, found at a depth of 20 m with no other abalone observed nearby (pers. comm. with Scott Groth, ODFW, on 26 June 2014). Since 2009, the same urchin diver has spotted about four more live pinto abalone on Orford Reef and another urchin diver found one live pinto abalone in Nellies Cove, near Port Orford (pers. comm. with Scott Groth, ODFW, on 26 June 2014). No directed surveys for pinto abalone have been conducted in Oregon, and we are not aware of any other information on pinto abalone presence or abundance in Oregon waters.

California

In California, estimates of baseline (*i.e.,* abundance prior to overfishing) and modern pinto abalone abundances have been made using both fishery-dependent and fishery-independent data. Both indicate a decline in population abundance from the 1970s to 2000s. As noted below, however, there is some uncertainty associated with these estimates. Data from surveys focused on pinto abalone are limited, but recent efforts are providing preliminary data on population abundances and densities along the California coast.

Harvest of abalone in California has occurred for thousands of years, with modern commercial and recreational fisheries beginning in the late 1890s and early 1900s, respectively. CDFW (formerly CDFG) landings records indicate that pinto abalone were landed at the Farallon Islands, Point Montara, Point Buchon, Point Conception, the Northern and Southern Channel Islands, Santa Barbara, San Diego, and the offshore banks from 1950–1997 (CDFG 2005). Pinto abalone is not considered a major component of the commercial or recreational abalone catch (CDFW 2005); however, fishing pressure led to decreased landings from a peak of approximately 10,000 pounds (4.5 mt) in 1974 to less than 500 pounds (0.2 mt) by the 1980s. If a dozen pinto abalone weighed about 15 pounds (Pinkas 1974, cited in Rogers-Bennett et al. 2002), then 10,000 pounds would equal about 8,000 pinto abalone and 500 pounds would equal about 400 pinto abalone. CDFW closed all commercial and recreational abalone fisheries south of San Francisco in 1997. In 1999, CDFW effectively excluded pinto abalone from the red abalone recreational fishery north of San Francisco by increasing the minimum legal size limit to 178 mm for all species (Rogers-Bennett *et al.* 2002). CDFW has since revised their regulations to specifically prohibit harvest of pinto abalone in this fishery.

Rogers-Bennett *et al.* (2002) estimated baseline abundance for *H. k. assimilis* using landings data from the peak of the commercial and recreational fisheries (1971–1980). The baseline minimum estimate of abundance for *H. k. assimilis* prior to overexploitation was 21,000 animals. After 1980, only 66 pinto abalone were landed, suggesting a decline of 99.6 percent over a 10-year period. This baseline abundance estimate of 21,000 animals provides a historical perspective on patterns in abundance. However, it is important to note that this estimate was based on data from a time period when pinto abalone abundances may have been higher than usual due to the decline of sea otters along the California coast. Thus, this estimate may overestimate the true baseline abundances that existed prior to the abalone fishery and the exploitation of sea otters.

Using estimated densities and suitable rocky habitat derived from data collected in 1971 and 1975, Rogers-Bennett *et al.* (2002) also estimated baseline abundance for *H. k. kamtschatkana* in northern California as 153,000 animals. This estimate had large 95 percent confidence intervals (CIs; upper = 341,000; lower = 29,000) because of the patchy nature of the abundance data and limited sampling. A modern estimate of 18,000 abalone (95 percent CI: 13,000–22,000) was derived from data collected in 1999–2000 at five sites in Mendocino County and indicates an estimated 10-fold decline in abundance between the 1970s and 1999–2000 (Rogers-Bennett *et al.* 2002).

CDFW conducted dive surveys at multiple sites in Mendocino County from 2007–2013 and in Sonoma County from 2007–2012 (L. Rogers-Bennett, CDFW, unpublished data, 24 April 2014). At sites deeper than 10 m, the mean densities exceeded the critical density thresholds for successful reproduction that have been estimated for other abalone species (Babcock and Keesing 1999, Neuman *et al.* 2010). Smaller size classes were observed, indicating that recent recruitment has occurred, despite limited observations of juveniles in abalone recruitment modules deployed from 2001–2014 in northern California.

In Southern California, there have been few reports of pinto abalone from 1970–2000. In 1974, CDFW conducted timed SCUBA surveys at the Northern Channel Islands (focusing on all abalone species) and found 53 individuals at San Miguel Island, 10 at Santa Rosa Island, and 18 off Santa Cruz Island (Ian Taniguchi, CDFW, unpublished data, 24 April 2014). The National Park Service, which has been conducting surveys at the Channel Islands since 1982, observed pinto abalone for the first time in 2001 (pers. comm. with David Kushner, NPS, cited in Rogers-Bennett *et al.* 2002). From 2006–2012, a number of entities observed pinto abalone during surveys that did not necessarily focus on pinto abalone but occurred in habitats suitable for them. These observations indicate that densities are low (ranging from 0.0002 to 0.0286 pinto abalone per sq m), but that recent recruitment has occurred in at least two locations (Santa Cruz Island and Point Loma) (Ian Taniguchi, CDFW, unpublished data, 24 April 2014).

Recently, reports of pinto abalone off San Diego have been more common. In most areas that are surveyed, reports range from a few individuals to up to several dozen abalone, including a wide size range (see status review report). Preliminary data from surveys conducted off San Diego in summer 2014 indicate densities of 0 to 0.015 pinto abalone per sq m, including animals ranging in size from 13 to 151 mm SL (Amanda Bird, CSUF, unpublished data). Densities are well below the estimated threshold values needed for successful recruitment (Babcock and Keesing 1999, Neuman *et al.* 2010). However, the presence of small animals and observations of most (> 50 percent) of animals in pairs within four meters of one another indicate that the species is extremely patchy, and that densities recorded on a per sq m basis may not be the best metric for evaluating population viability.

Mexico

Little information is available on pinto abalone distribution and abundance in Mexico. Because pinto abalone and white abalone overlap in range and are difficult to distinguish morphologically, the two species are often grouped and reported on together. In Mexico, the abalone fishery has been operating since the 1860s (Croker 1931) and is still operating, but modern commercial harvests did not develop until the 1940s. Historically, the fishery primarily harvested *H. fulgens* and *H. corrugata,* but *H. kamtschatkana/sorenseni* were also considered relatively abundant and harvested.

A recent collaborative study was conducted in August 2012 as a preliminary assessment of abalone species in the nearshore at El Rosario, Baja California, and provided density data on pinto and white abalone in five survey areas (Boch *et al.* 2014). Pinto and white abalone were grouped and referred to as a two species complex in the study, due to similarities in shell morphology and possibly misidentification by observers. However, the authors estimated that 75 percent of the abalone in this group were pinto abalone (*H. k. assimilis*) (pers. comm. with C. Boch, Stanford University). The survey included twenty-four transects, each covering a 400 sq sq m area within depths of 11–25 m. A total of 178 *H. k. assimilis/sorenseni* were found, ranging in size from 40 to 240 mm SL, with the majority ranging in size from 40 to 180 mm. Assuming that 75 percent of these were likely *H. k. assimilis,* the estimated density of *H. k. assimilis* for the study area would be 0.0139 per sq m. Recent recruitment was evident in at least one area where the population consisted primarily of animals ranging from 40 to 80 mm in size.

The ''Species'' Question

The ESA defines a species as ''any species or subspecies of wildlife or plants, or any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature.'' The pinto abalone is a marine invertebrate species that has been taxonomically subdivided into two subspecies: *Haliotis kamtschatkana kamtschatkana* (*i.e.,* the northern form that is described as ranging from Sitka Island, Alaska to Point Conception, California), and *Haliotis kamtschatkana assimilis* (*i.e.,* the southern form that is described as ranging from Monterey, California to Turtle Bay, Baja California, Mexico) (McLean 1966). The two subspecies were initially described as separate species by Jonas (*Haliotis kamtschatkana*) in 1845 and Dall (*Haliotis assimilis*) in 1878. McLean (1966) argued that the two previously described species were unique forms, or subspecies, representing geographic extremes of a single species, with differences in shell morphology likely related to varying environmental conditions along a latitudinal gradient within the species' range. Geiger (1999) upheld the subspecies classification scheme based on the morphological descriptions of shells provided by McLean (1966) and also maintained the subspecies range descriptions as described above.

More recently, two lines of evidence have raised uncertainty regarding the taxonomic structure of pinto abalone as consisting of two subspecies. First, none of the genetic tools and analyses conducted to date have been able to confirm a discernible difference between *H. k. kamtschatkana* and *H. k. assimilis.* Studies conducted thus far tend to indicate high intraspecific (within species) variability in pinto abalone, depending on the gene sequenced, but no genetic differentiation between subspecies. One highly conserved portion of the genome that has been investigated and that geneticists would have expected to be different between subspecies, is the area that controls the production of the reproductive proteins lysin and VERL (vitelline envelope receptor for lysin). Supernault *et al.* (2010) examined this portion of the genome for forensic analyses of northeastern Pacific abalone species. Results indicated that all species recognized on the basis of morphological differences have been confirmed to be distinct on the basis of genetic sequences, with only the two subspecies, *H. k. kamtschatkana* and *H. k. assimilis,* indistinguishable through molecular analysis. Gruenthal and Burton (2005) had similar results, concluding *H. k. kamtschatkana* and *H. k. assimilis* were statistically indistinguishable at sequenced portions of the mitochondrial genes cytochrome oxidase subunit one (COI) and cytochrome b (CytB), as well as VERL, although the sample sizes were small. Straus (2010) also found no statistically significant differences in either COI or lysin, stating that the two subspecies share identical sequences at both mitochondrial and nuclear loci and cannot be differentiated. Most recently, Schwenke and Park (unpublished data, cited in the status review report) constructed bootstrapped neighbor-joining trees of new and archived mitochondrial COI and VERL sequences, finding that VERL is currently the best marker available to resolve the most closely related abalone species group found along the Northeastern Pacific coast (white, pinto, flat, and red), whereas COI separates this group from the remaining species (*i.e.* black, pink, and green; pers. comm. with P. Schwenke, NMFS Northwest Fisheries Science Center, cited in status review report). Again, however, neither marker provided subspecies level resolution. Thus, to date, the subspecies remain indistinguishable at the molecular level, although future analyses using newer methods that search the entire genome (such as single nucleotide polymorphisms or SNPs) may be able to find genetic support for the delineation of the two putative subspecies.

Second, collections from several shell collectors contain multiple examples of the southern form (*H. k. assimilis*) in British Columbia and Washington and of the northern form (*H. k. kamtschatkana*) in Baja California, Mexico, as well as multiple specimens collected from both the northern and southern portion of the species' range that exhibit morphologies representative of both subspecies (pers. comm. with B. Owen and A. Rafferty, cited in status review report). We recognize that shell collections may not represent a random sample of shells from the population and that these shells may constitute a relatively small population of outliers in the wild. Despite this, these examples suggest that the range overlap between the two putative subspecies is much more extensive than was previously thought (Canada to Mexico, rather than just along the central California coast) and that this degree of overlap (approximately 80 percent of the species' range) does not meet the definition of subspecies as allopatric populations (Futuyma 1986).

The SRT concluded, and NMFS agrees, that the pinto abalone should be considered as one species throughout its range for the purposes of the status review. This conclusion was based on the lack of evidence for species divergence at the molecular level, the degree of overlap between the subspecies, and the fact that there are other examples of marine invertebrate species with broad geographic ranges (*e.g.,* ochre and bat stars) and/or pronounced morphological plasticity (*e.g.,* periwinkle snails) extending on the order of 1,000s of kilometers. We do not reject the possible existence of pinto abalone subspecies. However, the lack of genetic, geographic, or ecological justification for treating the two subspecies as separate species led the SRT to consider the status of the species and its extinction risk throughout its range from Alaska to Mexico.

Assessment of Risk of Extinction

Approach to Extinction Risk Assessment

The ESA defines an endangered species as ''any species which is in danger of extinction throughout all or a significant portion of its range.'' A threatened species is ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' Thus, we interpret an ''endangered species'' to be one that is presently in danger of extinction. A ''threatened species,'' on the other hand, is not presently in danger of extinction, but is likely to become so in the foreseeable future (that is, at a later time). In other words, the primary statutory difference between a threatened and endangered species is the timing of when a species may be in danger of extinction, either presently (endangered) or in the foreseeable future (threatened).

