

2012, meeting. Currently the only authorized method of take for the herring fresh fish market permit is a herring gill net up to 65 fathoms in length with other gear restrictions the same as for the herring gill net roe fishery.

Comment 2

Mr. Huffman states that his constituents maintain that throw nets (also known as Hawaiian casting nets) would have a very minimal impact on the herring fishery because they are small, hand-thrown nets that are a fraction of the size of the gill nets currently used by the commercial herring fishermen. His constituents also point out that herring fresh fish market permittees would land a fraction of the amount of herring landed typically by San Francisco Bay herring roe gill net permittees.

Response

Mr. Huffman's constituents are correct in stating that the throw nets they are requesting have a small fraction of the fish catching potential as the herring gill nets that are currently authorized for the herring roe and herring fresh fish market fisheries.

Comment 3

Mr. Huffman's constituents point out that a casting net would be advantageous in herring fishing because the fish would be in much better condition when brought to market than fish caught with large gill nets, thus the price for casting net caught herring would be much higher. Additionally, constituents state that the public would get to experience a local, abundant, nutritious and delicious California resource that is normally exported to Japan and rarely sold at local restaurants and markets.

Response

Comment noted.

Comment 4

Mr. Huffman's constituents state that the casting net would be a banner example of a small-scale, artisanal and sustainable gear type and that the casting net would also compliment the herring fresh fish market permit that was modified in 2011.

Response

Comment noted.

Comment 5

Assemblyman Huffman requests that the Commission give his constituents gear request serious consideration, with due attention to the health of the herring stocks, and initiate an agenda item dedicated to the topic before the rules are set for the winter 2012-2013 season.

Response

Proposed commercial herring regulation changes for the 2012-2013 herring season must be completed by the Department prior to the Commission Agenda Day on May 23, 2012, for the regulations to be in effect before the beginning of the herring fishing season. As a result, the Department was unable to include Mr. Lombard's proposal in this year's rulemaking package. The Department's scientific and law enforcement staff intends to evaluate Mr. Lombard's proposal during the rulemaking cycle for the 2013-2014 commercial herring season.

Anna Weinstein, Audubon California Seabird Program Manager, on behalf of Audubon California, Oceana, Earthjustice, Golden Gate Audubon, and Santa Clara Valley Audubon letter received by Commission September 25, 2012
(Attachment 2)

Comment 1

Audubon California et al. states they have interacted with the Department herring management team, as well as representatives of the commercial herring fleet, and found a high level of interest in protecting this fishery, commercial fleet leaders are clearly concerned for the long-term health of the stock, and have implemented harvest quota reductions aimed at recovering the stock from historic lows in the late 1990's, among other actions. They state that the recent modest recovery in estimated spawning biomass of herring may be at least partially attributed to these actions, as well as to favorable ocean and estuarine conditions. They believe however, that there are several causes for alarm in the status and management of Pacific herring in California and their main areas of concern are outlined in comments two through eight.

Response

Comment noted.

Comment 2

Audubon California et al. states that there is a persistent and worsening truncation of age structure in the stock, with almost no older fish remaining.

Response

The Department has noted a truncation of age classes since the 1990's in the San Francisco Bay spawning population. This truncation has been documented as a coast wide phenomenon, including in British Columbia and Alaska. It also occurs in areas that do not receive commercial fishing pressure and as a result, it is likely that age truncation is caused by numerous factors not directly linked to fishing. Those factors include the following; El Niño events, Pacific Decadal Oscillation, drought, decreased upwelling, predation, competition and to some degree fishing pressure. To safeguard the population and manage for age

truncation, the Department continues to manage the fishery using conservative harvest targets which will protect the spawning population and allow fishery recovery. The Department will continue to set low quotas to ensure ongoing recovery and sustainability of this fishery.

Comment 3

Audubon California et al., states that there has been a depressed stock biomass relative to past decades.

Response

It is important to note that Pacific herring are a short lived pelagic species that are subject to large swings in recruitment and survival due to a variety of factors. These often include oceanic conditions, drought, poor water quality, predation, fishing and reduced food availability. The historical spawning biomass average for Pacific herring (1979-1980 season to the present) equals 51,200 tons. The spawning biomass estimate for 2008-2009 fell to a historical low of 4,833 tons. During the 2009-2010 season the spawning biomass reached 38,000, followed by 57,000 tons in the 2010-2011 season. The spawning biomass estimate for the 2011-2012 season reached 61,000 tons. The Department managed for the low spawning biomass by closing the fishery in 2009-2010 and subsequently recommending reduced quotas to allow continued recovery. Currently, the population is recovering and the Department will continue to recommend low quotas to ensure a sustainable fishery and safeguard its importance as a forage fish.

Comment 4

Audubon California et al. states that there is an absence of a Fisheries Management Plan (FMP) under the California Marine Life Management Act (MLMA), which would provide clear objectives for herring management or reference points from which to evaluate stock recovery or sustainable management.

Response

The Department will develop an FMP in the future, dependant on available staff and funding. An Environmental Document (CEQA equivalent) was completed in 1998 and has been updated annually since that time as the primary tool for managing the Pacific herring fishery. It is currently used in place of an FMP. The Department is working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. This is a critical step that will be needed to implement an FMP at a later date, as well as better inform current management strategies.

Comment 5

Audubon California et al. states that there is a lack of monitoring herring stocks in areas open to commercial harvest outside of San Francisco Bay.

Response

San Francisco Bay is currently the only active fishery in California. As a result of state wide reduced fishing effort, reduced staffing, and budget constraints, the Department has discontinued survey efforts in other spawning locations. Should fishing effort or staffing levels increase, the Department will reevaluate the management of those fisheries. It should be noted that no commercial fishery has taken place in Tomales Bay since 2007, in Humboldt Bay since 2005 and in Crescent City Harbor since 2002. Given the poor market conditions, the previously mentioned fisheries are not expected to receive any fishing pressure for many years.

Comment 6

Audubon California et al. states that there is no clear or explicit accounting for the needs of herring-dependent predators when setting sac roe harvest quotas.

Response

*The Department does address herring as a forage species in the 2011 Final Supplemental Environmental Document (FSED), section **3.3.3 Importance of Herring as a Forage Species**. The Department does manage for herring's role as an important forage species by setting quotas and restricting access to the fishery through a limited entry permit system. Since 1972, the start of the sac-roe fishery, quotas have averaged 12 percent of the spawning biomass. Since the year 2000 they have averaged less than five percent and since the fishery was reopened in 2010, quotas have averaged three percent. Continuing conservative harvest rates will help reduce fishing mortality which is critical for continued stock recovery, fishery sustainability, and maintain herring's important role in both ocean and bay ecosystems.*

Comment 7

Audubon California et al. believes that violations of the California Environmental Quality Act (CEQA) occurred during this rulemaking process including a confusing and non-transparent management structure that discourages or prevents informed public input.

Response

The Department did follow all noticing and public review requirements pursuant to the California Administrative Procedure Act. Notices of Proposed Changes to Regulations were sent to all interested parties on July 3, 2012, including Audubon California. Proposed regulations were posted on the Commission

website and the 2011 FSED has been available since it was adopted in October of 2011. <http://www.fgc.ca.gov/regulations/2012/163ntc.pdf>
<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=39711&inline=true>
The Commission website also contains a detailed description of the rule making process and how to provide public input related to pending regulations.

Comment 8

Audubon California et al. states that there is inadequate support by the State for the Department's herring team.

Response

Comment noted.

Comment 9

Audubon California et al. expresses their concern about whether any commercial herring fishing is warranted at this time. They acknowledge the precautionary actions taken by the Commission, the Department, and the industry. They support a harvest of no more than 5% of estimated biomass, which is contingent on demonstrated continued recovery of the stock. However, they urge the immediate re-initiation of an FMP for this fishery and will strongly oppose any quota increases above 5% until the stock shows signs of recovery and management inadequacies are resolved.

Response

See response to comment 3 and 4 above.

Comment 10

Audubon California et al. states that there are clear and unique opportunities to reshape the future of the herring fishery, particularly in light of the "blueprint" for forage species management now before the Commission. This comment provides a review of the importance of herring to California's marine wildlife, explanation of areas of concern, and constructive recommendations and opportunities for improvement.

Response

Comment noted.

Comment 11

Forage species are the primary driver of marine predator distribution and abundance and the growing threats to their viability underlie the many scientific review papers, management recommendations, and policy changes recently initiated or completed at state and federal levels.

Response

Due to the importance of herring in bay and ocean ecosystems, the Department will continue to recommend conservative quotas and make management recommendations based on the best available science.

Comment 12

Audubon California et al. states that in 2012, the Lenfest Forage Fish Task Force, comprised of 13 of the world's leading fisheries biologists and marine scientists, released a comprehensive examination of the science and management of forage fish populations. The report called for the need to dramatically reduce harvest levels to protect predators, including large fish, seabirds and whales. Another 2012 review published in *Science* documented the consistent and significant negative response of marine birds to depletion of primary forage species in seven discrete marine ecosystems.

Response

Comment noted.

Comment 13

Audubon California et al. states that the findings of the above mentioned reports, among others, have supported significant new policy changes in forage species management on the west coast. In June 2012, the Pacific Fishery Management Council voted to "prohibit the development of new directed fisheries on forage species that are not currently managed."

Response

Comment noted.

Comment 14

Audubon California et al. states that in California, the Fish and Game Commission's Marine Resource Committee recently agreed to language for a state forage policy and also to bring the draft policy to the full Commission for adoption. This policy would prevent the expansion of existing state-managed fisheries on forage species, and prevent new directed fisheries on forage species.

Response

Comment noted.

Comment 15

Audubon California et al. states that Pacific herring stocks, found in the northern Pacific from Japan to Baja California, are foundationally important for marine wildlife. Many large fish, birds and marine mammals feed preferentially on energy-rich and highly exploitable herring and their roe, including special status species and salmonids. They state that estimates of the energetic demands for a number of marine species are now available and could be used to assess the amount of herring needed to sustain marine predator populations.

Response

The Department appreciates the literature review and will reference these publications as well as many others during the development of an FMP.

Comment 16

Audubon California et al. states that marine areas off central and northern California are some of the Pacific's most important areas for marine wildlife. This region attracts and retains a high density of whales, pinnipeds, turtles, large fish, and birds. The region is important for marine birds, with the largest seabird colony south of Alaska (the Farallon Islands), rich at-sea foraging grounds (Monterey Canyon, Farallon Escarpment and Cordell Bank), and the most important wintering areas for sea ducks and other Pacific waterbirds (San Francisco and Tomales Bays).

Response

Comment noted.

Comment 17

Audubon California et al. states that Pacific herring are known to spawn in at least 13 sites in California and that many predators feed preferentially on herring. Spawning events generate a feeding frenzy on herring eggs by ctenophores, juvenile salmonids, sturgeon, smelt, surfperches, crabs and at least 20 species of birds. Adult herring are prey for salmon, seals, sea lions, seabirds, porpoises, dolphins, orcas, humpback whales, salmonids, lingcod, several species of rockfish, and sand sole. Within San Francisco Bay, herring provide forage year-round, in the form of eggs and juveniles.

Response

Comment noted.

Comment 18

Audubon California et al. states that salmon rely on a diverse array of prey resources that fluctuate in abundance and distribution depending on ocean

climate, fisheries pressure and interspecific competition. Chinook salmon, an important commercial species in central California, has suffered dramatic population declines in recent years prompting multi-year closures of the commercial fisheries and displacement of fishing communities. Currently, over 200 salmon runs in the California and the Pacific Northwest are at “varying degrees of the risk of extinction in the near future” due to a combination of factors including reduced food availability.

Response

Comment noted.

Comment 19

Audubon California et al. states that herring is one of the most important prey items of Chinook salmon in central California, along with anchovies, sardines and jack mackerel. Chinook salmon feed preferentially on herring in offshore areas. There was a dramatic decline of herring in Chinook salmon diet in central California over the last half century. In 1955, herring comprised the majority of California Chinook salmon diet in the late winter and spring (February, March and April) with significant pulses also in summer. In 1980-1986, herring was a minority of Chinook salmon diet in late winter/spring, although summer pulses were still evident at similar levels. Winter/spring was not sampled in 2005-2007 but herring was undetectable during the summer period when herring had previously comprised 10% of salmon diet. Concurrently, stocks of anchovies in southern California, and stocks of sardines coast wide, have declined. This overall reduction in prey availability and diversity has “likely contributed to reduced and more variable Chinook salmon abundance and return rates.”

Response

The Department’s review of National Oceanic and Atmospheric Administration (NOAA) data indicates that abundance trends in sardine and herring stocks do not tend to track. This is based on Southwest Fishery Science Center’s micronecton cruises; the opposite trend appears and counters Audubon’s assertion. The recent decline in sardine stocks in Central California occurred in 2009 and 2010, when herring stocks began to show improvement.
http://pacoos.org/QuarterlyUpdate_Climatic/AprMayJun12.pdf

Comment 20

Audubon California et al. states that the 1998 Final Environmental Document (FED) and subsequent Final Supplemental Environmental Documents (FSEDs) lack any information on the status and energetic needs and prey preferences of marine mammals in California. The FED simply states that “California sea lions specialize on schooling, open-water fishes ... and may be one of the most significant of the mammalian predators of herring in California.... all of the smaller cetaceans are likely to be herring predators. Among the larger cetaceans, minke whales, humpback whales and fin whales are known to be fish

eaters.” They state that herring are a critical component of the diet of whales and pinnipeds, including the federally endangered humpback whale and the federally threatened Steller sea lion. Examples of recent studies on a few of these species were referenced.

Response

*The Department acknowledges that the FED and FSED do not contain specific information related to the energetic needs of predators for Pacific herring. Herring’s importance as a forage species is however addressed in the 2011 FSED in section **3.3.3 Importance of Herring as a Forage Species**. This section outlines herring’s importance and how the Department uses this information to guide its management policies for the commercial fishery. Because the Department currently lacks information that is specific to the North Central Coast of California (related to predator/prey relationships), it will continue to manage with conservative quotas to ensure most herring remain available as forage. Currently, recommended quotas will allow a minimum of 95 percent of the available spawning biomass to reproduce and serve as prey for a variety of marine mammals, birds and invertebrates. New information related to predation on herring will be included in an FMP and the Department looks forward to any information that Audubon California et al can contribute during FMP development.*

Comment 21

Audubon California et al. states that the *Humpback whale (Megaptera novaeangliae)* in the northeast Pacific has increased by approximately 5% per year for the last 20 years, requiring a larger share of forage species than in previous years. The California and Oregon population quadrupled from 1990 to 2008 and is now estimated at 2,043 individuals. The population of 2,043 humpback whales in California and Oregon requires approximately 817 tons of food per day (0.4 tons/day/whale/2043 whales). While studies of humpback whale diets off the US west coast are lacking, studies in southeast Alaska (Prince William Sound, Sitka Sound and Lynn Canal) have demonstrated the profound effects humpback whales have on herring spawning biomass. Herring is the most important prey item for humpback whales at all three sites but not in all months. In the most affected area, Prince William Sound, a population of 81 (2007-2008) and 147 (2008-2009) humpback whales removed an estimated 10-70% of herring biomass. According to these studies, “Whales foraged in large numbers (81-147 individuals) over much of the fall and winter in Prince William Sound resulting in significant predation intensity. In absolute terms, whales potentially consumed between 2,639 and 7,443 tons of herring in 2007-2008. This represented a predation intensity of 27% to 77%. In 2008-2009 whales potentially consumed between 2,362 and 12,989 tons and predation intensities ranged between 11% and 63% of the total biomass present in spring 2008. For comparison, the last harvest of herring from Prince William Sound was 3,904 tons in 1998- approximately 20% of the spawning biomass.” These studies hypothesize that disruption of herring schools by foraging whales makes herring available to other predators with limited diving abilities, and that the disruption of

herring's formation of overwinter schools by foraging humpback whales facilitates foraging of Steller sea lions, seabirds, and other pelagic predators for which the deep overwintering herring schools would otherwise be relatively inaccessible. Seabirds and pinnipeds associate with whales and capitalize on whale foraging efforts during the winter months. Overall, the Alaska studies have shown the profound importance of herring to humpback whales.

Response

Comment noted.

Comment 22

Audubon California et al. states that the *Steller sea lion (Eumetopias jubatus)* are recovering in Washington and Alaska, but failing to recover in central and southern California, where the population declined between 1982 and 2002 and is now estimated at 4,000 individuals. Two important rookeries occur at Ano Nuevo and the Farallon islands. There is no published information on Steller sea lion diet in California, but in southeast Alaska herring is the most common prey item. In southeast Alaska, Steller sea lions make high energetic investments to locate herring schools. One study notes that "abundant quantity and presence of some high quality prey (salmon, herring and eulachon) likely sustains the increasing population in southeast Alaska." The population of 4,000 Steller sea lion in central and northern California requires 78 tons of food each day (calculated using calorie content of herring and hake).

Response

Comment noted.

Comment 23

Audubon California et al. states that the *California sea lion (Zalophus californianus)* in the U.S. has increased 6.5% per year from 1983-2003, and may now be stabilized at about 238,000 individuals. California sea lions in central California (Hurricane Point to Ano Nuevo Island) in 1999, numbering about 18,000 individuals, consumed about 8-10% of the sardine stock. They continue by providing a U.S. estimate of 34,233 harbor seals (*phoca vitulina*) which are known to target herring spawning aggregations or juvenile herring.

Response

Comment noted.

Comment 24

Audubon California et al. states that the 1998 Final Environmental Document (FED) and subsequent Final Supplemental Environmental Documents (FSEDs) lack any information on the energetic needs and prey preferences of marine

mammals in California. The FED simply states that “California sea lions specialize on schooling, open-water fishes ... and may be one of the most significant of the mammalian predators of herring in California.... all of the smaller cetaceans are likely to be herring predators.”

Response

See response to comment 20.

Comment 25

Audubon California et al. states that herring and their roe provide a persistent, energy-rich, and aggregated food source for a wide suite of bird species. Adult herring are consumed by many birds along the coastline, including Brandt’s and double-crested cormorants, brown pelicans, western grebes, terns, gulls and loons. In San Francisco Bay, young-of-the-year herring are also an important component of the diet of the endangered California least tern. Off the coast, marine birds including shearwaters, cormorants, common murre, auklets, puffins, marbled murrelet, and brown pelican feed on adult herring. In Prince William Sound, herring comprise approximately 50% of the prey volume of black-legged kittawakes and this species actively seeks out herring while foraging. Many other species specialize on herring roe, which is thought to substantially increase winter survival rates for birds that have access to this food resource. In British Columbia, aggregations of 50,000-300,000 waterbirds, including gulls, sea ducks, and other diving species, have been observed at herring spawning events. Pacific sea ducks are more dependent on herring than any other taxa of birds. For example, harlequin ducks aggregate in British Columbia only when feeding on herring spawn and long-tailed ducks and Steller’s eiders seek out and preferentially feed on herring roe.

Response

Comment noted.

Comment 26

Audubon California et al. states that Scoters in particular are highly dependent on herring roe for overwinter survival and breeding success. Scoters dramatically alter their movement and habitat use patterns in spring to take advantage of ephemeral and energy-rich herring roe, suggesting that this food resource is of particular importance to these species. Surf scoters have declined by 50-60% in the last 50 years while greater and lesser scaup, two other diving ducks that depend on herring roe, have declined by 15%. From southeast Alaska to California, the spatial extent of herring spawning has declined and in British Columbia waterbirds aggregate at increasingly fewer spawning sites.

Response

Comment noted.

Comment 27

Audubon California et al. states that San Francisco Bay is a global Important Bird Area, supporting 50% of the wintering sea ducks along the Pacific Flyway (Alaska to Baja). This is in part because San Francisco Bay supports an estimated 90% of California's remaining herring stock, which provides critical overwinter nutritional support for at least 20 species of waterbirds, including all members of the scoter group. San Francisco Bay supports about 50% of the total Pacific population of surf scoters and 40% of the total population of greater and lesser scaup.

Response

Comment noted.

Comment 28

Audubon California et al. states that among other reasons, San Francisco Bay is critically important for waterbirds because of the spatially consistent and predictable foraging hotspots where herring spawn. Most herring spawning in San Francisco Bay takes place in greater Richardson Bay and to a lesser extent at Point Richmond. The vast majority of commercial herring catch originates in greater Richardson Bay an area known to strongly attract and retain waterbirds. There is a winter seasonal closure on 900 acres of subtidal area leased by Audubon California and administered by the Richardson Bay Audubon Center. In most years 38 species of wintering waterbirds occur here, and in recent years, up to 9,300 waterbirds, including a high of 126 surf scoters, have been observed here. This overlap of a critical wintering waterbird site and commercial fishing activity should be explicitly considered in management, as there is a potential for interference competition at these consistent foraging hotspots. Similar considerations exist for Tomales Bay, an Important Bird Area for waterbirds.