To evaluate whether the pinto abalone meets the definition of threatened or endangered, we considered the best available information and applied professional judgment in evaluating the level of risk faced by the species. We evaluated both demographic risks, such as low abundance and productivity, and threats to the species including those related to the factors specified by the ESA section 4(a)(1)(A)–(E). In a separate evaluation (see the ''Efforts Being Made to Protect the Species'' section below), we also considered conservation efforts being made to protect the species.

As described above, we convened an SRT, comprised of nine fishery biologists and abalone experts from the NMFS West Coast and Alaska Regions, the NMFS Northwest and Southwest Fisheries Science Centers, NMFS Office of Science and Technology, the National Park Service, and the U.S. Geological Survey/University of Washington. The SRT was asked to review the best available information on the species and to evaluate the overall risk of extinction facing pinto abalone now and in the foreseeable future. The ability to measure or document risk factors for pinto abalone is limited and the available information is often not quantitative, or less than ideal. Therefore, in assessing risk, we included both qualitative and quantitative information and modeled the assessment on the approaches used in previous NMFS status reviews to organize and summarize the professional judgment of the SRT members.

The SRT first performed a threats assessment for pinto abalone by scoring the severity and scope of threats to the species, as well as the time frame over which the threats are affecting the species and the level of data that is available regarding the threats and their effects. The SRT considered past factors for decline, as well as present and future threats faced by the species. Detailed definitions of these risk scores can be found in the status review report. The results of this threats assessment are summarized below under ''Summary of Factors Affecting the Species.''

The SRT then assessed the demographic risks for pinto abalone. The SRT considered demographic information reflecting the past and present condition of pinto abalone populations. This information is detailed in the status review report and summarized above under the ''Background'' section of this notice, and included the best available information on population abundance or density, population trends and growth rates, the number and distribution of populations, exchange rates of individuals among populations, and the ecological, life history, or genetic diversity among populations. In some cases, information was not available or severely limited.

As in previous NMFS status reviews, the SRT analyzed the collective condition of individual populations at the species level according to four demographic risk criteria: Abundance, growth rate/productivity, spatial structure/connectivity, and diversity. These four general viability criteria, reviewed in McElhany *et al.* (2000), reflect concepts that are well-founded in conservation biology, are generally applicable to a wide variety of species, and describe demographic risks that individually and collectively provide strong indicators of extinction risk. The SRT's methods and conclusions for the demographic risk assessment are described in more detail below in the ''Analysis of Demographic Risk'' section of this notice.

The SRT members were then asked to make an overall extinction risk determination for pinto abalone now and in the foreseeable future. For this analysis, the SRT considered the best available information regarding the status of the species along with the results of the threats assessment and demographic risk analysis. The SRT defined five levels of overall extinction risk: No/Very Low risk, Low risk, Moderate risk, High risk, and Very High risk. To allow individuals to express uncertainty in determining the overall level of extinction risk facing the species, the SRT adopted the ''likelihood point'' (Forest Ecosystem Management Assessment Team, or FEMAT, 1993) method, in which each SRT member distributed 10 'likelihood points' among the five levels of risks. The scores were then tallied and summarized. This approach has been used in previous NMFS status reviews (*e.g.,* for Pacific salmon, rockfish in Puget Sound, Pacific herring, black abalone, scalloped hammerhead) to structure the team's analysis and express levels of uncertainty when assigning risk categories.

The SRT did not make recommendations as to whether the species should be listed as threatened or endangered, or if it did not warrant listing. Rather, the SRT drew scientific conclusions about the overall risk of extinction faced by pinto abalone under present conditions and in the foreseeable future (defined as 30 years and 100 years) based on an evaluation of the species' demographic risks and assessment of threats. NMFS considered the SRT's assessment of overall extinction risk, along with the best available information regarding the species status and ongoing and future conservation efforts, in making a final determination regarding whether the species meets the definition of threatened or endangered.

Summary of Factors Affecting the Species

According to section 4 of the ESA, the Secretary of Commerce determines whether a species is threatened or endangered because of any (or a combination) of the following factors: The present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific or educational purposes; disease or predation; inadequacy of existing regulatory mechanisms; or other natural or man-made factors affecting its continued existence. We examined these factors for their historic, current, and/or potential impact on pinto abalone and considered them, along with current species distribution and abundance, to help determine the species' present vulnerability to extinction. When considering the effects of the threat into the foreseeable future, the time frame considered by the SRT varied based on the threat, but generally ranged from 30 to 100 years. A time frame of 30 years represents approximately 3 generation times for pinto abalone (McDougall *et al.* 2006, COSEWIC 2009) and was considered a reasonable period over which predictions regarding the threats and their effects on the species could be made. A time frame of 100 years was considered a reasonable period over which predictions regarding longer-term threats (*e.g.,* ocean acidification, effects of climate change) have been or could be made. The time frames for foreseeable future are discussed in more detail under the ''SRT Assessment of Overall Extinction Risk'' section of this notice.

For each of these factors, the SRT identified and evaluated several stressors that either have or may contribute to declines in pinto abalone. Overall, the SRT rated most of these stressors as low threats and several as moderate threats to pinto abalone, but did not identify any high or very high threats. Among the moderate threats, the SRT was most concerned about low densities that have resulted from past fisheries harvest of pinto abalone, the potential threat posed by ocean acidification, and illegal take due to poaching and inadequate law enforcement. The potential for reduced genetic diversity as a consequence of low population densities and the potential for predation (particularly by sea otters) to further reduce local densities were also identified as threats of greater concern. Finally, oil spills and disease outbreaks (through the spread of pathogens) were highlighted as highly uncertain risks that need to be addressed through careful planning, monitoring, and management. Below, we discuss the threats associated with each factor and our assessment of each factor's contribution to extinction risk to the species. Where relevant, we discuss the risks posed by a factor in combination with other factors (*e.g.,* risks posed by disease and inadequate regulatory mechanisms).

Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Most of the threats that result in substrate destruction or modification, such as coastal development, recreational access, cable repairs, nearshore military operations, and benthic community shifts, occur infrequently, have a narrow geographic scope, or have uncertain or indirect effects on pinto abalone. Some exceptions may exist in the cases of water temperature increases and reduced food quantity and quality associated with the ENSOs, PDOs, IPOs, and long-term climate change, as well as sea level rise due to long-term climate change, in that these threats have the potential to produce more widespread impacts, but the certainty in how these factors will affect pinto abalone is low. For example, increased water temperatures associated with climate change may be widespread throughout the U.S. West Coast, though the latest climate report suggests that impacts will be least felt in the Pacific Northwest (Mote *et al.* 2014). Increased water temperatures could affect the health and range of pinto abalone, particularly at the northern and southern extreme of the species range. However, pinto abalone have a wide temperature tolerance and may be able to adapt to changing temperatures over time, such as by seeking depth refuges. It is also not clear how El Niño/Southern Oscillation (ENSO) events, Pacific Decadal Oscillation (PDO) events, Interdecadal Pacific Oscillation (IPO) events, and climate change may affect food quantity and quality for pinto abalone. Sea level rise may result in loss of suitable habitat in a preferred depth range because of increased erosion, turbidity and siltation; however, the effects on pinto abalone are uncertain because pinto abalone typically occupy subtidal habitats throughout much of their range. We are not aware of any studies that have examined the potential effects of sea level rise on abalone, and therefore, we currently lack information to determine whether these habitat changes will be important factors for species decline.

Climate change impacts, such as ocean acidification, could affect settlement habitat by affecting the growth of crustose coralline algae, but the effects to pinto abalone are unclear. For example, McCoy (2013) and McCoy and Ragazzola (2014) found morphological changes (*e.g.,* reduced thickness or density) in crustose coralline algal species in response to ocean acidification, with responses varying by species. However, Johnson *et al.* (2014) found that crustose coralline algal species exposed to varying carbon dioxide levels may be acclimatized to ocean acidification, with species-specific variation in the responses. North Pacific waters, including the California Current Ecosystem, have relatively low seawater pH values due to a variety of natural oceanographic processes (Feely *et al.* 2004, Feely *et al.* 2008, Feely *et al.* 2009, Hauri *et al.* 2009), and this may make crustose coralline algal species within the pinto abalone's range better able to adapt to the effects of ocean acidification. In addition, it is unclear how ocean acidification may affect the chemical cues that are believed to attract pinto abalone to settle on crustose coralline algae. Overall, climate change impacts such as ocean acidification could affect settlement habitat, but the effects are highly uncertain at this time.

Oil spill and response activities were also identified as a concern for pinto abalone, for both the potential effects on habitat (substrate destruction or modification) and on the abalone themselves (environmental pollutant/toxins, under ''Other Natural or Man-made Factors''). These effects would be of particular concern where the species occurs in intertidal and shallower waters (*e.g.,* Alaska and British Columbia). The threat of an oil spill is greater in areas with higher ship traffic and human development. If a spill were to occur, acute effects could be very damaging in the localized area of the spill. However, there is little information available on the effects of oil spills on subtidal habitats where pinto abalone tend to occur throughout most of their range, as well as little information available on the effects of oil on abalone.

Overall, the best available information does not indicate that the threats discussed above have resulted in the destruction of or substantial adverse effects on pinto abalone habitat, or in curtailment of the species' range. Evaluations in British Columbia (COSEWIC 2009) and Washington (Vadopalas and Watson 2013) indicate that habitat does not appear to be a limiting factor for the species at this time. Future effects on the species' habitat and/or range may result from ENSOs/PDOs/IPOs or the impacts of long-term climate change; however, the magnitude, scope, and nature of these effects are highly uncertain at this time. We conclude that the habitat threats discussed above are not contributing substantially to the species' risk of extinction now. The future impacts of climate- and/or oil spill-related habitat changes are highly uncertain, but based on past impacts our best judgment leads us to conclude that impacts will not contribute substantially to the species' risk of extinction in the foreseeable future.

Overutilization for Commercial, Recreational, Scientific or Educational Purposes

Fisheries harvest of pinto abalone for commercial and recreational purposes (*i.e.,* prior to the fishery closures) has contributed to population declines and low densities throughout the species' range (see the ''Abundance'' section above). Harvest of pinto abalone is currently prohibited throughout the coast except in Alaska (*i.e.,* for personal use and subsistence harvest) and Mexico. Data on harvest levels and the impacts on pinto abalone are not available for Alaska and Mexico. In Mexico, green and pink abalone are the focus of the abalone fishery, with other abalone species (including pinto abalone) making up only one percent of the abalone fishery (Boch *et al.* 2014). In Alaska, the daily limits for personal use and subsistence harvest were reduced in 2012 from 50 to 5 abalone per day. We do not have data to assess how this harvest level would affect pinto abalone populations in Alaska. ADF&G believes that personal use and subsistence harvest of pinto abalone is currently low (ADF&G comments to NMFS on 17 January 2014). Bowers *et al.* (2011) found that the average subsistence harvest of pinto abalone ranged from 350–382 abalone per household in 1972 but decreased to 3–9 abalone per household in 1997. In recent interviews, local residents have indicated to ADF&G that they are not participating in the personal use fishery due to the lack of abalone (Bowers *et al.* 2011). Based on this information, it is likely that personal use and subsistence harvest of pinto abalone in Alaska is low. The SRT expressed concern regarding the continued harvest of pinto abalone in Alaska and Mexico, but rated fisheries harvest as a Moderate threat overall, due to prohibitions on harvest throughout most of the species' range and what appears to be low levels of harvest in Alaska and Mexico presently. However, monitoring of harvest levels and pinto abalone populations is needed to obtain a better understanding of the impacts of these fisheries in Alaska and Mexico.

The effects of past fisheries harvest on local densities still persist today throughout the species' range. Past harvest levels, particularly in commercial fisheries in Alaska and British Columbia, were not sustainable and reduced densities to very low or non-existent levels. Some populations (*e.g.,* at the San Juan Islands Archipelago in Washington) appear to be experiencing recruitment failure. There are also a few areas where pinto abalone have not been observed in recent surveys in Washington and British Columbia. However, pinto abalone populations continue to persist throughout most survey sites. In addition, evidence of recent recruitment events have been observed at several areas throughout the species' range. Since the closure of abalone fisheries in British Columbia in 1990, small size classes of pinto abalone have been observed regularly during index site surveys at Haida Gwaii and along the Central Coast (two areas that once supported a large proportion of fisheries harvest) (COSEWIC 2009). Small pinto abalone have also been observed in surveys conducted within the last 10 years off Alaska (pers. comm. with S. Walker, ADF&G, cited in status review report), California (pers. comm. and unpublished data from A. Bird, CSUF, and Ed Parnell, UCSD, cited in status review report), and Mexico (Boch *et al.* 2014), indicating recent recruitment events (see the ''Reproduction and Spawning Density'' section of this notice for more details). These observations show that densities at those locations remain high enough to support reproduction and recruitment, and also that we have much more to learn about the species' population dynamics and the factors influencing successful reproduction and recruitment. For example, mean adult densities may not be an appropriate metric for predicting reproductive and recruitment success because it does not adequately represent the patchy distribution of abalone within an area. Fine-scale spatial distribution patterns (*e.g.,* aggregations) may be more important for reproductive and recruitment success than the overall density of adults in an area.