Response

The Department agrees that spawning herring do provide foraging "hotspots" in several regions of San Francisco Bay. However, it is incorrect to state that "most" spawning occurs only in Richardson Bay and Point Richmond. The actual spawning grounds cover San Francisco Bay, from the San Mateo Bridge in the south, to the Richmond Bridge in the north. From west to east the grounds extend from the Golden Gate Bridge to the Berkeley Marina. The Department has noted spawning in all locations across the entire bay during the 40 year history of the fishery. The San Francisco waterfront, Golden Gate Recreation Area and the Marin county shoreline near the Romberg Tiburon Center are frequently visited by spawning herring. Other recent locations include Coyote Pt and Pt San Pablo. Herring do favor some locations on an annual basis but there is great variability and it is impossible to predict spawning sequence or location.

It should also be noted that no commercial fishing occurs inside Richardson Bay. Section 163, Title 14, California Code of Regulations state that, "(1) For purposes of this section regarding harvest of herring: San Francisco Bay is defined as the waters of Fish and Game districts 12 and 13 and that portion of district 11 lying south of a direct line extending westerly from Peninsula Point, the most southerly extremity of Belvedere Island (37 degrees 51 minutes 43 seconds N, 122 degrees 27 minutes 28 seconds W), to the easternmost point of the Sausalito ferry dock (37 degrees 51 minutes 30 seconds N, 122 degrees 28 minutes 40 seconds W)." The area north of this line, known as Richardson Bay, has never been open to the sac-roe fishery and herring are able to spawn without being subjected to commercial gill nets.

Comment 29

Audubon California et al. states that in British Columbia, total annual consumption of herring by 13 predators averaged 61,000 tons from 1973-2008. This is over 25% of the estimated maximum carrying capacity for herring in British Columbia.

Response

Comment noted.

Comment 30

Audubon California et al. states that the common murre population between Cape Blanco and Pt Conception, numbering ~1.5 million birds, requires over 170,000 tons of prey per year, primarily Market squid, shiner surfperch, midshipman, rockfish, anchovies, sardines and herring.

Response

Comment noted.

Comment 31

Audubon California et al. states that the San Francisco Bay stock, where commercial fishing activity still takes place, is manifesting signs of stress in the form of severe age class truncation, low biomass, and reduced size at age.

Response

See response to comment 2 and 3.

Comment 32

Audubon California et al. states that the severe age class truncation of Pacific herring shows no sign of improvement, despite several years of improved biomass after historic lows in 2006-2009. Eight-year-old fish disappeared after

1982-1983, seven-year-olds disappeared after 1998-1999, six-year-olds disappeared in 2010-2011, five-year-olds were almost undetectable in 2010-2011, and four-year-olds were at or near historic lows in the three seasons starting in 2008-2009. Age-class truncation is a well-documented sign of stress in fish stocks.

Response

See response to comment 2 and 3.

Comment 33

Audubon California et al. states that this trend has also been observed in Tomales and Humboldt Bays. While discussing a downward trend in landings relative to harvest quota for Humboldt Bay, the 2005 FSED notes that “a long-time Humboldt Bay herring permittee attributed these low landings to a disproportionate amount of small herring entering the bay, which were unavailable to commercial 2 ¼-in. mesh nets. Landing data from the Department’s research nets appear to support this observation as approximately 91 percent (by number) of the herring caught during the 2004-05 season were captured in meshes 2-in. or less.” Humboldt Bay stocks have not been assessed since 2005-2006.

Response

See response to comment 5.

Comment 34

Audubon California et al. states that the Department does not offer an explanation for state-wide age class truncation, nor a plan for addressing the cause and improving age structure in this population. One possibility is that predators may be consuming the majority of the older herring that tend to occur on the continental shelf and outer coast.

Response

See response to comment 2 and 3.

Comment 35

In addition to the age-class truncation reported in the FSEDs, CDFG notes that “more two-year-olds are sexually mature, and more fish are smaller-at-age than in past years.” This important detail, an indicator of stressed stocks in schooling pelagic species, is not reported in the FSEDs.

Response

The Department has documented that San Francisco Bay herring has exhibited a smaller-at-age trend and it is believed to be caused by the same factors that appear to be causing truncation. Those factors likely include the following; El Niño events, Pacific Decadal Oscillation, drought, decreased upwelling, predation, competition and to some degree fishing pressure. To safeguard the population and manage for this smaller-at-age trend, the Department continues to manage the fishery using conservative harvest targets to protect the spawning population and to allow fishery recovery. The Department will continue to set low quotas to ensure ongoing recovery and sustainability of this fishery. This trend has been documented in British Columbia as well and Department staff are working with Department of Fisheries and Oceans herring managers to better understand this phenomenon.

Comment 36

Audubon California et al. states that the Department has characterized the stock as “recovering” despite the lack of significant improvement in biomass between 2010-2011 and 2011-2012 (~57,000 tons and ~61,000 tons, respectively). It is notable and worrisome that highly favorable ocean conditions in 2009-2010 failed to support strong recruitment of two year-olds in 2010-2011.

Response

The historical spawning biomass average for Pacific herring (1979-1980 season to the present) equals 51,200 tons. The spawning biomass estimate for 2008-2009 fell to a historical low of 4,833 tons. During the 2009-2010 season, the spawning biomass reached 38,000 tons, followed by 57,000 tons in the 2010-2011 season. The spawning biomass estimate for the 2011-2012 season reached 61,000 tons. The Department managed for the low spawning biomass by closing the fishery in 2009-2010 and subsequently recommending reduced quotas to allow continued recovery. Currently, the population is recovering and the Department will continue to recommend low quotas to ensure a sustainable fishery and safeguard its importance as a forage fish. Herring often do not return to spawn until age three, so it is difficult to predict recruitment based on the 2010-2011 season estimates. Preliminary age estimates for the 2011-2012 season actually show a strong recruitment from the 2009-2010 year class of what are now three-year-old herring.

Comment 37

Audubon California et al. states that the Department measures recovery against estimated spawning biomass from the early 1970s. They believe this an unacceptable historical baseline against which to measure recovery. They state that the 1970s were years of heavy overexploitation when quotas approached or reached 20%. It is, rather, a shifting baseline nested in a long-term declining trend; for example, in 2007 the average historic biomass was 52,302 tons, in 2011 it was 49,327 tons. Again, this highlights the need for estimates of unfished

biomass and reference points based on best estimates of abundance prior to fishing pressure.

Response

The historical spawning biomass average for Pacific herring (1979-1980 season to the present) equals 51,200 tons. The spawning biomass estimate for 2008-2009 fell to a historical low of 4,833 tons. During the 2009-2010 season the spawning biomass reached 38,000, followed by 57,000 tons in the 2010-2011 season. The spawning biomass estimate for the 2011-2012 season reached 61,000 tons. The Department considers this to show a very significant recovery for this fishery.

Since 1972, the start of the sac-roe fishery, quotas have averaged 12 percent of the spawning biomass. Since the year 2000 they have averaged less than five percent and since the fishery was reopened in 2010, it has averaged three percent. Continuing conservative harvest rates will help reduce fishing mortality which is critical for continued stock recovery, fishery sustainability, and maintain herring's important role in both ocean and bay ecosystems.

The Department disagrees with the assessment claiming a shifting baseline. It is important to note that Pacific herring are a short lived pelagic species that are subject to large swings in recruitment and survival due to a variety of factors. These often include oceanic conditions, drought, poor water quality, predation, fishing and reduced food availability. The Department's data show a recovery from a historic low to current population levels that are well above the 33 year spawning biomass average.

The Department is working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. It is anticipated that this model will help to better inform current management strategies and continue to ensure the sustainability of this important fishery.

Comment 38

The 2007 FSED is the last in which Tomales Bay, Humboldt Bay, Monterey Bay and Crescent City are included in the Environmental Setting. The Department ceased survey work in these areas following the 2005-2006 season. Regardless, the Commission continues to authorize substantial commercial fishing in these areas.

Response

San Francisco Bay is currently the only active fishery in California. As a result of state wide reduced fishing effort as well as reduced staffing and budget constraints, the Department has discontinued survey efforts in other spawning locations. Should fishing effort or staffing levels increase; the Department will reevaluate the need for managing those fisheries. It should be noted that no

commercial fishery has taken place in Tomales Bay since 2007, in Humboldt Bay since 2005 and in Crescent City Harbor since 2002. Given the poor market conditions, the previously mentioned fisheries are not expected to receive any fishing pressure for many seasons, if ever. The Open Ocean Fishery (primarily Monterey Bay) was closed to commercial fishing in 2009. No population assessments have ever been produced for open ocean herring.

Comment 39

Audubon California et al. states that Tomales Bay was historically the focal point for herring harvest in the greater Bay Area, with periods of heavy fishing to supply a canned fish market in California and the overseas herring roe market. Herring stocks declined nearly 20% in Tomales Bay from 1972-2005 and show a clear declining trend between the first and second half of this 33-year time period. The last year that estimated biomass exceeded 5,000 tons was in 1986 and prior to that biomass estimates were as high as 22,000 tons. The 1993 to 2006 average estimated spawning biomass in Tomales Bay was 3,712 tons. Yet, the Commission has been authorizing a 350 ton quota, almost 10% of the estimated current standing biomass.

Response

The Tomales Bay fishery was historically an important fishery but has declined due to changing markets, low fishing effort, and poor access for buyers and fishers. Audubon California overstates a declining trend by referencing 22,000 tons which was clearly an outlier for spawning biomass that averages less than 5,000 tons since 1972. It is also important to note that prior to 1993, the Outer Bodega Bay Fishery and the Tomales Bay Fishery were managed as one fishery. During the 1993-1994 season, the Department and the herring industry agreed to close the Outer Bodega Bay Fishery due to a concern over the accuracy of biomass data in this area.

It should be noted that no commercial fishery has taken place in Tomales Bay since 2007 and given current market conditions and access constraints, it is unlikely to receive any fishing pressure. The Department has discontinued survey efforts in Tomales Bay as a result of reduced staffing and budget constraints. Should fishing effort or staffing levels increase, the Department will reevaluate the need for managing this fishery.