Reduced genetic diversity is a potential risk associated with low densities. Withler *et al.* (2001) provide the only published assessment of population structure in pinto abalone and found high levels of genetic variation in pinto abalone populations sampled at 18 sites throughout coastal British Columbia and at one site in Sitka Sound, Alaska. Unfortunately, research on populations throughout the remainder of the species' range has not been conducted, and thus the Wither *et al.* (2001) study represents the best available information. Based on this, the SRT expressed a moderate degree of concern, but most members felt that the species' genetic diversity likely remains high.

Overall we conclude that past fisheries harvest has reduced the abundance of pinto abalone populations throughout its range, but not to a point that contributes substantially to the species risk of extinction now or in the foreseeable future. The presence of small, newly-recruited animals in multiple areas spanning the species' range (except for the San Juan Islands) suggests that abundance levels are not low enough to lead to repeated recruitment failure. The threat of overutilization from fisheries harvest has largely been removed, because fisheries harvest of pinto abalone has been prohibited throughout most of the species range. Presently, harvest of pinto abalone is only allowed in Alaska's personal use and subsistence fisheries and in Mexico. The best available information indicates that these fisheries are not contributing substantially to the species' risk of extinction; however, data on harvest levels are needed to better assess how these fisheries may be affecting the status of the species in Alaska and Mexico.

Disease or Predation

Disease has been identified as a major threat to abalone species worldwide, with four significant abalone diseases emerging over the past several decades (withering syndrome, ganglioneuritis, vibriosis, and shell deformities). Pinto abalone are likely susceptible to all of these diseases, and have been confirmed to be highly susceptible to withering syndrome, a disease that has resulted in significant declines in black abalone populations throughout southern California. No infectious diseases affecting wild pinto abalone have been reported in Alaska, Washington, or California, but two abalone pathogens have been reported in British Columbia. To date, no outbreaks have been observed in wild populations and there is no evidence indicating that disease has been a major source of mortality in the recent past or currently. However, multiple sources and pathways exist for pathogens or invasive species to be introduced into wild pinto abalone populations, including aquaculture facilities and the movement of abalone (*e.g.,* import, transfer) for aquaculture, research, and food/hobby markets (identified under the ''Inadequacy of existing regulatory mechanisms'' factor below). Great care is needed to closely monitor and manage these sources and pathways, to protect wild populations from potentially devastating pathogens and invasives.

Abalone face non-anthropogenic predatory pressure from a number of consumer species such as gastropods, octopuses, lobsters, sea stars, fishes and sea otters (Ault 1985; Estes and VanBlaricom, 1985; Shepherd and Breen 1992). Pinto abalone have been exposed to varying predation pressure through time and this pressure is likely to continue. However, in the past, pinto abalone populations may have been better able to absorb losses due to predation without compromising viability. Specifically, predation by sea otters has been raised as a potentially significant factor in the continued decline and/or lack of recovery of pinto abalone populations in areas where the two species overlap.

Sea otters were hunted to near extinction in the mid-1700s to 1800s, but have begun to recover in recent decades with protection from the North Pacific Fur Seal Convention of 1911, the Marine Mammal Protection Act, and the help of reintroductions in Southeast Alaska, British Columbia, and Washington in the late 1960s. Within the geographic range of pinto abalone, contemporary sea otter populations are present in Southeast Alaska, in two discrete population segments off British Columbia, from Cape Flattery to Destruction Island off Washington, from Half Moon Bay to near Gaviota on the mainland California coast, and at San Nicolas Island off southern California. Sea otter populations in these areas have been expanding in both abundance and distribution in recent years and are likely to continue to expand as the populations grow. Sea otters remain regionally extinct in the marine waters of Oregon and Baja California, Mexico.

Available data on red abalone in California suggests that sea otter predation typically reduces red abalone density by about 90 percent (Ebert 1968, Lowry and Pearse 1973, Cooper *et al.* 1977, Hines and Pearse 1982, Ostfeld 1982, Wendell 1994, Fanshawe *et al.* 2003) and eliminates viable commercial and recreational harvests of red abalone (Wild and Ames 1974, Estes and VanBlaricom 1985). Relationships of sea otters with pinto, white, and black abalone are uncertain because of lesser overlap in habitat characteristics, especially water depth. Sea otters are known to feed on pinto abalone, but the level of predation pressure and effects on pinto abalone populations have not been directly investigated and remain poorly known. To our knowledge there are no published data documenting effects of predation by sea otters on pinto abalone at the population level.

Continued growth of the sea otter population will encompass an increasing proportion of pinto abalone habitat and will increase the risk of predation by sea otters on pinto abalone populations. However, the effects are not clear. Observations by divers for the ADF&G on the outer coast of Southeast Alaska suggest that sea otters preferentially select red sea urchins and pinto abalone as prey when foraging in rocky subtidal habitats (Rumble and Hebert 2011). The dramatic increase in sea otter numbers and range has thus caused significant concern about benthic invertebrate fisheries in Southeast Alaska. However, in British Columbia, in at least two index sites where sea otters have been present for several years, densities of pinto abalone are higher than in areas with no sea otters (pers. comm. with J. Lessard, DFO, 24 April 2014). At one of these sites, the density of mature abalone in 2011 exceeded DFO's long-term recovery target of one abalone per sq m (pers. comm. with Joanne Lessard, DFO, on 24 April 2014). As in other areas along the coast, however, data are not available to determine the natural population levels of pinto abalone prior to the local extirpation of sea otters in British Columbia in the early 1920s. Thus, we lack historical data with which to compare current density estimates.

Sea otter predation will likely affect pinto abalone populations, but in no case has local extinction of any abalone population or species in the northeastern Pacific been documented as a result of predation by sea otters. Sea otters have been present in significant numbers in the coastal North Pacific Rim since the Pleistocene, and in northern hemisphere oceans of the earth for approximately seven million years. It seems certain that undisturbed populations of sea otters and abalones can sustainably co-exist as a consequence of co-evolved interactions.

Overall, the best available information indicates that threats associated with disease are not contributing substantially to the pinto abalone's risk of extinction now or in the foreseeable future. Disease could pose a risk to pinto abalone in the future if an outbreak of sufficient magnitude and scope occurs among wild populations, but the likelihood of such an outbreak is difficult to predict. The SRT emphasized the importance of closely monitoring and managing potential sources and pathways by which pathogens or invasive species could be introduced to wild populations (*e.g.,* import or transfer of abalone for aquaculture, research, and food/hobby markets). Such precautions are important for the protection of all abalone species throughout the coast.

In addition, the best available information indicates that predation is not contributing substantially to the pinto abalone's risk of extinction presently or in the foreseeable future. Sea otter predation has likely contributed to continued declines and/or lack of recovery of pinto abalone populations where the two species overlap. However, we agree with the SRT's conclusion that sea otters and abalone can sustainably co-exist and that our criteria for healthy, sustainable abalone populations must account for the presence of sea otters in the ecosystem.

Inadequate Regulatory Mechanisms

Poaching has been a source of mortality for pinto abalone throughout their range since the establishment of harvesting regulations by the States and Canada. The problem of poaching clearly persists in some regions along the coast, particularly in British Columbia. The continued declines in mature pinto abalone densities at Haida Gwaii and along the Central Coast, despite the fisheries closures and observed recruitment events, were mainly attributed to illegal harvest (COSEWIC 2009). However, recent index site surveys in 2011 and 2012 indicate a decline in annual mortality at both the Haida Gwaii and Central Coast sites and an increase in both immature and mature abalone densities (pers. comm. with J. Lessard, DFO, on 24 April 2014). This decrease in annual mortality and increase in densities is most likely due to a decrease in poaching pressure as a result of existing regulatory mechanisms and outreach and education programs; however, it may also be due to other factors such as improved oceanographic conditions to support juvenile survival or the benefits of the fisheries closures finally being manifested in population recovery (pers. comm. with Joanne Lessard, DFO, on 24 April 2014). We are not aware of any evidence indicating illegal harvest is currently occurring in Washington, although several cases of illegal harvest and laundering of pinto abalone product were investigated in the late 1980s and periodic cases of illegal sport harvest were reported after the 1994 fishery closure (WDFW 2014). It is generally believed that current populations in Washington no longer exist at commercially-viable quantities, and the effort vs. reward deters poaching. WDFW enforcement covers the entire coast and includes at-sea monitoring of commercial and recreational fisheries and periodic patrols of commercial buyers and markets. However, Vadopalas and Watson (2013) identify poaching as a major threat to abalone in Washington. In other regions along the coast, poaching is recognized as a historical and future risk, but specific information on current levels of poaching is lacking. We are not aware of any enforcement cases or evidence for poaching, but continued efforts to enforce the regulations and monitor their effectiveness are needed to protect the species from this threat.

As discussed above (under ''Disease and Predation''), the introduction of pathogens or invasive species was also a concern identified by the SRT, given the potentially high risks posed by disease to pinto abalone. Regulatory mechanisms are advisable to ensure adequate monitoring whenever animals are moved (*e.g.,* imports, transporting between facilities) for aquaculture, research, and/or food/hobby markets, to protect wild populations from pathogens and invasive species. In California, state regulations require abalone health monitoring at aquaculture facilities and control the importation/exportation of abalone between facilities. The State also monitors aquaculture facilities for introduced organisms and disease on a regular basis and restricts out-planting abalone from facilities that have not met certification standards. These measures will likely reduce the transmission of pathogens or invasive species from aquaculture facilities. In Washington and British Columbia, where abalone hatcheries are operated in support of restoration efforts, disease monitoring is also conducted and precautions are taken to avoid and minimize the transmission of pathogens and invasive species. Some improvements to existing regulations are needed to further protect the species. Although a permit is required to import non-native abalone species into California, a permit is not needed to import native abalone species, even if the source of those abalone is outside of the U.S. This presents a potential risk because live abalone imported into the State could carry pathogens. Information is not available regarding the amount of native abalone species that are imported into the U.S. from other countries each year.

Overall, based on the best available information, we conclude that existing regulatory mechanisms are adequate and that existing deficiencies in regulatory mechanisms are not contributing substantially to the pinto abalone's risk of extinction now or in the foreseeable future. Prohibitions on the harvest of pinto abalone throughout most of the coast provide a high level of protection for the species. Poaching continues to occur in British Columbia; however, recent increases in abalone densities at index sites were most likely due to reduced poaching pressure as a result of enforcement and outreach efforts, although favorable oceanographic conditions and reduced harvest pressure could have also contributed to these increases. In other areas, information on poaching is limited. Enforcement measures are in place throughout the coast, but monitoring is needed to ensure illegal take is not occurring. In addition, regulations and measures have been implemented to minimize the risk of transmitting pathogens or invasive species to wild populations. However, some improvements are advisable (*e.g.,* to regulations on live abalone imports) to further protect pinto abalone and other abalone species.

Other Natural or Man-Made Factors

Among the other natural or human factors affecting pinto abalone, the SRT identified ocean acidification as a threat of greater concern. Ocean acidification is a concern particularly for early life stages because of the potential for reduced larval survival and shell growth, as well as increased shell abnormalities. The impacts of ocean acidification can be patchy in space and time and may develop slowly. Effects of ocean acidification on early life stages of pinto abalone are beginning to be understood. Laboratory studies indicate that reduced larval survival and shell abnormalities or decreased shell size occur at elevated levels of CO_2 (800 and 1800 ppm CO_2), compared to lower levels (400 ppm CO_2) (Crim *et al.* 2011). Friedman *et al.* (unpublished data) have also found reduced larval survival occurs at elevated pCO2 and are studying the synergistic effects of increased pCO2, varying temperature, and exposure to *Vibrio tubiashii* on early life stages of pinto abalone (results pending).