Comment 40

Audubon California et al. states that from 1974 to 2007, Humboldt Bay averaged just under 400 tons of herring and returns have weakened noticeably since 2000. The last biomass estimate for Humboldt Bay was seven tons in 2007, the same year of near-historic low returns in San Francisco Bay. Trends in biomass for Humboldt Bay were nearly the reverse of those observed in San Francisco Bay, with strong returns in the mid-1990s when San Francisco Bay stocks were depressed and poor returns in the mid- 2000s when San Francisco Bay stocks were stronger. The Commission is authorizing a quota of 60 tons for Humboldt

Bay; this is eight times the total biomass from the Department's assessment in 2007. Sixty tons is also 15% of the average biomass estimate of 400 tons since 1974.

Response

The Department acknowledges this trend and has continued to recommend a 60 ton quota based on historical data. No changes have been recommended due to a lack of fishing activity, no fishing has taken place in Humboldt Bay since 2005. Should the Department be notified of pending activity it will reevaluate the priority for monitoring this fishery.

Comment 41

Audubon California et al. states that the FED and FSEDs do not appear to contain information on stock assessments conducted in Crescent City. The 1998 FED contains a map of the coastal area open to commercial fisheries and the Commission has authorized a 30 ton quota for this area, despite a lack of information on spawning biomass.

Response

The Fish and Game Commission established a set quota of 30 tons during the 1977-1978 season for Crescent City, which is still in effect today. No fishing effort has taken place since 2002. The Department has not conducted biomass surveys in Crescent City Harbor. However, given the poor market conditions, Crescent City is not expected to receive any fishing pressure in the near future and can be evaluated should it be necessary.

Comment 42

Audubon California et al. states that from 1947 through 1972, landings of herring caught on the coast in Monterey Bay normally exceeded that of San Francisco Bay, with a high of 2,951 tons caught in 1952. This stock is no longer assessed, open ocean fishing is no longer allowed, and there is no information available on current spawning areas of herring in the region of Monterey Bay. The FED notes that spawning historically occurred in Elkhorn Slough, also an Important Bird Area.

Response

It is important to note that the Monterey and San Francisco Bay fisheries prior to 1972 were not utilized for sac-roe. All information from the period 1916-1972 was based on landings data reported to the Department of Fish and Game. These fisheries were used for canning and bait during this period and catch estimates cannot be directly compared to the sac-roe fishery. In addition, because of the nature of those fisheries, no spawning biomass assessments were completed prior to 1972 for Monterey or San Francisco.

Comment 43

Audubon California et al. states that management of the herring fishery must take into account the stochastic nature of herring productivity, as well as the cumulative effects of the fishery with other natural and anthropogenic stressors. In particular, a major goal of herring management should be to maintain the resilience of the stock in the face of unexpected events. In 2007, the container ship Cosco Busan released 54,000 gallons of bunker fuel oil into San Francisco Bay, causing unexpectedly high mortality in Pacific herring embryos and contributing to recent population declines. Ultimately, the effects of fishing pressure and this type of event are cumulative, rather than separate effects, as a healthier herring stock is more robust to unexpected impacts than an already depleted one.

Response

The Department acknowledges that Pacific herring are a short lived pelagic species that are subject to large swings in recruitment and survival due to a variety of factors. Those factors often include the following; El Niño events, Pacific Decadal Oscillation, drought, decreased upwelling, predation, competition, poor water quality and to some degree fishing pressure. Currently, recommended quotas will allow a minimum of 95 percent of the available spawning biomass to reproduce as well as serve as prey for a variety of marine mammals, birds and invertebrates. The Department considers this management approach to be the appropriate way of accounting for stochastic events, both human caused and “natural.”

Comment 44

Audubon California et al. states that the FSEDs (generated from 1999-2000 to 2011-2012) fail to adequately describe herring predators (Affected Resources) in central California, and their energetic needs relative to herring, and therefore provide insufficient grounds for findings of No Significant Impact. The FED contains general information on herring predators in central and northern California, but is outdated and lacks detail on current status and dietary requirements in the context of herring abundance (described in part above) that should inform a consideration of significant impact. Subsequent FSEDs contain approximately one page on the role of herring as forage, and fail to include current, updated or additional information. For example, the FED, in its finding of No Significant Impact on birds and marine mammals, states that “direct feeding by birds on herring roe has only been reported in the ornithological literature as a limited or incidental, late-winter activity...mitigation in recognition of the importance of herring as a forage item for birds is provided by setting conservative exploitation rates ... no additional mitigation is proposed for impacts to bird (and marine mammal) populations because they are expected to be localized, short-term and less than significant.”

Response

*The Department acknowledges that the FED and FSED do not contain specific information related to the energetic needs of predators for Pacific herring; however, herring's importance as a forage species is addressed in the 2011 FSED in section **3.3.3 Importance of Herring as a Forage Species**. This section outlines herring's importance and how the Department uses this information to guide its management policies for the commercial fishery. Because the Department currently lacks information that is specific to the North Central Coast of California (related to predator/prey relationships), it will continue to manage with conservative quotas to ensure a majority of herring remain available as forage. Currently, recommended quotas will allow a minimum of 95 percent of the available spawning biomass to reproduce and serve as prey for a variety of marine mammals, birds and invertebrates. Information related to predation on herring will be included in an FMP and the Department looks forward to any information that Audubon California et al can contribute during FMP development.*

Comment 45

Audubon California et al. states that the 1998 finding, approved each year in FSEDs through the certification process, fails to take into account new information on the importance of herring and roe to ducks, seabirds, marine mammals and salmonids. The FED and FSEDs conclude No Significant Impact without attempting to acknowledge or account for the energetic requirements of herring-dependent scoters, or the status of many other predators of herring in central California, such as whether these predators are able to feed on alternative prey sources, the availability of those alternative prey sources, or the consequences of feeding on prey with lower energy density than herring.

Response

See response to comment 44.

Comment 46

Audubon California et al. states that the previously mentioned documents define a conservative exploitation rate as up to 20% of estimated biomass, for which there is no clear justification or evidence. Recent scientific studies of forage fish fishing strategies demonstrate that traditional concepts of "conservative exploitation rates" for single species can cause widespread impacts on predators and include recommendations that fishing rates do not exceed ½ of FMSY levels and that management plans utilize "hockey stick" harvest rules where at least 40% of unfished biomass is set-aside. These studies represent the best available science and call for significantly revised definitions of conservative exploitation rates.

Response

The Department acknowledges that traditionally 20 percent exploitation rates have driven fishery management. The Department agrees that given the current status of the herring fishery, a 20 percent exploitation rate may not be considered “conservative” due to the complexity of ocean/bay ecosystems and herring’s recovering status. It should also be noted that in 2003, due to ongoing exploitation rate concerns, the Department requested a peer review of its fishery management activities. The Department worked with California Sea Grant to assemble a team of scientists with demonstrated expertise in modeling and assessing fish populations: Dr. Alec MacCall, Mark Maunder, and Jake Schweigert. A key recommendation that resulted from the peer review was the following: “A harvest rate in the range of 10-15% appears to be sustainable with the lower level providing a desirable target for stock rebuilding.” Based on this assessment the Department has continued to recommend low exploitation rates to the Commission. At present this rate is 4.7 percent of the spawning biomass for San Francisco Bay.

Currently, the Department is working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. It is anticipated that this model will help to better inform current management strategies and continue to ensure the sustainability of this important fishery.

Comment 47

Audubon California et al. states that the proposed 4.7% estimated biomass harvest level (2,854 tons) for 2012-2013 equals 30-35% of the highest reported harvest rates (about 8500 tons) since 1916.

Response

Prior to 1972, the Monterey and San Francisco Bay fisheries were not utilized for sac-roe. All information from the period 1916-1972 was based on landings data reported to the Department of Fish and Game. These fisheries were used for canning and bait during this period and catch estimates cannot be directly compared to the sac-roe fishery. In addition, because of the nature of those fisheries, no spawning biomass assessments were completed prior to 1972 for San Francisco.

Comment 48

Audubon California et al. states that, an EIR has never been conducted for the commercial fishery. Instead, the State has taken a “functional equivalent” approach to the commercial herring fishery.

Response

CEQA requires all public agencies in the State to evaluate the environmental impacts of projects that they approve or carry out. Most agencies satisfy this requirement by preparing an Environmental Impact Report (EIR) if there are potentially significant environmental impacts. If no potentially significant impacts exist, a Negative Declaration (ND) is prepared. However, an alternative to the EIR/ND requirement exists for State agencies for activities that include protection of the environment as part of their regulatory program. Under this alternative, an agency may request certification of its regulatory program from the Secretary for Natural Resources. With certification, an agency may prepare functional equivalent environmental documents in lieu of EIRs or NDs. The regulatory program of the Commission has been certified by the Secretary for Natural Resources. A functional equivalent, Final Environmental Document for Pacific Herring Commercial Fishing Regulations, was certified by the Commission on August 28, 1998, and has been updated annually since that time.

Comment 49

Audubon California et al. states that according to the State's requirements for a "functional equivalent" approach, a new FED is clearly needed to satisfy (1) and (2). In the 14 years since the publication of the FED, substantial new information of importance to the project is available, and new potentially significant environmental impacts have not been considered. As previously discussed, some of those deficiencies that need to be addressed include the importance of herring as forage, the severe age class truncation of the stock, and a lack of assessment effort in Tomales Bay and Crescent City.

Response

The Department recognizes the need to implement an FMP. However, until an FMP can be developed, the Department will use the 1998 FED and subsequent FSEDs as an interim management tool. Given current budget and staffing constraints, the Department does not have a timeline for this important process; however, the Department does believe the current CEQA process adequately protects the herring resource by using conservative exploitation rates and working to protect herring as a vital forage species. The annual supplemental documents have discussed and made recommendations to address the truncation of age classes as well as herring's importance as a forage species. These documents have also been used to recommend a fishery closure when warranted.

Comment 50

Audubon California et al. states that other new information includes the known and projected impact of climate change. More frequent and intense storms are likely to affect the availability of vegetative substrate, in particular the red algae *Gracilaria*, which may be the most important spawning substrate for herring in central California. The FED notes that Richardson Bay was the primary subtidal

spawning area in the Bay in the 1970s and early 1980s, until “storm action during the 1982-1983 El Nino is thought to have removed much of the *Gracilaria* from this area. Despite the loss of subtidal vegetation, Pacific herring have continued to spawn in Richardson Bay, often on pilings and boat bottoms in marinas as well as on eelgrass.” Audubon California’s own observations of spawning substrate in Richardson Bay, both with DFG herring staff and independently, support the idea that *Gracilaria* is the preferred spawning substrate, but this has yet to be definitively confirmed. The 2002 FSED also supports this conclusion, stating that for Tomales Bay “70% of total spawning escapement was estimated to have occurred on *Gracilaria*. Herring displayed a preference for *Gracilaria* as a spawning substrate. This was especially noticeable in areas where both types of vegetation occurred simultaneously.”