Other climate-change related effects that may impact pinto abalone include increased water temperatures and decreased salinity (due to freshwater intrusions). Bouma's (2007) studies with cultured pinto abalone indicated that laboratory rearing temperatures of 11, 16, and 21 °C did not affect post-larval survival. Larvae tolerated temperatures of 12–21 °C, with mortality at 24 °C. Captive adult pinto abalone in Alaska showed no behavioral abnormalities at 2–24 °C, but high mortality at 0.5 °C and 26.5 °C. Low salinity intrusions from freshwater inputs to Puget Sound and the San Juan Islands Archipelago may also have negative effects on pinto abalone recruitment. In laboratory experiments, early life stages of pinto abalone appear to be intolerant to low salinities below 26 psu (Bouma 2007). Bouma (2007) found that when introduced into a halocline microcosm (where salinity levels change with depth along the water column), larvae actively avoided areas of lower salinity. Later larval stages appear to be more tolerant of sub-optimal salinity levels (Bouma 2007).

In evaluating the threat of ocean acidification and other climate change impacts, the SRT recognized that some information is available regarding the potential effects of ocean acification, elevated water temperatures, and low salinity intrusions on pinto abalone. However, the SRT also recognized that our understanding of these effects includes a high degree of uncertainty, due to limited studies involving pinto abalone and the uncertainty and spatial variability in predictions regarding ocean acidification and climate change impacts into the future. The overall level of data available is low, especially regarding how ocean acidification may affect the species throughout its range, given variability in local conditions throughout the coast, natural variation in ocean pH, species adaptability, and projections of future carbon dioxide emissions.

Environmental pollutants and toxins are likely present in areas where pinto abalone have occurred and still do occur, but evidence suggesting causal and/or indirect negative effects on pinto abalone due to exposure to pollutants or toxins is lacking. In addition, very little is known regarding entrainment and/or impingement risks posed by coastal facilities. Direct effects would be focused on larval stages and be very localized in area. Despite uncertainties due to lack of data, the SRT felt that the risk posed by environmental pollutant/toxins and entrainment or impingement is likely low given their limited geographic scope.

Overall, the best available information regarding other natural or manmade factors affecting pinto abalone do not indicate that these factors are contributing substantially to the species' risk of extinction now or in the foreseeable future. Ocean acidification and climate change impacts could affect pinto abalone in the future; however, the magnitude, scope, and nature of these effects are highly uncertain at this time.

Analysis of Demographic Risk

The SRT first identified a series of questions related to the four demographic risk criteria (abundance, growth rate/productivity, spatial structure/connectivity, and diversity), in order to structure their evaluation of these four criteria. For example, one of the questions related to the abundance criterion was: Is the species' abundance so low, or variability in abundance so high, that it is at risk of extinction due to depensatory processes? The SRT then assessed these questions using a voting process that was first used in an ESA status review by Brainard *et al.* (2011) to assess extinction risk for 82 coral species.

For each question, each SRT member scored the likelihood that the answer to each question was true, by anonymously assigning 10 points across the following eight likelihood bins, developed by the IPCC (Intergovernmental Panel on Climate Change 2007): exceptionally unlikely (<1 percent), very unlikely (1–10 percent), unlikely (10–33 percent), less likely than not (33–50 percent), more likely than not (50–66 percent), likely (66–90 percent), very likely (90–99 percent), and virtually certain (>99 percent). The IPCC (2007) developed this approach as one method for assessing the uncertainty of specific outcomes using expert judgment and, where available, quantitative information. The IPCC (2007) used this approach to evaluate the probability of occurrence of different climate change model outcomes, whereas Brainard *et al.* (2011) used this approach to qualitatively evaluate the likelihood that different coral species would fall below a defined critical risk threshold. In this status review, the SRT applied this approach to qualitatively evaluate the likelihood that pinto abalone are at risk of extinction due to different demographic risks. For each question, the scores were tallied (mean and range for each SRT member and across all SRT members) and reviewed, and the range of perspectives was discussed by the SRT. Each SRT member then had the opportunity to change their scores before submitting their final scores. Below, we summarize the SRT's conclusions regarding demographic risks. Additional details are provided in the status review report.

The SRT concluded that the risks to the species associated with abundance and population growth are moderate. Team members agreed that depensatory processes due to low and/or highly variable abundance or low population growth were a concern for pinto abalone in a number of locations (*e.g.,* San Juan Island Archipelago, Alaska). Pinto abalone abundance and population growth have declined throughout the species' range, and, while there is some indication that recent recruitment has occurred in localized areas (*e.g.,* Mexico, Point Loma, Palos Verdes, Mendocino County, British Columbia, Alaska), the rate of population growth is unknown. The SRT expressed some concern that population growth may not be occurring at a pace or extent sufficient to buffer against possible further declines due to processes happening over longer (*e.g.,* PDO, IPO, climate change, and ocean acidification over decades; ENSO events over years) and/or uncertain time scales (*e.g.,* cumulative oil spill impacts, poaching events, or harvest impacts). However, the SRT also expressed a high degree of uncertainty regarding the species' abundance and productivity.

The majority of SRT members agreed that spatial structure and diversity pose a low risk to pinto abalone. The SRT expressed a low level of concern regarding loss of variation in life history traits, population demography, morphology, behavior, or genetic characteristics. Most SRT members agreed that it is very unlikely that the species is at risk due to the loss of or changes in diversity, or due to alterations in the natural processes of dispersal, migration, and/or gene flow, or those that cause ecological variation. The SRT acknowledged that the species has experienced population declines and currently has a patchy distribution, but noted that the species has historically existed with a highly patchy distribution. The SRT was concerned about the potential loss of source populations or subpopulations in some areas due to past fishing pressure;

however, they also expressed a high level of uncertainty regarding this risk, given the limited information on source-sink dynamics for pinto abalone. Recent evidence of localized recruitment in a few areas, spread over a wide geographic range (Alaska to Mexico) suggests that local populations are dense enough to support reproduction. The SRT's prevailing justification for concluding that spatial structure and diversity pose low risk to pinto abalone was that other related species of abalone that were overfished (*e.g.,* red, pink, and green abalone) and that may exhibit lower spatial connectivity and/or genetic diversity than is suspected for pinto abalone, made remarkable recoveries in many locations range-wide over a period of roughly two decades (see status review report).

Overall, despite their high degree of uncertainty, the SRT members expressed low to moderate levels of concern for the majority of the questions and demographic categories. The SRT expressed a higher degree of uncertainty regarding the species' abundance and productivity and the risks posed by these demographic factors. However, none of the SRT members placed any of their likelihood points in the highest risk category (>99 percent) and they placed very few points (<5 percent) in the next highest risk category (90–99 percent) across all questions and demographic categories, indicating that no SRT member thought the risk of extinction of pinto abalone was virtually certain, or even very likely, due to any of the demographic risks identified.

SRT Assessment of Overall Extinction Risk

In the overall risk assessment, the SRT considered the demographic risks together with the threats to evaluate the level of extinction risk faced by the species now and in the foreseeable future. Because data are not available to quantitatively assess the species' extinction risk (*e.g.,* through development of a population viability model), the SRT adopted an approach similar to what has been done in previous NMFS status reviews, using a voting process to organize and summarize the professional judgment of the SRT members regarding the overall level of extinction risk to the species. We summarize the SRT's assessment and conclusions regarding extinction risk below. In the ''Final Determinations'' section of this notice, we considered the SRT's conclusions, along with the best available information regarding the status of the species and ongoing/future conservation efforts (see section titled ''Efforts Being Made to Protect the Species'') to develop a final determination regarding overall extinction risk to the species.

For the purpose of this extinction risk analysis, the term ''foreseeable future'' was defined as the time frame over which threats can be predicted reliably and over which their impacts to the biological status of the species may be observed. The SRT considered the life history of pinto abalone and the availability of data regarding threats to the species, and recommended two time frames for the foreseeable future.

First, the SRT recommended a foreseeable future of 30 years, representing approximately three generation times for pinto abalone as defined in the IUCN (International Union for Conservation of Nature) Red List assessment (McDougall *et al.* 2006) and the COSEWIC (2009) assessment for pinto abalone. This time frame is consistent with what was used to define the foreseeable future in the black abalone status review (VanBlaricom *et al.* 2009) and represents a reasonable time frame over which threats can be predicted reliably and impacts to the species' status would be observable.

The SRT also recommended a foreseeable future of 100 years, because they felt that a time frame greater than 30 years may be needed to adequately consider the effects of longer-term threats, such as climate change, ocean acidification, ENSOs, and PDOs/IPOs. This time frame was used by Brainard *et al.* (2011) in their status review of multiple coral species that are affected by climate change and ocean acidification. A foreseeable future of 100 years represents a reasonable time frame over which we have some information on and predictions regarding longer-term threats and oceanographic regime shifts. However, the SRT also recognized that this longer time frame introduces more uncertainty into the assessment.

NMFS agreed that the 30 year and 100 year time frames for foreseeable future were appropriate and asked the SRT to assess the overall level of extinction risk over both time frames. As stated above, the SRT assessed the overall level of extinction risk to the species now and in the foreseeable future (30 years and 100 years) using the likelihood point method (*e.g.,* FEMAT method), in which each member distributed 10 likelihood points among the following five levels of extinction risk: No/Very Low, Low, Moderate, High, and Very High risk. We summarize the SRT's assessment below; further details can be found in the status review report.

Over both time frames, SRT members distributed likelihood points across all five extinction risk categories, with the majority of likelihood points placed in the Low risk and Moderate risk categories and very few (1–2) points placed in the Very High risk category. When considering a foreseeable future of 100 years, most of the SRT members shifted some likelihood points from the No/Very Low and Low risk categories to the Moderate and High risk categories, expressing greater concern, but also greater uncertainty, regarding demographic risks and threats over the 100 year time frame compared to the 30 year time frame.

For the overall risk now and in a foreseeable future of 30 years, the SRT distributed their likelihood points across the five extinction risk categories as follows (the first number represents the total points attributed by SRT members and the second number represents the total possible points, which was 80): No or Very Low Risk (11/80, or 14 percent), Low Risk (33/80, or 40 percent), Moderate Risk (32/80, or 41 percent), High Risk (3/80, or 4 percent), Very High Risk (1/80, or 1 percent). Only one SRT member placed a likelihood point in the Very High risk category. Based on the likelihood point distributions, the SRT was fairly certain that the species has a Low to Moderate risk of extinction currently and in a foreseeable future of 30 years. Of the 80 points distributed across categories, the SRT placed 76 points across the Very Low, Low, and Moderate risk categories. The categories with the greatest number of points were the Low risk (33 points) and Moderate risk (32 points) categories.

For the overall risk now and in a foreseeable future of 100 years, the SRT distributed their likelihood points across the five extinction risk categories as follows: No or Very Low Risk (6/80, or 8 percent), Low Risk (24/80, or 30 percent), Moderate Risk (36/80, or 45 percent), High Risk (12/80, or 15 percent), Very High Risk (2/80, or 3 percent). Only two SRT members placed likelihood points in the Very High risk category. All but one SRT member (who made no changes to their point distribution when considering 100 years vs. 30 years) shifted some of their likelihood points from the No/Very Low and Low risk categories to the Moderate and High risk categories when considering a foreseeable future of 100 years rather than 30 years. This shift indicated that the SRT was more certain that the species has a Moderate risk of extinction currently and in the foreseeable future when considering a foreseeable future of 100 years vs. 30 years. Again, the SRT distributed most of their points (66 out of 80 points) across the Very Low, Low, and Moderate risk categories.

Overall, the SRT concluded that pinto abalone have a Low to Moderate level of extinction risk now and in the foreseeable future (over both the 30 year and 100 year time horizons). The SRT recognized that there is a high level of uncertainty regarding demographic factors, in particular regarding abundance and productivity levels. The main concerns highlighted by the SRT include declines in abundance and uncertainty regarding whether current abundance and productivity levels are sufficient to support the persistence and recovery of the species in the face of continuing and potential future threats. Long-term declines have been observed in surveyed areas throughout the species range. There is concern that these declines may be putting the populations at the San Juan Islands Archipelago at risk, because the populations appear to be experiencing recruitment failure. Throughout the rest of the species' range, densities remain low but recurring and/or recent recruitment events have been observed and have even resulted in increased densities (of mature and all sizes of pinto abalone) at several index sites in British Columbia. Observed recruitment events indicate that demographic characteristics are sufficient to support reproduction in locations throughout the species range, but productivity is variable and occurring at undetermined rates. Observations suggest that abalone recruitment and populations, in general, are both temporally and spatially episodic. One of the main data gaps is the lack of historical data on the status of the species prior to fisheries harvest and prior to the removal of sea otters throughout most of the coast. Lacking this baseline for comparison further increases the uncertainty regarding how to interpret the limited demographic data available for the species, and points to the need for improved monitoring of pinto abalone populations throughout its range in order to adequately assess the species' status.

The main reason for the increase in likelihood points for the Moderate risk category versus the Low risk category when considering a foreseeable future of 100 years was the general perception by most SRT members that the species is likely to face more challenging conditions over the longer time frame, given the currently available predictions regarding climate change impacts, ocean acidification, and increasing sea otter populations. However, the SRT also recognized that there is more uncertainty associated with our understanding of and predictions regarding these threats and their effects on the species over the longer time frame. Additional sources of uncertainty include: the lack of information regarding how naturally occurring events may affect the species into the future (*e.g.,* IPOs, predation); the unpredictability of some threats (*e.g.,* oil spills, climate change impacts); and the potential for pinto abalone to adapt to changing climate and conditions, as well as to recover from low abundances, which has been observed for other abalone species. We considered all of these factors when considering the SRT's assessment in our final determination of overall extinction risk for the species.

Consideration of ''Significant Portion of Its Range''

The ESA defines an ''endangered'' species as ''any species which is in danger of extinction throughout all or a significant portion of its range,'' and a ''threatened'' species as ''any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.'' On July 1, 2014, the USFWS and NMFS issued a final policy on the interpretation and application of the phrase ''significant portion of its range'' under the ESA (79 FR 37578; ''Final Policy''). Under this policy, the phrase ''significant portion of its range'' provides an independent basis for listing a species under the ESA. In other words, a species would qualify for listing if it is determined to be endangered or threatened throughout all of its range or if it is determined to be endangered or threatened throughout a significant portion of its range. This policy defines the term ''significant'' as follows: ''a portion of the range of a species is 'significant' if the species is not currently endangered or threatened throughout its range, but the portion's contribution to the viability of the species is so important that, without the members in that portion, the species would be in danger of extinction, or likely to become so in the foreseeable future, throughout all of its range.'' The range of the species is defined as ''the general geographical area within which that species can be found at the time FWS or NMFS makes any particular status determination.''

The Final Policy explains that it is necessary to fully evaluate a portion for potential listing under the ''significant portion of its range'' authority only if information indicates that the members of the species in a particular area are likely *both* to meet the test for biological significance *and* to be currently endangered or threatened in that area. Making this preliminary determination triggers a need for further review, but does not prejudge whether or not the portion actually meets these standards such that the species should be listed:

> To identify only those portions that warrant further consideration, we will determine whether there is substantial information indicating that (1) the portions may be significant and (2) the species may be in danger of extinction in those portions or likely to become so within the foreseeable future. We emphasize that answering these questions in the affirmative is not a determination that the species is endangered or threatened throughout a significant portion of its range—rather, it is a step in determining whether a more detailed analysis of the issue is required (79 FR 37586; July 1, 2014).

Thus, the preliminary determination that a portion may be both significant and endangered or threatened merely requires NMFS to engage in a more detailed analysis to determine whether the standards are *actually* met. *Id.* at 37587. Unless both are met, listing is not warranted. The Final Policy explains that, depending on the particular facts of each situation, NMFS may find it is more efficient to address the significance issue first, but in other cases it will make more sense to examine the status of the species in the potentially significant portions first. Whichever question is asked first, an affirmative answer is required to proceed to the second question. *Id.* (''[I]f we determine that a portion of the range is not ''significant,'' we will not need to determine whether the species is endangered or threatened there; if we determine that the species is not endangered or threatened in a portion of its range, we will not need to determine if that portion was ''significant.''). Thus, if the answer to the first question is negative—whether that regards the significance question or the status question—then the analysis concludes and listing is not warranted.

In keeping with the process described in the Final Policy, to inform NMFS' assessment of whether pinto abalone are endangered or threatened throughout all or a significant portion of its range, we asked the SRT to conduct a 3-step process. First, to help identify any potentially significant portions of the species' range, the SRT was asked to evaluate whether any portions of the range may be significant and whether the members of the species in those portions may be endangered or threatened. Second, if any potentially significant portions of the range were identified, we then asked the SRT to evaluate the level of extinction risk faced by the species within those portions. Third, if the SRT's assessment of extinction risk indicated that the species is at risk of extinction now or likely to become so in the foreseeable future within any of the portions, we asked the SRT to evaluate whether under a hypothetical scenario, the portion's contribution to the viability of the species is so important that, without the members in that portion, the remainder of the species would be at risk of extinction now or in the foreseeable future. If the SRT's assessment does not indicate that the species is at risk of extinction now or likely to become so in the foreseeable future within any of the portions, then the SRT would not need to conduct this last step of examining the actual biological significance of the portion.

Thus, under the process contemplated in the Final Policy and followed by the SRT, the status question was evaluated first, and the significance question would only be reached if the evaluation of status yielded a conclusion that the species is endangered or threatened in a particular portion. In fact, as is explained below, no portions of the range were evaluated for ''significance'' because the analysis indicated that no portions contained members of the species that were actually at risk of extinction presently or likely to become so within the foreseeable future. We summarize the SRT's analysis below; the status review report provides further details. Final determinations were made by NMFS upon consideration of the SRT's evaluation (see ''Final Determinations'' section of this notice).

To identify potentially significant portions of the species' range (SPR), the SRT was presented the following portions and each member was asked to indicate (Yes/No) whether they thought the portion may be significant (based on the final SPR policy's definition of ''significant'') and whether members of the species within that portion may be considered threatened or endangered: Alaska (AK), British Columbia (BC), San Juan Islands Archipelago (SJA), Northern California (NorCal), Southern California (SoCal), and Mexico (MX). Only two of the eight voting members indicated that British Columbia may be significant and only one member indicated that Alaska may be significant. None of the SRT members indicated that the remaining portions (SJA, NorCal, SoCal, and MX) may be significant. Overall, the SRT agreed that none of these portions contribute substantially to the viability of the species such that the loss of that portion would put the species in danger of extinction presently or in the foreseeable future. Thus, none of these portions were considered as potential SPRs on their own. However, at least half of the SRT members indicated that the species may be threatened or endangered in AK, BC, SJA, SoCal, and MX. These portions were considered together as a potential SPR, according to the approach by Waples *et al.* (2007) for identifying SPRs.

The SRT also evaluated the following larger portions: (a) The Northern portion of the species range (AK/BC/SJA); and (b) the Southern portion of the species range (NorCal/SoCal/MX). The Northern and Southern portions were delineated based on the geographic proximity of the areas and what appears to be a natural gap in the species' range between Washington and California (based on the absence of pinto abalone observations along the outer coasts of Washington and Oregon, except for a handful of pinto abalone found off Oregon). More than half of the SRT members indicated that the Northern portion may be significant, because this portion encompasses a large part of the species' range, including areas that historically supported the greatest numbers of pinto abalone (British Columbia). More than half of the SRT members also indicated that the Northern portion may be threatened or endangered, based on the declines in pinto abalone abundance from historical levels, increasing sea otter populations in several areas, and what appears to be recruitment failure in the San Juan Islands Archipelago. More than half of the SRT members indicated that the Southern portion may be significant, based on the large area encompassed by this portion and evidence of recent recruitment throughout California and Mexico, which could benefit the species throughout its range. Half of the SRT members indicated that the Southern portion may be threatened or endangered based on the declines in pinto abalone abundance from historical levels, but expressed a high degree of uncertainty regarding this question. To be conservative, the SRT included both the Northern and Southern portions as potential SPRs for further consideration.

The SRT was then asked to evaluate the level of extinction risk to the species within these three potential SPRs, using the same methods that were used to evaluate the overall extinction risk to the species throughout its range. For each of the three potential SPRs, each SRT member distributed 10 likelihood points among the following five levels of extinction risk: No/Very Low, Low, Moderate, High, and Very High risk. The SRT assessed extinction risk to the species now and in the foreseeable future, considering both a 30-year and a 100-year time frame for foreseeable future.

For the Northern portion (AK/BC/SJA), the SRT concluded that pinto abalone have a low to moderate level of extinction risk now and in the foreseeable future over both the 30-year and 100-year time frame. Likelihood points attributed to the categories for the level of extinction risk now and in a foreseeable future of 30 years were as follows: No or Very Low Risk (14/80, or 18 percent), Low Risk (29/80, or 36 percent), Moderate Risk (30/80, or 38 percent), High Risk (7/80, or 9 percent), Very High Risk (0/80, or 0 percent). None of the SRT members placed likelihood points in the Very High risk category and few points were placed in the High risk category. The majority (54 percent) of likelihood points were placed in the No/Very Low and Low risk categories. The categories with the greatest number of points were the Low (29 points) and Moderate (30 points) risk categories. Likelihood points attributed to the categories for the level of extinction risk now and in a foreseeable future of 100 years were as follows: No or Very Low Risk (11/80, or 14 percent), Low Risk (19/80, or 24 percent), Moderate Risk (31/80, or 39 percent), High Risk (17/80, or 21 percent, Very High Risk (2/80, or 3 percent). When considering a foreseeable future of 100 years rather than 30 years, most of the SRT members shifted some of their points from the No/Very Low and Low risk categories to the Moderate and High risk categories. In general, more points were placed in the No/Very Low and Low risk categories (total: 30 points) than in the High and Very High risk categories (total: 19 points). The category with the greatest number of points was the Moderate risk category (31 points).

For the Southern portion, the SRT concluded that the species has a Low risk of extinction now and in a foreseeable future of 30 years and a Low to Moderate risk of extinction now and in a foreseeable future of 100 years. Likelihood points attributed to the categories for the level of extinction risk now and in a foreseeable future of 30 years were as follows: No or Very Low Risk (25/80, or 31 percent), Low Risk (37/80, or 46 percent), Moderate Risk (18/80, or 23 percent), High Risk (0/80, or 0 percent), Very High Risk (0/80, or 0 percent). None of the SRT members placed likelihood points in the High or Very High risk categories. The majority (77 percent) of likelihood points was placed in the No/Very Low and Low risk categories; these were also the categories with the greatest number of points (25 and 37 points, respectively).

Likelihood points attributed to the categories for the level of extinction risk now and in a foreseeable future of 100 years were as follows: No or Very Low Risk (17/80, or 21 percent), Low Risk (28/80, or 35 percent), Moderate Risk (30/80, or 38 percent), High Risk (5/80, or 6 percent), Very High Risk (0/80, or 0 percent). When considering a foreseeable future of 100 years rather than 30 years, most of the SRT members shifted some of their points from the No/Very Low and Low risk categories to the Moderate and/or High risk categories. However, the majority of points remained in the No/Very Low and Low risk categories (total: 45 points or 56 percent). The categories with the greatest number of points were the Low (28 points) and Moderate (30 points) risk categories.

For the AK/BC/SJA/SoCal/MX portion, the SRT concluded that the species has a Low risk of extinction now and in a foreseeable future of 30 years and a Low to Moderate risk of extinction now and in a foreseeable future of 100 years. Likelihood points attributed to the categories for the level of extinction risk now and in a foreseeable future of 30 years were as follows: No or Very Low Risk (22/80, or 28 percent), Low Risk (34/80, or 43 percent), Moderate Risk (23/80, or 29 percent), High Risk (1/80, or 1 percent), Very High Risk (0/80, or 0 percent). None of the SRT members placed likelihood points in the Very High risk category and only one member placed a likelihood point in the High risk category. The majority (71 percent) of likelihood points were placed in the No/Very Low and Low risk categories. The category with the greatest number of points was the Low risk category (34 points). Likelihood points attributed to the categories for the level of extinction risk now and in a foreseeable future of 100 years were as follows: No or Very Low Risk (15/80, or 19 percent), Low Risk (29/80, or 36 percent), Moderate Risk (30/80, or 38 percent), High Risk (6/80, or 8 percent), Very High Risk (0/80, or 0 percent). When considering a foreseeable future of 100 years rather than 30 years, most of the SRT members shifted some of their points from the No/Very Low and Low risk categories to the Moderate and/or High risk categories. None of the SRT members placed any likelihood points in the Very High risk category and few points were placed in the High risk category. The majority (55 percent) of points were placed in the No/Very Low and Low risk categories. The categories with the greatest number of points were the Low (29 points) and Moderate (30 points) risk categories.