Response

*The Department agrees that climate change is an important consideration for managing the Pacific herring fishery. It will likely be included during the development of an FMP and the Department looks forward to reviewing any available literature on this subject. The Department does conduct annual vegetation surveys in Richardson Bay (as well as other areas) to identify species and density. Based on the Department’s own data there can be great variability from year to year but, in general, populations of *Gracilaria* and *Zostera* appear to be stable.*

*In regard to “herring’s preference for *Gracilaria*,” the Department agrees that this is an important spawning substrate for herring; however, its relative importance by Audubon California is overstated. Herring have been shown to spawn on all types of substrate including: marine vegetation, algae, rock, and various manmade structures. The spawning preference is more likely related to timing and substrate availability, but further research is warranted.*

Comment 51

Audubon California et al. states that more erratic and flashy patterns of precipitation are likely to affect spawning conditions due to the influence of salinity on spawning intensity and duration. For example, spawning biomass in Tomales Bay began to decline drastically in the late 1980s as a result of what would become a six-year drought. Drought conditions in Tomales Bay were thought to be the primary cause of the decline in spawning biomass. Without normal rainfall, bay salinities remain high and are not conducive for spawning. Poor spawning conditions may have led a large portion of herring to temporarily abandon Tomales Bay until conditions improved.

Response

The Department agrees and spawning behavior is well documented to be affected by precipitation and salinity.

Comment 52

Audubon California et al. states that in addition to the deficiencies of the “functional equivalent” documents, the process for public input is poorly organized and communicated. There is no supplemental information provided on the rationale for the proposed 2012-2013 quota of 5% estimated 2011-2012 biomass.

Response

See response to comment 7.

Comment 53

Audubon California et al. states that critical information should be aggregated and made easily accessible to the public should include, at a minimum: 2011-2012 estimated biomass, size-frequency distribution from the research catch and samples of commercial catches, the relationship of gill net mesh size and other aspects of authorized fishing gear to management goals, and the status and timeline for development of a fishery management plan in accordance with the California Marine Life Management Act.

Response

See response to comment 7.

Comment 54

Audubon California et al. states that other critical information has not been publicly available and includes notice of public forums, such as the annual meeting of the Commission’s herring committee, at which many important discussions and decisions take place.

Response

Audubon California et al. incorrectly states that notification of public meetings was improperly noticed. The Department and Commission have followed all noticing requirements pursuant to the Administrative Procedure Act (see response to comment 7).

Audubon California et al. also misstates a concern over an “annual meeting of the Commission’s herring committee.” No such named committee exists; there is, however, a Director’s Herring Advisory Committee (DHAC). The purpose of DHAC is to receive input and advice from industry representatives to allow for more effective, inclusive, comprehensive, and collaborative marine management. DHAC is designed to exchange information between Industry representatives and the Department in annual or bi-annual meetings or during one-on-one communications through-out the year, for the purposes of;

- 1) *Sharing information on the status of the herring population and associated issues.*
- 2) *For Industry representatives to provide input and advice to Department staff for consideration when they are proposing regulatory changes.*
- 3) *The DHAC is an information exchange committee. It is not a policy or management decision committee. Recommendations and advice from the DHAC members are recorded and provided to the Commission along with recommended regulatory changes that have taken the DHAC dialogues into account.*

These meetings are open to the public and information related to the meetings is available from industry representatives or nominated chair-persons.

Comment 55

Audubon California et al. states that overall, the FED and FSEDs fail to fully and accurately inform decision-makers and the public of the environmental consequences of proposed actions, and therefore do not satisfy the basic requirements of CEQA. Courts have invalidated EIRs as a matter of law due to the omission of information about a project's setting that undermined accurate analysis of environmental effects. An accurate description of the environmental setting also is critical because existing conditions normally constitute the baseline for determining the significance of environmental impacts.

Response

The Department disagrees with this assessment and is confident it has met all requirements put forth by CEQA based on an assessment by its legal department. The Department does look forward to future input through the rulemaking process or upon development of an FMP.

Comment 56

Audubon California et al. supports a sac roe quota of no more than 4.7% of the 2011-2012 estimated biomass, as is recommended by the Department, but does not support certification of the FSED, in light of CEQA violations.

Response

Comment noted.

Comment 57

Audubon California et al. recommends a closure of commercial fisheries in Tomales Bay and Crescent City pending an assessment of stocks in these areas.

Response

Comment noted.

Comment 58

Audubon California et al. recommends a commercial fishing harvest of no more than 5% or less of the estimated biomass until the identified deficiencies in this letter are resolved, particularly the completion of a new FMP.

Response

Comment noted.

Comment 59

Audubon California et al. recommends the Commission require the Department to develop an EIR (or, at a minimum, a new FED) that fulfills CEQA requirements.

Response

See response to comment 49.

Comment 60

Audubon California et al. recommends retiring latent permits, and other mechanisms, to prevent fishery expansion.

Response

The Department plans to address this issue during the development of an FMP in consultation with industry and other interested parties.

Comment 61

Audubon California et al. acknowledges and supports the fresh fish quota and markets.

Response

Comment noted.

Comment 62

Audubon California et al. requests that good faith efforts be made to identify funds for the Department's herring program staff to undertake essential activities in support of a robust EIR, including, but not limited to: assess stock status in Tomales Bay and Crescent City; convene experts to evaluate the severe age class truncation of the San Francisco Bay stock; and map essential spawning and buffer habitat in these areas.

Response

Comment noted.

Comment 63

Audubon California et al. would like the Department to inform the public as to the timeline and status of the development of an FMP under the MLMA, and reasons for the delay in developing an FMP.

Response

See response to comment 49.

Comment 64

Audubon California et al. states that in order for the Department to justify the 4.7% harvest rate as conservative, it must consider and describe for public review its justification in the context of the whole ecosystem and the newly available scientific benchmarks established by recent studies.

Response

See response to comments 6 and 20.

Comment 65

Audubon California et al. requests that the Department account for how much herring are needed by predators and integrate forage reserves into the harvest quota. They believe sufficient data exists to develop these estimates.

Response

See response to comments 6 and 20.

Comment 66

Audubon California et al. requests that the Department clearly describe the management goals for Pacific herring, including target and limit reference points for herring biomass.

Response

*These goals are spelled out in the **2011 Final Supplemental Document for Pacific Herring, Section 2.1 Project Objectives.***

The project goal is to maintain healthy herring stocks in California.

Objectives for achieving this goal include:

- *Restore healthy age structures to stocks in need of rebuilding;*

- *Avoid and/or minimize the harvest of two and three-year-old herring, many of which are first-time spawners;*
- *Manage commercial harvest of herring to achieve a sustainable fishery;*
- *Provide sufficient herring to conserve living resources of the ocean that utilize herring as a food source;*
- *Provide sufficient herring to support recreational take.*

Comment 67

Audubon California et al. requests that the Department determine how quotas, mesh sizes, areas closures, and other recommendations, will help reverse the severe age class truncation of the SF Bay stock and recover the population to specified target levels.

Response

Quotas, mesh size requirements and area closures have all been used throughout the history of the sac-roe fishery. The Department will continue to use these management tools as well as develop new strategies for continued herring recovery.

Comment 68

Audubon California et al. requests that the Department assess the cumulative impacts of the functional disappearance of other historically important herring spawning stocks in Tomales and Monterey Bays and possibly other areas of California.

Response

At present, staffing and budget constraints do not allow for any additional assessment activities. However, should additional funding be identified, the Department will evaluate the need in the broader context of Pacific herring management in California.

Comment 69

Audubon California et al. requests that the Department consider the coast wide depletion of herring stocks from California through British Columbia, which has reduced the cumulative availability of herring to predators.

Response

Comment noted.

Comment 70

Audubon California et al. requests that the Department develop an estimate of historic unfished biomass in order to establish a baseline against which current stock status can be measured.

Response

The Department is currently working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. This model will help establish baselines and is anticipated to better inform current management strategies while continuing to ensure the sustainability of this important fishery.

Comment 71

Audubon California et al. requests that the Department integrate, minimally, coarse descriptions of the known and potential impact of climate change on herring stocks in California.

Response

The Department agrees that climate change is an important consideration for managing the Pacific herring fishery. It will likely be included during the development of an FMP and the Department looks forward reviewing any available literature on this subject.

Comment 72

Audubon California et al. requests that the Department immediately resume development of a Fishery Management Plan for the commercial herring fishery.

Response

See response to comment 4.

Comment 73

Audubon California et al. requests that the Department clearly post opportunities for public involvement as per CEQA.

Response

See response to comment 7.

Comment 74

Audubon California et al. requests that the Department make essential ecological, socioeconomic, and other relevant information available for public review.

Response

See response to comment 7.

Comment 75

California Audubon et al. requests that the Department assess herring management of other U.S. states and British Columbia to identify best practices.

Response

Comment noted.

Comment 76

Audubon California et al. requests that the Department apply the recommendations in the literature discussed above, to the management of Pacific herring, including the establishment of a harvest threshold cutoff and other reference points.

Response

See response to comments 44 and 70.

Dr. Geoff Shester (California Program Director, Oceana), in oral comment at the October 3, 2012, Commission Meeting

Comment 1

Dr. Shester states that herring are critically important for a wide suite of marine mammals, marine birds, and larger fish.

Response

*The Department acknowledges herring's importance as a forage species and is addressed in the 2011 FSED, section **3.3.3, Importance of Herring as a Forage Species**. This section outlines herring's importance and how the Department uses this information to guide its management policies for the commercial fishery. Because the Department currently lacks information that is specific to the North Central Coast of California (related to predator/prey relationships), it will continue to manage with conservative quotas to ensure a majority of herring remain available as forage. Recommended quotas will allow a minimum of 95 percent of the available spawning biomass to reproduce and serve as prey for a variety of marine mammals, birds and invertebrates.*

Comment 2

Dr. Shester acknowledges recognition of this (herring as forage) by the Department; however they do have some concerns about this population recovering from recent historic lows.

Response

Pacific herring are a short lived pelagic species that are subject to large swings in recruitment and survival due to a variety of factors. These often include oceanic conditions, drought, poor water quality, predation, fishing and reduced food availability.