Overall, the SRT expressed greater concern regarding extinction risk to the species within the Northern portion of its range (AK/BC/SJA) than in the Southern portion (NorCal/SoCal/MX) or the AK/BC/SJA/SoCal/MX portion (encompassing all areas excluding Northern California). The SRT focused on long-term declining trends throughout much of the Northern portion, and threats posed by continuing personal use and subsistence harvest in Alaska, the recovery of sea otter populations in several locations, and potential climate change and ocean acidification impacts. Evidence of recent and recurring recruitment in a number of areas throughout the Southern portion was a major factor in the SRT's assessment of lower risk for this portion and for the AK/BC/SJA/SoCal/MX portion. For the AK/BC/SJA/SoCal/MX portion, the majority of the SRT considered the inclusion of Southern California and Mexico as providing a buffer from threats that may be more pronounced in the Northern portion than in the Southern portion. The SRT also expressed greater concern, as well as greater uncertainty, regarding extinction risk to the species when considering a foreseeable future of 100 years compared to 30 years for all three portions.

The SRT concluded that Low to Moderate risks to the species within any of these portions and over either time frame were the most plausible. The SRT did not believe that the species is likely to be at High or Very High risk of extinction in any of the portions over either time frame. In the ''Final Determinations'' section of this notice, we discuss our consideration of the SRT's conclusions in determining whether the species is at risk of extinction now or likely to become so in the foreseeable future within any of these three potential SPRs.

Efforts Being Made To Protect the Species

Section 4(b)(1)(A) of the ESA requires the Secretary of Commerce to consider ''efforts, if any, being made by any State or foreign nation, or any political subdivision of a State or foreign nation, to protect such species, whether by predator control, protection of habitat and food supply, or other conservation practices, within any area under its jurisdiction or on the high seas.'' Therefore, in making a listing determination, we first assess a species' level of extinction risk and identify factors that have led to its decline. We then assess existing efforts being made to protect the species to determine if those measures ameliorate the risks.

In judging the efficacy of certain protective efforts, we rely on the joint NMFS-U.S. Fish and Wildlife Service (FWS) ''Policy for Evaluation of Conservation Efforts When Making Listing Decisions'' (''PECE'', 68 FR 15100; March 28, 2003). PECE provides direction for the consideration of formalized conservation efforts, such as those identified in conservation agreements, conservation plans, management plans, or similar documents (developed by Federal agencies, state and local governments, Tribal governments, businesses, organizations, and individuals), that have not yet been implemented, or have been implemented but have not yet demonstrated effectiveness.

In determining whether a formalized conservation effort contributes to a basis for not listing a species, or for listing a species as threatened rather than endangered, we must evaluate whether the conservation effort improves the status of the species under the ESA. Two factors are key in that evaluation: (1) For those efforts yet to be implemented, the certainty that the conservation effort will be implemented and (2) for those efforts that have not yet demonstrated effectiveness, the certainty that the conservation effort will be effective. Evaluations of the certainty an effort will be implemented include whether: The necessary resources (*e.g.,* funding and staffing) are available; the requisite agreements have been formalized such that the necessary authority and regulatory mechanisms are in place; there is a schedule for completion and evaluation of the stated objectives; and (for voluntary efforts) the necessary incentives are in place to ensure adequate participation. The evaluation of the certainty of an effort's effectiveness is made on the basis of whether the effort or plan: Establishes specific conservation objectives; identifies the necessary steps to reduce threats or factors for decline; includes quantifiable performance measures for the monitoring of compliance and effectiveness; incorporates the principles of adaptive management; and is likely to improve the species' viability at the time of the listing determination.

PECE also notes several important caveats. Satisfaction of the above mentioned criteria for implementation and effectiveness establishes a given protective effort as a candidate for consideration, but does not mean that an effort will ultimately change the risk assessment. The policy stresses that just as listing determinations must be based on the viability of the species at the time of review, so they must be based on the state of protective efforts at the time of the listing determination. PECE does not provide explicit guidance on how protective efforts affecting only a portion of a species' range may affect a listing determination, other than to say that such efforts will be evaluated in the context of other efforts being made and the species' overall viability.

Conservation measures that may apply to listed species include conservation measures implemented by tribes, states, foreign nations, local governments, and private organizations. Also, Federal, tribal, state, and foreign nations' recovery actions (16 U.S.C. 1533(f)), Federal consultation requirements (16 U.S.C. 1536), and prohibitions on taking (16 U.S.C. 1538) constitute conservation measures. In addition, recognition through federal or state listing promotes public awareness and conservation actions by Federal, state, tribal governments, foreign nations, private organizations, and individuals.

The following is a review of the major conservation efforts and an evaluation of whether these efforts are reducing or eliminating threats by having a positive conservation benefit and thus improving the status of the pinto abalone.

Alaska: Pinto Abalone Monitoring Plan

In the past, ADF&G has not conducted fishery-independent monitoring of pinto abalone populations. Instead, opportunistic observations of pinto abalone were recorded while surveying other species. The SRT identified this as an important data gap contributing to the high degree of uncertainty regarding the status of the species in Alaska. Fishery-independent surveys focused on pinto abalone will be particularly informative for assessing population abundance and trends in response to harvest pressure (*e.g.,* from continuing personal use and subsistence harvest) and sea otter predation and, as needed, making sound management decisions.

ADF&G recently conducted monitoring surveys for pinto abalone in Alaska. At the American Academy of Underwater Sciences (AAUS) conference in September 2014, a pinto abalone dive workshop was held in which participants surveyed eight sites within Sitka Sound (pers. comm. with K. Hebert, ADF&G, on 25 September 2014). Workshop participants counted and measured pinto abalone along transects and recorded habitat observations. The surveys are a first step toward developing a pinto abalone monitoring program in Alaska. In a letter to NMFS on October 6, 2014 (Ingle 2014), ADF&G stated their commitment to developing a directed monitoring program for pinto abalone in Alaska. In partnership with the Sitka Sound Science Center, ADF&G was awarded a 2-year grant from Alaska Sea Grant to begin a monitoring program for pinto abalone and kelp forests in Sitka Sound. ADF&G plans to establish long-term monitoring at several index sites throughout southeast Alaska to estimate abalone density, population size structure, and abundance and to document habitat characteristics. The goal of such a monitoring program would be to monitor population trends over time. In addition, ADF&G plans to evaluate the impacts of sea otter predation on abalone through monitoring of index sites both within and outside of the current range of sea otters. ADF&G has already initiated efforts to seek funding for development and implementation of the monitoring program beyond the 2-year Alaska Sea Grant.

Based on our judgment, development and implementation of a long-term pinto abalone and kelp forest monitoring program will benefit the species in Alaska and inform our evaluation of the species status and ADF&G's future management decisions to address threats to the species. ADF&G has already conducted pilot surveys and begun establishing partnerships and seeking the funding needed to develop and implement the planned monitoring program. Thus, we believe that the level of certainty that this monitoring program will be implemented is fairly high, but the extent to which it is actually implemented will be dependent on funding. Implementation of this monitoring program would not reduce risks to the species, but it would provide data to inform our understanding of the species' status and provide the basis for future actions to reduce the species' extinction risk.

British Columbia: SARA Listing and Recovery Plan

Pinto abalone are currently listed as endangered (*i.e.,* facing imminent extirpation or extinction) in British Columbia under Canada's Species at Risk Act (SARA). This listing was based on continued low population numbers and declines despite the closure of abalone fisheries throughout British Columbia since 1990. The species was first assessed in 1999 by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and designated as threatened by COSEWIC in 2000 and later under SARA in 2003. COSEWIC re-examined and up-listed pinto abalone to endangered in 2009, due to continued population declines primarily attributed to poaching (COSEWIC 2009). Up-listing to endangered status under SARA followed in 2011. Pinto abalone are also included on British Columbia's Red-list, with a global status of G3G4 (indicating uncertainty regarding the species' status as vulnerable or apparently secure) and a provincial status of S2 (*i.e.,* imperiled in the nation or state/province because of rarity due to very restricted range, very few populations, steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province) (BC Conservation Data Centre 2014).

SARA prohibits killing, harming, harassing, possessing, and buying or selling an individual or its parts (including the shell); these prohibitions apply to both farm-raised and wild pinto abalone (COSEWIC 2009). Although fisheries harvest has been prohibited since 1990, poaching has continued to pose a major threat to pinto abalone in British Columbia (Lessard *et al.* 2007). To address this threat, protocols have been established to track abalone sold on the market, to deter the sale of wild abalone as cultured abalone (COSEWIC 2009). In addition, enforcement patrols, prosecution of poaching cases, and stewardship programs, such as the CoastWatch program, aim to reduce illegal harvest (DFO 2012). Preliminary data from the most recent index site surveys in 2012 and 2013 indicate a decrease in mortality associated with illegal harvest, likely due to these enforcement and stewardship efforts (pers. comm. with Joanne Lessard, DFO, on 24 April 2014).

In 2007, DFO finalized a Recovery Strategy (DFO 2007) for pinto abalone in Canada that sets goals and objectives for halting and reversing the decline of the species and identifies the main areas of activities to be undertaken. In 2012, the DFO finalized the Action Plan (DFO 2012) to guide implementation of the Recovery Strategy. The Recovery Strategy and Action Plan set specific population and distribution objectives as well as short-term (10-year) and long-term (30-year) recovery targets for pinto abalone. The Action Plan identifies recovery activities to address threats, monitor status, and support rebuilding of pinto abalone populations, and also identifies critical habitat for pinto abalone within four areas in British Columbia. Few activities were identified as likely to destroy critical habitat, and the overall estimated impact of works or developments in critical habitat areas was rated as low. An assessment protocol has been established that specifies criteria to avoid harmful alteration, disruption, or destruction of critical habitat (Lessard *et al.* 2007). This protocol applies to works or development proposed to occur in, on, or under water within pinto abalone critical habitat. In addition to DFO's Recovery Strategy and Action Plan, several First Nations and coastal communities have developed area-based Community Action Plans with similar goals and objectives to support the long-term recovery of pinto abalone.

Many of the protections and conservation efforts identified in the Recovery Strategy and Action Plan have been ongoing for several years. DFO continues to conduct index site surveys every 4–5 years, providing valuable time series and size frequency data to monitor population status. Adult translocations have been conducted at various locations, and preliminary results from one site (Broken Group Islands) indicate success in increasing juvenile densities (Lessard *et al.* 2007, pers. comm. with Joanne Lessard, DFO, cited in COSEWIC 2009). Outplanting studies have also been conducted at various locations between 2000 and 2010, through partnerships between DFO, First Nations, and other coastal communities (DFO 2012). Results from Barkley Sound show that outplanted abalone experience high mortality and/or emigration rates, but that outplanted individuals made up to 26 percent of the observed abalone at the sites (Read *et al.* 2012). Education and outreach efforts continue to raise awareness regarding the status of pinto abalone and reduce poaching pressure. Under DFO's Recovery Strategy and Action Plan, these protections and conservation efforts will continue to be implemented, evaluated, improved, and added to as new information becomes available.

Based on the criteria in the PECE policy, in our judgment the DFO Recovery Strategy and Action Plan have a high certainty of implementation because many of the actions are ongoing and DFO has the management authority, resources, and partnerships to continue carrying out these actions. We also anticipate that implementation of the Recovery Strategy and Action Plan is highly likely to be effective at substantially reducing the overutilization of pinto abalone as well as the demographic risks facing the species. For example, preliminary results from the 2012 and 2013 index site surveys at Haida Gwaii and along the Central Coast indicate that the reduction in poaching has allowed populations to rebound, with densities at some sites exceeding the short-term recovery targets. We anticipate that ongoing and further protections and conservation efforts will benefit the status of the species in the foreseeable future, decreasing the species' extinction risk.

Washington: Ongoing Conservation Efforts and Draft Recovery Plan

Since the early 2000s, the WDFW, Puget Sound Restoration Fund (PSRF), University of Washington, Jamestown S'Klallam Tribe, NOAA, and other partners have worked together to advance the recovery of pinto abalone in Washington State, focusing on the area around the San Juan Island Archipelago (see Vadopalas and Watson 2013). With the establishment of a hatchery for pinto abalone rearing and restoration studies at NOAA's Mukilteo facility in 2003, much progress has been made in the development of successful captive propagation and grow-out methods, as well as in understanding the effects of rearing conditions, salinity, temperature, and ocean acidification on abalone survival and behavior. Field studies have been conducted to inform the prioritization and development of enhancement activities, including abalone recruitment studies, experimental out-plantings with larvae and juveniles, adult aggregations, and tagging trials. In addition, a public outreach campaign was initiated to inform the public about the status of pinto abalone in Washington.