The historical spawning biomass average estimate for Pacific herring (1979-1980 season to the present) equals 51,200 tons. The spawning biomass estimate for 2008-2009 fell to a historical low of 4,833 tons. During the 2009-2010 season the spawning biomass reached 38,000, followed by 57,000 tons in the 2010-2011 season. The spawning biomass estimate for the 2011-2012 season reached 61,000 tons. The Department managed for the low spawning biomass by closing the fishery in 2009-2010 and subsequently recommending reduced quotas to allow continued recovery. Currently, the population is recovering and the Department will continue to recommend low quotas to ensure a sustainable fishery and safeguard its importance as a forage fish.

Comment 3

Dr. Shester states that the Department talks about herring population rebuilding and recovery, but there are no clear goals and objectives laid out by the Department to achieve recovery. CEQA and other management documents do not have reference points or target levels that show whether the population is recovered. He states that until we have these reference points, they characterize much of the management of herring as ad hoc.

Response

These goals are spelled out in the 2011 FSED for Pacific Herring, Section 2.1 Project Objectives.

The project goal is to maintain healthy herring stocks in California.

Objectives for achieving this goal include:

- *Restore healthy age structures to stocks in need of rebuilding;*
- *Avoid and/or minimize the harvest of two and three-year-old herring, many of which are first-time spawners;*
- *Manage commercial harvest of herring to achieve a sustainable fishery;*
- *Provide sufficient herring to conserve living resources of the ocean that utilize herring as a food source;*
- *Provide sufficient herring to support recreational take.*

The Department is currently working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. This model will help establish baselines and is anticipated to better inform current management strategies while continuing to ensure the sustainability of this important fishery.

Comment 4

Dr. Shester states that they've heard (from the Department) that five percent is a low number and a low precautionary harvest rate. He states that Oceana wants to call that into question, particularly with respect to what is conservative and what is recommended for a harvest rate when dealing with an important forage species like herring. Oceana states that it does not accept the idea that five percent is necessarily the low or conservative number. He further states that Oceana doesn't have any way to evaluate that in an ecosystem context.

Response

Historically, 20 percent exploitation rates have driven fishery management, including Pacific herring. Given the current status of the herring fishery, a 20 percent exploitation rate would not be considered "conservative" due in part to a greater appreciation of the complexity of ocean/bay ecosystems and herring's recovering status. At present the harvest rate is 4.7 percent of the spawning biomass for San Francisco Bay. This will allow at minimum, 95 percent of the available spawning biomass to reproduce and serve as prey for a variety of marine mammals, birds and invertebrates.

In 2003, the Department requested a peer review of its fishery management activities. The Department worked with California Sea Grant to assemble a team of scientists with demonstrated expertise in modeling and assessing fish populations: Alec MacCall; Mark Maunder, and Jake Schweigert. A key recommendation that resulted from the peer review was the following: "A harvest rate in the range of 10-15% appears to be sustainable with the lower level providing a desirable target for stock rebuilding." Based on this assessment the Department has continued to recommend low exploitation rates to the Commission. The current harvest targets have been set well below fishery experts recommendations from the peer review. This is why the Department considers five percent to be conservative and appropriate for herring fishery recovery.

Comment 5

Dr. Shester states that for now Oceana is tentatively supportive of the current fishery and not interested in shutting it down at this point. They are however very concerned about continuing to manage in this ad hoc fashion, which is why an FMP is the ultimate answer to this issue.

Response

The Department plans to develop an FMP in the future, dependant on available staff and funding. An Environmental Document (CEQA equivalent) was completed in 1998 and has been updated annually since that time as the primary tool for managing the Pacific herring fishery. It is currently used in place of a Fishery Management Plan. The Department is working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. The development of this model is a critical step that will be needed to implement an FMP at a later date and better inform current management strategies.

Comment 6

Dr. Shester states that Oceana and other NGOs would like to be a part of an overall effort, joining with the Commission, industry and Department to go out and secure FMP funding; seek public/private partnerships etcetera. Oceana believes herring is a critically important species and an important historic fishery in San Francisco Bay. They want to see it (the fishery) done in a sustainable, ecosystem based way, and think an FMP is the way forward.

Response

Regarding FMP development, the Department will consider public/private partnerships and appreciates the offer of support.

Comment 7

Dr. Shester states that Oceana wanted to voice support for the fresh fish market of herring and if there is anything the Commission can do regarding changing gear restriction regulations to facilitate a higher value type of market we would support that as well.

Response

Comment noted.

Mike Duorak (San Francisco Bay area commercial fisherman), in oral comment at the October 3, 2012, Commission Meeting

Comment 1

Mr. Duorak states that he purchased a herring fresh fish market permit and was told (by the Department) that he could not use it because he did not have a large enough boat or a gill net.

Response

Current herring regulations, CCR Title 14 Section 163, do not allow as an authorized method of take any gear except gear as defined as herring gill nets up to 65 fathoms in length. Throw nets are not an authorized method of take per regulations 163(f)(2)(A). There are no regulations specifying size of vessel or minimum length of gill net required to fish in the fresh fish fishery.

Comment 2

Mr. Duorak states that (roe) herring fishermen go for tonnage and it is not feasible to land fish for the fresh fish market. He states that he and his fishing partner purchased fresh fish market licenses and were anticipating bringing beautiful, pristine herring to the markets. He states that they are the ones that were going to take care of (the herring stocks) a little bit better and take advantage of the license (fresh fish). However, they were not allowed because they are fishing from small boats, kayaks, and from shore with Hawaiian style throw nets, which are not allowed to be used for the (fresh fish market) fishery.

Response

Comment noted.

Comment 3

Mr. Duorak states he would like gear restrictions changed so they can use sustainable, no by-catch (gear). He states that they would only catch 100 or 150 fish, and have buyers to bring beautiful, fresh, sustainable, pristine fish to market.

Response

The Department's scientific and law enforcement staff intends to evaluate fresh fish regulation change proposals during the rulemaking cycle for the 2013-2014 commercial herring season.

Anna Weinstein (Audubon California), in oral comment at the October 3, 2012, Commission Meeting

Comment 1

Ms. Weinstein states that Audubon California was a signatory to the letter (Attachment 2) mentioned earlier, and they would like to address inadequacies with CEQA. She emphasized their goal is to move toward an FMP that was referred to by Jeff Shester. They would like a robust fishery management plan for the fishery, and from an Audubon perspective they support commercial fishing.

Response

The Department will develop an FMP in the future, dependant on available staff and funding. An Environmental Document (CEQA equivalent) was completed in 1998 and has been updated annually since that time as the primary tool for managing the Pacific herring fishery. It is currently used in place of a Fishery Management Plan. The Department is working with the Centre for Environment, Fisheries and Aquaculture Science to develop a fishery model for the San Francisco Bay herring fishery. This is a critical step that will be needed to implement an FMP at a later date as well as better inform current management strategies.

Comment 2

Ms. Weinstein states that the roe herring fishery is the last commercial fishery in San Francisco Bay, making it unique. She states that Audubon California wants the roe herring fishery to thrive, and also supports the fresh fish fishery and would like the Commission to support it as well.

Response

Comment noted.

Comment 3

Ms. Weinstein summarized the three points in the letter mentioned previously. First she states that herring stocks are stressed and declining in San Francisco Bay and coast wide.

Response

Pacific herring are a short lived pelagic species that are subject to large swings in recruitment and survival due to a variety of factors. These often include oceanic conditions, drought, poor water quality, predation, fishing and reduced food availability.

The historical spawning biomass average for Pacific herring (1979-1980 season to the present) equals 51,200 tons. The spawning biomass estimate for 2008-2009 fell to a historical low of 4,833 tons. During the 2009-2010 season the spawning biomass reached 38,000, followed by 57,000 tons in the 2010-2011 season. The spawning biomass estimate for the 2011-2012 season reached 61,000 tons. Currently, the population is recovering and the Department will continue to recommend low quotas to ensure a sustainable fishery and safeguard its importance as a forage fish.

Comment 4

Ms. Weinstein states that in developing this letter they noted the critical importance of herring to salmonids, mammals, birds, other large fish, ducks,

whales; some of which are in decline. Ms. Weinstein referenced a study by Julie Thayer and her colleagues at the Farallon Institute. They found that, historically, herring were the most important prey item for Chinook salmon in Central California in the 1950s, and since that time (herring) have drastically declined as a percentage of their diet. Ms. Weinstein stated that surf scoters require herring roe to thrive and to reproduce successfully in the summer. She noted that for humpback whales in Prince William Sound, Alaska, herring are the most important prey item. Ms. Weinstein states that there is critical information that they would like the Department to integrate into its (environmental) documents where currently, there is a finding of insignificant impact. She states that none of the information is included and they want to see that information included in a FMP context.

Response

*The Department acknowledges that the FED and FSED do not contain specific information related to the energetic needs of predators for Pacific herring. Herring's importance as a forage species is however addressed in the 2011 FSED in section **3.3.3 Importance of Herring as a Forage Species**. This section outlines herring's importance and how the Department uses this information to guide its management policies for the commercial fishery. Because the Department currently lacks information that is specific to the North Central Coast of California (related to predator/prey relationships), it will continue to manage with conservative quotas to ensure most herring remain available as forage. Currently, recommended quotas will allow a minimum of 95 percent of the available spawning biomass to reproduce and serve as prey for a variety of marine mammals, birds and invertebrates.*

New information related to predation on herring will be included in an FMP and the Department looks forward to any information that Audubon California et al can contribute during FMP development.

Comment 5

Ms. Weinstein's states that her third point is that in the absence of an FMP, the Department has had a year-by-year ad hoc approach (to herring management) with no clear objective and very poor public transparency.

Response

*The Department's goals for herring fishery management are spelled out in the **2011 FSED for Pacific Herring, Section 2.1 Project Objectives**. The project goal is to maintain healthy herring stocks in California. Objectives for achieving this goal include:*

- *Restore healthy age structures to stocks in need of rebuilding;*
- *Avoid and/or minimize the harvest of two and three-year-old herring, many of which are first-time spawners;*

- *Manage commercial harvest of herring to achieve a sustainable fishery;*
- *Provide sufficient herring to conserve living resources of the ocean that utilize herring as a food source;*
- *Provide sufficient herring to support recreational take.*

The Department did follow all noticing and public review requirements pursuant to the California Administrative Procedure Act. Notices of Proposed Changes to Regulations were sent to all interested parties on July 3, 2012, including Audubon California. Proposed regulations were posted on the Commission website and the 2011 FSED has been available since it was adopted in October of 2011.

<http://www.fgc.ca.gov/regulations/2012/163ntc.pdf>

<https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=39711&inline=true>

The Commission website also contains a detailed description of the rule making process and how to provide public input related to pending regulations.

In addition, herring project staff has responded to all public information requests in a timely and open manner. They have also provided Audubon staff access to survey operations for first hand insight into management of this important fishery.

Comment 6

Ms. Weinstein's states that Audubon California pulled information from 12 different (Department) documents to summarize information in preparing the letter (submitted to the Commission). Ms. Weinstein states that the Department has competent people and good scientists working to provide this information and complete analysis. However, that without an FMP, there is no way to unify this information.

Response

See response to comment 4.

Comment 6

Ms. Weinstein's states that Audubon California wants to focus on opportunities, so they urge the Commission to address the following: keep the fishery open this year at the five percent level, not certify the Supplemental Environmental Document due to CEQA inadequacies; close the commercial fisheries outside of San Francisco Bay that have not been assessed since the mid-2000s; inform the public as to the status of the FMP, and make it easier for the fresh fish market fishery to grow.

Response

See responses to comments 4 and 5.

The current Final Supplemental Environmental Document (FSED) was adopted in October 2011. Only season date changes were recommended, thus no new FSED was required for the 2012-2013 herring season. San Francisco Bay is currently the only active fishery in California. As a result of state wide reduced fishing effort, reduced staffing and budget constraints, the Department has discontinued survey efforts in other spawning locations. If fishing effort increase or staffing levels improve, the Department will reevaluate the management of those fisheries. No commercial fishery has taken place in Tomales Bay since 2007, in Humboldt Bay since 2005 and in Crescent City Harbor no activity since 2002. Given the poor market conditions, the previously mentioned fisheries are not expected to receive any fishing pressure for many years, if ever.

The Department's scientific and law enforcement staff intends to evaluate fresh fish regulation change proposals during the rulemaking cycle for the 2013-2014 commercial herring season.

Comment 7

Ms. Weinstein's requested that the Commission add to its agenda, a discussion for a pathway to an FMP, including funding opportunities. She stated that Audubon California would like to work with the commercial fisheries and Fish and Game to identify funding.

Response

Comment noted.

VI. Location and Index of Rulemaking File:

A rulemaking file with attached file index is maintained at:

California Fish and Game Commission
1416 Ninth Street
Sacramento, California 95814

VII. Location of Department Files:

Department of Fish and Game
1416 Ninth Street
Sacramento, California 95814

VIII. Description of Reasonable Alternatives to Regulatory Action:

(a) Alternatives to Regulation Change: No alternatives were identified.

(b) No Change Alternative:

A no change alternative would provide a quota for the 2012-2013 fishing season of 1,920 tons.

(c) Consideration of Alternatives:

In view of the information currently possessed, no reasonable alternative considered would be more effective in carrying out the purposes for which the regulation is proposed, would be as effective and less burdensome to affected private persons than the proposed regulation, or would be more cost-effective to the affected private persons and equally effective in implementing the statutory policy or other provision of law.

IX. Impact of Regulatory Action

The potential for significant statewide adverse economic impacts that might result from the proposed regulatory action has been assessed, and the following determinations relative to the required statutory categories have been made:

(a) Significant Statewide Adverse Economic Impact Directly Affecting Businesses, Including the Ability of California Businesses to Compete with Businesses in Other States:

The Department is providing the Commission a quota option range between zero to 10 percent of the 2011-2012 spawning biomass estimate of 60,985 tons. The potential changes to total State economic output, if the Commission were to choose a 10 percent, five percent, or zero percent option, are \$2,062,000, \$564,000, and \$(753,000), respectively, relative to last season. Both the 10 and five percent options result in positive incremental contributions to total economic output for the State, whereas the zero percent option would result in an adverse economic impact to the State and loss of as much as \$753,000 (2011 dollars) in total economic output. This is based on an economic output multiplier of 1.99 used in calculating total direct, indirect, and induced effects arising from the California herring fishery.

Depending on which harvest option the Commission chooses for 2012-2013, the harvestable quota will be between zero and 6,099 tons. No adverse economic impacts to businesses in California would occur under the Department's recommended five percent quota of 2,854 tons. Moreover, given the overriding market conditions for herring roe (declining demand overseas and lower prices), none of the quota options are expected to affect the ability of California businesses to compete with businesses in other states.

(b) Impact on the Creation or Elimination of Jobs Within the State, the Creation of New Businesses or the Elimination of Existing Businesses, or the Expansion of Businesses in California; Benefits of the Regulation to the Health and Welfare of California Residents, Worker Safety, and the State's Environment:

Depending on which harvest option the Commission chooses for 2012-2013,

the harvestable quota will be between zero and 6,099 tons. Both the 10 percent and five percent harvest options, result in positive incremental contributions to employment for the State of about 13 and four jobs, respectively, whereas a zero percent harvest could result in as much as 196 potential job losses. This is based on an employment multiplier of 12.7 jobs per each million dollar change in direct economic output from fishing activities in the California herring fishery, and a fleet of about 190 permittees.

The Commission anticipates benefits to the health and welfare of California residents. Providing opportunities for a herring fishery encourages consumption of a nutritious food.

The Commission does not anticipate any non-monetary benefits to worker safety.

The Commission anticipates benefits to the environment by the sustainable management of California's herring resources.

(c) Cost Impacts on a Representative Private Person or Business:

The agency is not aware of any cost impacts that a representative private person or business would necessarily incur in reasonable compliance with the proposed action. There are no new fees or reporting requirements stipulated under the proposed regulations.

(d) Costs or Savings to State Agencies or Costs/Savings in Federal Funding to the State:

None.

(e) Nondiscretionary Costs/Savings to Local Agencies:

None.

(f) Programs Mandated on Local Agencies or School Districts:

None.

(g) Costs Imposed on Any Local Agency or School District that is Required to be Reimbursed Under Part 7 (commencing with Section 17500) of Division 4, Government Code:

None.

(h) Effect on Housing Costs:

None.

INFORMATIVE DIGEST POLICY STATEMENT OVERVIEW

Under existing law, herring may be taken for commercial purposes only under a revocable permit, subject to such regulations as the Commission shall prescribe. Current regulations specify: permittee qualifications; permit application procedures and requirements; permit limitations; permit areas; vessel identification requirements; fishing quotas; seasons; gear restrictions; quotas; and landing and monitoring requirements.

The proposed regulations would establish the fishing quota, season dates and times for fishing operations for the 2012-2013 season in San Francisco Bay based on the most recent biomass assessments of spawning populations of herring as well as season dates and times for fishing operations for the 2012-2013 season in Tomales Bay. There are no quota changes proposed for Crescent City Harbor, Humboldt or Tomales bays for the 2012-2013 herring season.

The following is a summary of the proposed changes in Sections 163, and 164, Title 14, CCR:

- Set the San Francisco Bay quota between zero (0) and 10 percent (0 and 6,099 tons) of the 2011-2012 spawning biomass. The Department is recommending that the San Francisco Bay quota be set at 2,854 tons, which is approximately five percent of the 2011-2012 spawning biomass. If the Commission were to adopt this option, a 2,854 ton quota would result in a 5.0 ton individual quota for a "CH" gill net permittee and a 3.1 ton individual quota for a non-"CH" gill net permittee participating in the HEOK fishery.
- Set the dates of the roe herring fisheries in San Francisco Bay for Odd and Even platoons in San Francisco Bay from 8:00 a.m. on Wednesday, January 2, 2013, until noon on Friday, March 15, 2013.
- Set the dates of the roe herring fishery in Tomales Bay from noon on Wednesday, December 26, 2012, until noon on Friday, February 22, 2013.

The Commission adopted the Department recommended proposed regulations for the 2012-2013 commercial herring season.

The proposed regulatory action will benefit fishermen, processors, and the State's economy in the form of a healthy sustainable fishery, and future harvestable herring populations.

The Commission does not anticipate non-monetary benefits to the protection of public health and safety, worker safety, the prevention of discrimination, the promotion of fairness or social equity and the increase in openness and transparency in business and government.

The Commission performed a California Administrative Code database search for herring regulations in various Sections and Titles of California Code of Regulations. The Commission has considered these regulations and determined that they are neither inconsistent nor incompatible with the proposed regulations.

(Attachment 1)

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0006
(916) 319-2006
FAX (916) 319-2106

DISTRICT OFFICE
3501 CIVIC CENTER DRIVE, SUITE 412
SAN RAFAEL, CA 94903
(415) 479-4920
FAX (415) 479-2123

<http://democrats.assembly.ca.gov/members/a06>

Assembly California Legislature



JARED HUFFMAN
ASSEMBLYMEMBER, SIXTH DISTRICT

COMMITTEES
CHAIR, WATER, PARKS AND
WILDLIFE
BUDGET
NATURAL RESOURCES
UTILITIES AND COMMERCE

BUDGET SUBCOMMITTEE NO.3
ON RESOURCES

June 15, 2012

Mike Sutton, Vice President
California Fish and Game Commission
P.O. Box 944209
Sacramento, CA 94244-2090

Dear Commissioner Sutton:

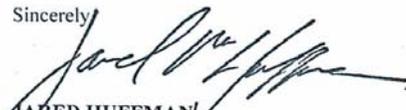
I am writing to support the request made by commercial fishermen in my district who were represented by Kirk Lombard, a former fisheries observer for the DFG/PSMFC, during the public comment portion of the Department of Fish and Game Commission meeting held on May 23, 2012. Mr. Lombard asked the Commission to explore a proposal to change the gear restrictions for Pacific herring that would allow for the use of small, hand held casting nets to be used in conjunction with the *Herring For Fresh Fish Market License* that was made available to fishermen last year. } 1

My constituents maintain that Hawaiian casting nets would have a very minimal impact on the fishery: they are small, hand-thrown nets that are a fraction of the size of the gill nets currently used by the commercial herring fishermen. Gill nets are typically hundreds of feet long and are weighted by 35 pound anchors. By contrast, Hawaiian casting nets (aka: "throw nets") are 6 feet long and weigh about 5 pounds. These nets do not work in water deeper than 10 feet, so herring could only be caught when they move inshore – which amounts to approximately 15 days of fishing. To illustrate: the commercial herring take last year was approximately 3 million 8 hundred thousand total pounds compared to a potential two thousand total pounds that might be caught with a casting net. Put another way, a successful throw net fisherman, if he did extremely well, might possibly succeed in catching 3 hundredths of 1 percent of the total herring catch. } 2

They point out that a casting net would be advantageous in herring fishing because the fish would be in pristine condition when brought to market (large gill nets smash and rip to shreds the fish). Even though a comparatively insignificant number would be caught, the price would be much higher than that paid for gill netted fish. Additionally, the public would get to experience a local, abundant, nutritious and delicious California resource that is normally exported to Japan and rarely sold at local restaurants and markets. The casting net would be a banner example of a small-scale, artisanal and sustainable gear type. The casting net would also compliment the "*Herring For Fresh Fish Market License*" that was modified last year (2011). } 3 } 4

I hope you will give their gear request serious consideration, with due attention to the health of the herring stocks, and initiate an agenda item dedicated to the topic before the rules are set for the winter 2012/2013 season. } 5

Sincerely


JARED HUFFMAN
Assemblymember, 6th District

2012 JUN 21 PM 2:01
RECEIVED
CALIFORNIA
FISH AND GAME
COMMISSION



September 24, 2012

To: James Kellogg, President
California Fish and Game Commission
1416 Ninth Street, Room 1320
Sacramento, CA 95814

Dear President Kellogg and Commissioners:

On behalf of our members, Audubon California, Oceana, Earthjustice, Golden Gate Audubon, and Santa Clara Valley Audubon submit the following comments on the supplemental environmental document for the commercial herring fishery 2012-2013, and the Commission's proposed intent to amend sections 163 and 164, Title 14, California Code of Regulations, relating to the commercial herring fishery.