A final recovery plan for pinto abalone in Washington (Vadopalas and Watson 2013) was developed in collaboration between WDFW, University of Washington (Friedman Lab), PSRF, NOAA NMFS Mukilteo Research Station, Baywater, Inc., Western Washington University's Shannon Point Marine Center, and the Jamestown S'Klallam Tribe. The plan summarizes the biology, life history, and status of pinto abalone in the San Juan Islands Archipelago, provides an overview of recovery efforts to date, and establishes a plan for recovering the species, including goals and objectives, recommended approaches, and an evaluation of potential recovery strategies. To achieve the long-term goal of halting the decline of pinto abalone and recovering populations to a self-sustainable level, the plan focuses on aggregation and supplementation activities, drawing upon what has been learned from collaborative restoration efforts thus far to guide future efforts.

The plan includes clear objectives, identification of threats to the species, and a diversity of specific strategies to address those threats, including monitoring and evaluation criteria and an adaptive management approach. Implementation of the plan would ensure continuation of current protections, raise awareness of pinto abalone, and contribute to recovery through active enhancement efforts, using a multi-faceted approach involving investigation of several strategies (*e.g.,* aggregation, out-planting) that have been shown to have the potential to enhance wild populations. We recognize that the plan is not a State Environmental Policy Act (SEPA) document that has been vetted through a public review process. In addition, the plan does not identify funding sources to support the captive propagation and enhancement activities. WDFW has the legal authority and responsibility to carry out management (*e.g.,* maintain harvest closures) and recovery of pinto abalone, and has already established partnerships that are needed to effectively carry out the plan. Based on the success of past and ongoing collaborative efforts, we are fairly certain that the protections and conservation efforts described in the plan will be implemented. However, funding will determine to what extent enhancement efforts are implemented, and we cannot be certain what amount of funding will be available at this time. Overall, we anticipate that implementation of the recovery actions under the recovery plan would be highly likely to be effective at substantially reducing the demographic risks currently facing pinto abalone populations at the San Juan Islands Archipelago and decrease the species' extinction risk.

California: Abalone Recovery and Management Plan

In 1997, passage of the Thompson bill (AB 663) in California created a moratorium on the taking, possessing, or landing of abalone for commercial or recreational purposes in ocean waters south of San Francisco (including at all offshore islands), and also mandated the creation of an Abalone Recovery and Management Plan (ARMP), with a requirement that the California Fish and Game Commission undertake abalone management in a manner consistent with this plan. The ARMP was finalized by the CDFW and adopted by the California Fish and Game Commission in December 2005. It includes all of California's abalone species, providing a cohesive framework for the recovery of depleted abalone populations in southern California and for the management of the northern California fishery and future abalone fisheries. The recovery portion of the plan addresses all abalone species that are subject to the fishing moratorium (including pinto abalone), with the ultimate goal of recovering species from a perilous condition to a sustainable one, with a margin of abalone available for fishing. The management portion of the plan applies to populations considered sustainable and fishable (*e.g.,* the current red abalone fishery north of San Francisco), with the goal of maintaining sustainable fisheries under a long-term management plan that can be adapted quickly to respond to environmental or population changes. The ARMP identifies timelines, estimated costs, and funding sources for implementing the recovery and management actions.

The recovery portion of the ARMP specifies several actions to assess the status of the species and enhance populations. These include: Exploratory surveys to evaluate current population levels and the location of aggregations; detailed surveys of known abalone habitat; assessment surveys to evaluate achievement of recovery criteria and goals; disease and genetics research; the development or support of existing culture programs; and out-planting and aggregation/translocation feasibility studies and, if successful, large-scale efforts. Given limited resources, the plan primarily focuses on red, pink, green, white, and black abalone, because these species made up the majority of the commercial and recreational fishery and are more commonly encountered. The ARMP includes focused assessment surveys for pinto abalone, but other actions will be conducted in conjunction with those for the other species. For example, exploratory surveys for pinto abalone will be conducted as part of exploratory surveys for the five major species. Pinto abalone have been documented during surveys for other abalone species over the past 15 years, and will continue to be recorded during surveys for emergent abalone and monitoring of recruitment modules that have been deployed throughout southern California (4 sites) and in northern California (one site). Because the specific habitat and depth requirements of pinto abalone may differ from the other species, these surveys may or may not provide an accurate assessment of pinto abalone population levels in California. Enhancement activities (*e.g.,* culture programs, out-planting and aggregation/translocation studies) will focus on the other abalone species. Although the information gained from these studies will likely benefit future enhancement efforts for pinto abalone, the direct benefits to the species are limited at this time.

The ARMP also calls for the establishment of new marine protected areas or MPAs (in addition to those already established) to protect and preserve abalone populations. The State recently established new MPAs as part of the Marine Life Protection Act (MLPA; FGC § 2852) process in areas throughout the California coast. Depending on their location and specific regulations, some MPAs may provide increased protection for pinto abalone and their habitat. In addition, the ARMP discusses enhanced enforcement efforts that include routine patrols of tidal areas, boat patrols, undercover operations, spot-checks of fishing licenses and abalone permit report cards, abalone checkpoints, and community outreach and education regarding overfishing and ocean stewardship. These efforts are likely to reduce the risk of poaching to pinto abalone.

In our judgment, the recovery actions and increased enforcement efforts under the ARMP are not necessarily certain to occur due to funding limitations but would be beneficial to the persistence of pinto abalone. We anticipate enforcement efforts will help reduce extinction risk to the species by reducing the risk of overutilization and poaching, both of which were considered by the SRT to pose moderate risk to the species. In addition, assessment surveys for pinto abalone and opportunistic observations during surveys for other abalone will provide additional data to inform assessments of the species' status and trends. However, the lack of long-term monitoring and enhancement efforts focused on pinto abalone limits the effectiveness of the ARMP in addressing current demographic risks to the species. An important question is whether and how the habitat and depth distribution of pinto abalone may differ from other abalone species, to evaluate the degree of overlap between the species.

National Marine Sanctuary Regulations

Three coastal national marine sanctuaries in California contain habitat suitable for pinto abalone: Channel Islands National Marine Sanctuary (CINMS), Monterey Bay National Marine Sanctuary (MBNMS), and Gulf of the Farallones National Marine Sanctuary (GFNMS). At all three sanctuaries, the inshore boundary extends to the mean high water line, thus encompassing intertidal habitat.

Federal regulations (which are similar at all three sites) for these National Marine Sanctuaries provide protection against some of the threats to pinto abalone. For example, direct disturbance to or development of pinto abalone habitat is regulated at all three sanctuaries by way of a prohibition on the alteration of, construction upon, drilling into, or dredging of the seabed (including the intertidal zone), with exceptions for anchoring, installing navigation aids, special dredge disposal sites (MBNMS only), harbor-related maintenance, and bottom tending fishing gear in areas not otherwise restricted. Water quality impacts to pinto abalone habitat are regulated by strict discharge regulations prohibiting the discharge or deposit of pollutants, except for effluents required for normal boating operations (*e.g.,* vessel cooling waters, effluents from marine sanitation devices, fish wastes and bait). In addition, CDFW has established networks of marine reserves and marine conservation areas within the CINMS and along portions of the MBNMS, where multi-agency patrols provide elevated levels of enforcement presence and increased protection against poaching of pinto abalone.

We anticipate that enforcement of these management plans and regulations will be effective at reducing the risk of poaching and habitat destruction or alteration for pinto abalone populations within the sanctuaries. The level of benefits to the species' status is uncertain, however, because we lack data to understand what proportion of the populations reside within the sanctuaries. Each of the sanctuaries is currently undergoing management plan review processes, which may result in changes to the regulations. However, the level of protection provided to pinto abalone is not expected to decrease, and possibly may increase should stricter regulations regarding large vessel discharges and proposed prohibitions on the release of introduced species be adopted.

IUCN and NMFS Species of Concern Listings

The pinto abalone was added to the IUCN Red List in 2006 (McDougall *et al.* 2006). The IUCN listing raises public awareness of the species but does not provide any regulatory protections to address threats to the species. The pinto abalone was also added to the NMFS Species of Concern List in 2004 (69 FR 19975; 15 April 2004). Species of Concern are those species about which we have some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the ESA. Although inclusion on the Species of Concern List does not carry any procedural or substantive protections under the ESA, it does draw proactive attention and conservation action to the species. In addition, funding under the Species of Concern grant program has been provided to support research and conservation efforts for pinto abalone in the past, including components of Washington's pinto abalone recovery efforts, as described above, and studies on the effects of ocean acidification on pinto abalone. Funding for new grants, however, has not been available since 2011. In general, the listings under the IUCN Red List and NMFS Species of Concern List benefit the persistence of pinto abalone by promoting public awareness of the species. However, it is difficult to evaluate how effective this will be in reducing threats to pinto abalone.

Final Determination

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, being made by any state or foreign nation, or political subdivisions thereof, to protect and conserve the species. We have reviewed the petition, public comments submitted on the 90-day finding, the status review report, and other available published and unpublished information, and have consulted with species experts and other individuals familiar with pinto abalone. We considered each of the five ESA statutory factors to determine whether any presented an extinction risk to the species on its own or in combination with other factors. As required by the ESA section 4(b)(1)(a), we also took into account efforts to protect pinto abalone by the states, Tribes, foreign nations, or other entities and evaluated whether those efforts provide a conservation benefit to the species. On the basis of the best available scientific and commercial information, we conclude that the pinto abalone is not presently in danger of extinction, nor is it likely to become so in the foreseeable future, throughout all or a significant portion of its range. Below, we summarize the factors supporting this conclusion.

In our assessment of the five ESA statutory factors, we agree with the SRT's conclusion that the identified stressors represent low to moderate threats to the species. Among the moderate threats, the SRT identified the following as threats of greater concern: Low densities resulting from historical fisheries harvest; illegal take due to poaching and inadequate enforcement; sea otter predation; and ocean acidification impacts. Prohibitions on pinto abalone harvest throughout most of the species' range have largely removed the threat of over-utilization. Although populations continue to remain at low densities, recent/recurring recruitment events indicate that the densities are high enough to support successful reproduction and recruitment in Alaska, British Columbia, Northern and Southern California, and Mexico. Poaching was a major threat hindering the recovery of populations in British Columbia, but recent evidence indicates that enforcement and outreach efforts have been effective at reducing illegal take and allowing population numbers to increase. Regulations are in place, but continued enforcement and monitoring are needed throughout the range to evaluate their effectiveness. Sea otter predation has contributed to population declines and/or lack of recovery in pinto abalone populations where the two species overlap, but in no case has local extinction of any abalone population or species in the northeastern Pacific been documented as a result of predation by sea otters. Researchers in British Columbia have reported higher pinto abalone densities at survey sites where sea otters are present compared to sites where sea otters are absent (pers. comm. with J. Lessard, DFO, 24 April 2014), showing that the population level impacts of increasing sea otter presence may vary. Overall, the SRT concluded, and we agree, that the two species can sustainably co-exist. Finally, ocean acidification could affect pinto abalone populations and their habitat in the future, but there is a high level of uncertainty regarding the magnitude, scope, and nature of these effects. Overall, we did not identify any factors or combinations of factors that are contributing significantly to the species' extinction risk now or in the foreseeable future. Therefore, we conclude that pinto abalone are not endangered or threatened due to any of the five ESA statutory factors.

In evaluating the overall risk to the species throughout its range, we relied on the SRT's assessment of overall extinction risk and the best available information regarding the species' status and ongoing and future conservation efforts. We asked the SRT to assess the overall level of extinction risk to the species now and in the foreseeable future, considering two time frames: 30 years and 100 years. Thirty years represents about three generation times for pinto abalone and is a reasonable time frame over which threats can be predicted reliably and their impacts to the biological status of the species may be observed. This time frame for foreseeable future is also consistent with what was used in the status review for black abalone (VanBlaricom *et al.* 2009) and by the IUCN (McDougall *et al.* 2006) and COSEWIC (2009) in their assessments of the status of pinto abalone. The 100-year time frame was also used to consider the impacts of longer-term threats, such as climate change and changes in oceanographic conditions, but introduces additional uncertainty into the analysis. We decided to consider the SRT's assessment over both time frames; however, we put more weight on the SRT's assessment over a foreseeable future of 30 years, because there is greater certainty in this assessment (*i.e.,* we can more reliably predict the threats and their impacts over the 30-year time frame than the 100-year time frame). We note, however, that the SRT's assessment over both time frames led to the same conclusion regarding the species' extinction risk, as discussed below.

Over the 30 year time frame, the SRT was fairly certain that the species faces a Low to Moderate risk of extinction, but expressed some uncertainty as to the severity of threats and demographic risks. This uncertainty is expected, given the wide distribution of the species and varying levels of data available for different regions. The SRT placed the majority (55 percent) of their likelihood points in the No/Very Low and Low risk categories, indicating that Low risk may be more plausible over the 30 year time frame.

We also considered the SRT's assessment over a foreseeable future of 100 years. The SRT again concluded that the species has a Low to Moderate risk of extinction, but perceived slightly greater risk (*i.e.,* increased points in the Moderate risk category) to the species over a foreseeable future of 100 years compared to a foreseeable future of 30 years, citing increased concern regarding long-term threats such as ocean acidification, climate change impacts, and increasing sea otter predation. Again, the SRT noted increased uncertainty regarding these threats and their effects on the status of pinto abalone over the 100 year time frame. Although the perceived risk is slightly greater over the 100 year time-frame, the analysis ultimately indicated a Low to Moderate risk of extinction, consistent with the analysis over the 30 year time-frame.

In our evaluation of ongoing and future conservation efforts for pinto abalone, we found that conservation efforts throughout California, the San Juan Islands Archipelago, and British Columbia are highly likely to reduce threats to the species and its habitat. At the San Juan Islands Archipelago and British Columbia, enhancement activities directly focused on pinto abalone are highly likely to benefit pinto abalone populations and reduce the demographic risks currently affecting the species. Thus, these ongoing and future conservation efforts will further reduce the species' extinction risk now and in the foreseeable future, particularly in British Columbia and at the San Juan Islands Archipelago where the SRT expressed the most concern. Based on our evaluation of the best available information regarding the species' status and threats, the SRT's assessment of extinction risk, and our assessment of conservation efforts, we conclude that the pinto abalone has a Low to Low/Moderate risk of extinction now and in the foreseeable future. Based on our judgment, a Low to Low/Moderate risk of extinction indicates that pinto abalone are not presently in danger of extinction or likely to become so in the foreseeable future throughout its range.

In evaluating the overall risk to the species within a significant portion of its range, we relied on the SRT's identification and assessment of potential SPRs. The SRT identified three potential SPRs: A Northern portion (AK/BC/SJA), a Southern portion (NorCal/SoCal/MX), and a portion encompassing the whole range excluding Northern California (AK/BC/SJA/SoCal/MX). The SRT concluded that the Southern portion and AK/BC/SJA/SoCal/MX portion of the species range have a Low risk of extinction now and in a foreseeable future of 30 years and Low to Moderate risk of extinction now and in a foreseeable future of 100 years. For the same reasons as stated above, we considered the SRT's assessment for both time frames, but put more weight on the SRT's assessment over a foreseeable future of 30 years. Over both time frames, the SRT indicated that extinction risk of No/Very Low to Low was most plausible for the Southern portion (76 percent of points over a foreseeable future of 30 years; 56 percent of points over a foreseeable future of 100 years) and for the AK/BC/SJA/SoCal/MX portion (71 percent of points over a foreseeable future of 30 years; 55 percent of points over a foreseeable future of 100 years). The SRT was more certain of a No/Very Low to Low risk to the species over a foreseeable future of 30 years, whereas there was some uncertainty regarding whether the species may have a Low to Moderate risk over a foreseeable future of 100 years. As stated above, there are ongoing and future conservation efforts throughout California, San Juan Islands Archipelago, and British Columbia that have a high likelihood of reducing threats and demographic risks to the species. Based on the best available information regarding the species' status, the SRT's assessment of extinction risk, and our analysis of conservation efforts, we conclude that pinto abalone has a Low risk of extinction throughout the Southern portion and AK/BC/SJA/SoCal/MX portion now and in the foreseeable future. Based on our judgment, a Low risk of extinction indicates that pinto abalone are not presently in danger of extinction or likely to become so in the foreseeable future throughout the Southern portion or AK/BC/SJA/SoCal/MX portion of its range. Therefore, we determined that the species is not endangered or threatened throughout the Southern portion or the AK/BC/SJA/SoCal/MX portion of its range and did not need to address the question of whether these two potential SPRs are indeed significant.

For the potential SPR in the Northern portion of the species' range (AK/BC/SJA), the SRT concluded that there is a Low to Moderate risk of extinction now and in the foreseeable future (30 years and 100 years). For the same reasons as stated above, we considered the SRT's assessment for both time frames, but put more weight on the SRT's assessment over a foreseeable future of 30 years. When considering a foreseeable future of 30 years, the SRT placed the majority (54 percent) of their likelihood points in the No/Very Low and Low risk categories, indicating that No/Very Low to Low risk was the most plausible. When considering a foreseeable future of 100 years, the SRT indicated that Low to Moderate risk is more plausible, but expressed greater uncertainty regarding their assessment of risk because of greater uncertainty regarding threats (*e.g.,* climate change, ocean acidification, sea otter predation) and how they might affect pinto abalone into the future. We note that even over the 100 year time frame, the number of points in the No/Very Low and Low risk categories (total: 30 points) were almost equal to the number of points in the Moderate risk categories (31 points). Most of the SRT members expressed concern regarding the lack of population data in Alaska and the declines in pinto abalone abundance in British Columbia and at the San Juan Islands Archipelago. However, SRT members also noted evidence for recent/recurring recruitment in both Alaska and British Columbia and recent signs of recovery in British Columbia under the SARA protections and decreased poaching pressure. We found that in both British Columbia and at the San Juan Islands Archipelago, protective regulations and conservation efforts have been implemented that have a high likelihood of substantially reducing the demographic risks and threats facing the species. In both regions, Federal, state, and local governmental entities, Tribes, and non-governmental organizations have established strong partnerships and are working together on ongoing conservation and enhancement activities for the recovery of pinto abalone. In addition, ADF&G has indicated that they will conduct monitoring surveys for pinto abalone to better assess the species' status in Alaska. Based on the best available information regarding the species' status, the SRT's assessment of extinction risk, and our assessment of conservation efforts, we concluded that pinto abalone have a Low to Low/Moderate risk of extinction now and in the foreseeable future throughout the Northern portion. Based on our judgment, a Low to Low/Moderate risk indicates that pinto abalone are not presently in danger of extinction or likely to become so in the foreseeable future throughout the Northern portion of its range. Therefore, we determined that the species is not endangered or threatened throughout the Northern portion of its range and did not need to address the question of whether this potential SPR is indeed significant.

Based on these findings, we conclude that the pinto abalone is not presently in danger of extinction throughout all or a significant portion of its range, nor is it likely to become so within the foreseeable future. Accordingly, the pinto abalone does not meet the definition of a threatened or endangered species and therefore the pinto abalone does not warrant listing as threatened or endangered at this time. However, the species will remain on our NMFS Species of Concern list, with one revision to apply the Species of Concern status to the species throughout its range (currently, the Species of Concern status applies only to the species range from Alaska to Point Conception). We will continue to encourage research, monitoring, and conservation efforts for the species throughout its range.

We recognize that the status of pinto abalone has been assessed by various groups at the State and international level. Pinto abalone are considered a Species of Greatest Conservation Need (*i.e.,* not State ESA listed, but needing conservation action or additional information) and a Candidate Species for State ESA listing in Washington; as Endangered in Canada under SARA (as of 2011; originally listed as Threatened in 2003); and as Endangered on the

IUCN Red List as of 2006. However, these assessments and their conclusions do not directly inform our analysis of extinction risk for the pinto abalone. First, the criteria used for assessing whether a species warrants listing under the State ESA, Canada's SARA, or the IUCN Red List are different than the standards for making a determination that a species warrants listing as threatened or endangered under the Federal ESA. Second, the geographic scope considered in these assessments differed from the scope of our analysis. Washington State's review focuses on the status of the species within state waters. Canada's SARA listing focused on the status of the species within British Columbia, and also did not incorporate more recent data that has become available since 2011, showing decreased poaching pressure and increasing abundances at index survey sites. The IUCN Red List assessment focused on the status of the northern form of pinto abalone (Point Conception to Alaska), and was largely based on population trends in Alaska and British Columbia (McDougall *et al.* 2006). McDougall *et al.* (2006) cited the lack of overlap in abundance and low presence of the southern form relative to other California abalone species as reasons for focusing on the northern form. However, as we have discussed above (see ''The Species Question'' section), more recent evidence indicates that the degree of overlap between the northern and southern form is greater than previously thought. We considered the pinto abalone as one species throughout its range due to the lack of genetic, geographic, or ecological justification for treating the northern and southern forms as separate species. In addition, the ESA does not allow the consideration of distinct population segments for invertebrate species. Thus, our analysis of the species' status under the Federal ESA considered different standards and a broader geographic scope than these previous assessments.

In this status review, we identified several important data gaps that need to be addressed to inform our understanding of the status of the species. These data gaps include: pinto abalone abundance and trends in Alaska, California, and Mexico; past and present fisheries harvest levels in Alaska and Mexico; and the presence, distribution, and abundance of pinto abalone along the outer coast of Washington and Oregon. We encourage the following research and monitoring efforts to address these data gaps.

- In Alaska: (a) Establishment of regular, long-term monitoring of pinto abalone population abundance, trends, and distribution; and (b) monitoring and management of personal use and subsistence harvest to minimize impacts to pinto abalone. As discussed under the ''Summary of factors affecting the species'' (see the section on ''Overutilization''), ADF&G believes that personal use and subsistence harvest is currently low, but regulations still allow harvest of up to five pinto abalone per person per day. Monitoring would provide the data needed to estimate current harvest levels and to evaluate the impacts of these harvest levels (allowed and actual) on the pinto abalone population in Alaska.
- In Washington: Surveys to evaluate the presence, abundance, and distribution of pinto abalone along the outer coast of Washington.
- In Oregon: Surveys to evaluate the presence, abundance, and distribution of pinto abalone along the outer coast of Oregon. Revision of the fisheries regulations may also be needed to clarify that harvest of pinto abalone is prohibited.
- In California: Establishment of regular, long-term monitoring of pinto abalone population abundance, trends, and distribution.
- In Mexico: (a) Establishment of regular, long-term monitoring of pinto abalone population abundance, trends, and distribution; and (b) monitoring of pinto abalone harvest and, as needed, management measures to minimize impacts of fisheries harvest on pinto abalone. As discussed under the ''Summary of factors affecting the species'' (see the section on ''Overutilization''), current harvest levels of pinto abalone in Mexico are thought to be low. Monitoring would provide the data needed to estimate current harvest levels and their impacts on the pinto abalone population in Mexico.

Given the data gaps and uncertainties associated with our current understanding of the status of the species, we plan to retain pinto abalone on the NMFS Species of Concern list with one revision to apply the Species of Concern status throughout the species' range (Alaska to Mexico).

References

A complete list of all references cited herein is available on the NMFS West Coast Region Web site (*http://www.westcoast.fisheries.noaa.gov/*) and upon request (see **FOR FURTHER INFORMATION CONTACT**).

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

Dated: December 22, 2014.

Eileen Sobeck,

Assistant Administrator, National Marine Fisheries Service.

[FR Doc. 2014–30345 Filed 12–22–14; 4:15 pm]

BILLING CODE 3510–22–P

DEPARTMENT OF COMMERCE

National Oceanic and Atmospheric Administration

50 CFR Part 648

[Docket No. 141103917–4917–01]

RIN 0648–BE60

Magnuson-Stevens Fishery Conservation and Management Act Provisions; Fisheries of the Northeastern United States; Black Sea Bass Fishery; Framework Adjustment 8

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

ACTION: Proposed rule; request for comments.

SUMMARY: NMFS proposes regulations to implement Framework Adjustment 8 to the Summer Flounder, Scup, and Black Sea Bass Fishery Management Plan. This action would allow the black sea bass recreational fishery to begin on May 15 of each year, instead of May 19, to provide additional fishing opportunities earlier in the year.

DATES: Comments must be received by 5 p.m. local time, on January 28, 2015.

ADDRESSES: You may submit comments on this document, identified NOAA–NMFS–2014–BE60, by any of the following methods:

- *Electronic Submission:* Submit all electronic public comments via the Federal e-Rulemaking Portal. Go to *www.regulations.gov/#!docketDetail;D=NOAA-NMFS-2014-0155,* click the ''Comment Now!'' icon, complete the required fields, and enter or attach your comments.
- *Mail and Hand Delivery:* John K. Bullard, Regional Administrator, NMFS, Greater Atlantic Regional Fisheries Office, 55 Great Republic Drive, Gloucester, MA 01930. Mark the outside of the envelope: ''Comments on Black Sea Bass Framework 8.''

Instructions: Comments sent by any other method, to any other address or individual, or received after the end of the comment period, may not be considered by NMFS. All comments received are a part of the public record and will generally be posted for public