In the past year, we have interacted with the California Department of Fish and Game (CDFG) herring management team, as well as representatives of the commercial herring fleet, and found a high level of interest in protecting this fishery. Commercial fleet leaders are clearly concerned for the long-term health of the stock, and have implemented harvest quota reductions aimed at recovering the stock from historic lows in the late 1990's, among other actions. Recent modest recovery in estimated spawning biomass of herring may be at least partially attributed to these actions, as well as to favorable ocean and estuarine conditions. Regardless, there are several causes for alarm in the status and management of Pacific herring in California including:

- Persistent and worsening truncation of age structure in the stock, with almost no older fish remaining;
- Depressed stock biomass relative to past decades;

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- Absence of a Fisheries Management Plan (FMP) under the California Marine Life Management Act (MLMA), which would provide clear objectives for herring management or reference points from which to evaluate stock recovery or sustainable management;
- Lack of monitoring herring stocks in areas open to commercial harvest outside of San Francisco Bay;
- No clear or explicit accounting for the needs of herring-dependent predators when setting sac roe harvest quotas;
- Violations of the California Environmental Quality Act (CEQA) including a confusing and non-transparent management structure that discourages or prevents informed public input; and
- Inadequate support by the state for the Department’s herring team.

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While these concerns raise serious questions about whether any commercial herring fishing is warranted at this time, we acknowledge the precautionary actions taken by the Commission, the Department, and the industry and support a harvest of no more than 5% of estimated biomass, contingent on demonstrated continued recovery of the stock. However, we urge the immediate re-initiation of an FMP for this fishery and will strongly oppose any quota increases above 5% until the stock shows signs of recovery and management inadequacies are resolved.

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Fortunately, there are clear and unique opportunities to reshape the future of the herring fishery, particularly in light of the “blueprint” for forage species management now before the Commission. This comment provides a review of the importance of herring to California’s marine wildlife, explanation of areas of concern, and constructive recommendations and opportunities for improvement.

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Forage Species - the Foundation for Marine Predators

Forage species are the primary driver of marine predator distribution and abundance and the growing threats to their viability underlie the many scientific review papers, management recommendations, and policy changes recently initiated or completed at state and federal levels. In 2012, the Lenfest Forage Fish Task Force, comprised of 13 of the world’s leading fisheries biologists and marine scientists, released a comprehensive examination of the science and management of forage fish populations, calling for the need to dramatically reduce harvest levels to protect predators, including large fish, seabirds and whales.¹ Another 2012 review published in *Science* documented the consistent and significant negative response of marine birds to depletion of primary forage species in seven discrete marine ecosystems.²

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These findings, among others, have supported significant new policy changes in forage species management on the west coast. In June 2012, the Pacific Fishery Management Council voted to “prohibit the development of new directed fisheries on forage species that are not currently managed.”³ In California, the Fish and Game Commission’s Marine Resource Committee recently agreed to language for a state forage policy and also to bring the draft policy to the full Commission for adoption. This policy would prevent the

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expansion of existing state-managed fisheries on forage species, and prevent new directed fisheries on forage species.⁴

} 14 cont.

Pacific herring stocks, found in the northern Pacific from Japan to Baja California, are foundationally important for marine wildlife. Many large fish, birds and marine mammals feed preferentially on energy-rich and highly exploitable herring and their roe, including special status species and salmonids. Fortunately, estimates of the energetic demands for a number of marine species are now available and could be used to assess the amount of herring needed to sustain marine predator populations.

} 15

The Importance of Pacific Herring to Birds and Other Wildlife in California and the Northwest Pacific

Marine areas off central and northern California are some of the Pacific's most important areas for marine wildlife. This region attracts and retains a high density of whales, pinnipeds, turtles, large fish, and birds.⁵ The region is hemispherically important for marine birds, with the largest seabird colony south of Alaska (the Farallon Islands), rich at-sea foraging grounds (Monterey Canyon, Farallon Escarpment and Cordell Bank), and the most important wintering areas for sea ducks and other Pacific waterbirds (San Francisco and Tomales Bays).

} 16

Pacific herring are known to spawn in at least 13 sites in California (Figure 1). Many predators feed preferentially on herring. Spawning events generate a feeding frenzy on herring eggs by ctenophores, juvenile salmonids, sturgeon, smelt, surfperches, crabs and at least 20 species of birds. Adult herring are prey for salmon, seals, sea lions, seabirds, porpoises, dolphins, orcas, humpback whales, salmonids, lingcod, several species of rockfish, and sand sole. Within San Francisco Bay, herring provide forage year-round, in the form of eggs and juveniles.⁶

} 17

The following is a summary of some of the information available regarding the dependence of key predator species on herring.

Salmonids

Salmon rely on a diverse array of prey resources that fluctuate in abundance and distribution depending on ocean climate, fisheries pressure and interspecific competition. Chinook salmon, an important commercial species in central California, has suffered dramatic population declines in recent years prompting multi-year closures of the commercial fisheries and displacement of fishing communities. Currently, over 200 salmon runs in the California and the Pacific Northwest are at "varying degrees of the risk of extinction in the near future" due to a combination of factors including reduced food availability.⁷

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Herring is one of the most important prey items of Chinook salmon in central California, along with anchovies, sardines and jack mackerel.⁸ Chinook salmon feed preferentially on herring in offshore areas.⁹ There was a dramatic decline of herring in Chinook salmon diet in central California over the last half century. In 1955, herring comprised the majority of California Chinook salmon diet in the late winter and spring (February,

} 19

March and April) with significant pulses also in summer. In 1980-1986, herring was a minority of Chinook salmon diet in late winter/spring, although summer pulses were still evident at similar levels. Winter/spring was not sampled in 2005-2007 but herring was undetectable during the summer period when herring had previously comprised 10% of salmon diet.¹⁰ Concurrently, stocks of anchovies in southern California, and stocks of sardines coast-wide, have declined.¹¹ This overall reduction in prey availability and diversity has "likely contributed to reduced and more variable Chinook salmon abundance and return rates."¹²

19 cont.

Marine mammals

The 1998 Final Environmental Document (FED) and subsequent Final Supplemental Environmental Documents (FSEDs) lack any information on the status and energetic needs and prey preferences of marine mammals in California. The FED simply states that "California sea lions specialize on schooling, open-water fishes ... and may be one of the most significant of the mammalian predators of herring in California.... all of the smaller cetaceans are likely to be herring predators. Among the larger cetaceans, minke whales, humpback whales and fin whales are known to be fish eaters."

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In reality, herring are a critical component of the diet of whales and pinnipeds, including the federally endangered humpback whale and the federally threatened Steller sea lion. Examples of recent studies on a few of these species, referenced below, show that many of these predators feed preferentially on herring, and this predation can have a strong impact on herring stocks.

Humpback whale (Megaptera novaeangliae) The humpback whale population in the northeast Pacific has increased by approximately 5% per year for the last 20 years, requiring a larger share of forage species than in previous years. The California and Oregon population quadrupled from 1990 to 2008 and is now estimated at 2,043 individuals.^{13,14} The population of 2,043 humpback whales in California and Oregon requires approximately 817 tons of food per day (0.4 tons/day/whale/2043 whales).^{15,16}

While studies of humpback whale diets off the US west coast are lacking, studies in southeast Alaska (Prince William Sound, Sitka Sound and Lynn Canal) have demonstrated the profound effects humpback whales have on herring spawning biomass. Herring is the most important prey item for humpback whales at all three sites but not in all months (Figure 2). in the most affected area, Prince William Sound, a population of 81 (2007-2008) and 147 (2008-2009) humpback whales removed an estimated 10-70% of herring biomass. According to these studies, "Whales foraged in large numbers (81-147 individuals) over much of the fall and winter in Prince William Sound resulting in significant predation intensity. In absolute terms, whales potentially consumed between 2,639 and 7,443 tons of herring in 2007-2008. This represented a predation intensity of 27% to 77%. In 2008-2009 whales potentially consumed between 2,362 and 12,989 tons and predation intensities ranged between 11% and 63% of the total biomass present in spring 2008. For comparison, the last harvest of herring from Prince William Sound was 3,904 tons in 1998- approximately 20% of the spawning biomass."¹⁷

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These studies hypothesize that disruption of herring schools by foraging whales makes herring available to other predators with limited diving abilities, and that the disruption of herring's formation of overwinter schools by foraging humpback whales facilitates foraging of Steller sea lions, seabirds, and other pelagic predators for which the deep overwintering herring schools would otherwise be relatively inaccessible. Seabirds and pinnipeds associate with whales and capitalize on whale foraging efforts during the winter months.¹⁸ Overall, the Alaska studies have shown the profound importance of herring to humpback whales.

21 cont.

Steller sea lion (Eumetopias jubatus): Steller sea lions are recovering in Washington and Alaska, but failing to recover in central and southern California, where the population declined between 1982 and 2002 and is now estimated at 4,000 individuals.¹⁹ Two important rookeries occur at Ano Nuevo and the Farallon islands. There is no published information on Steller sea lion diet in California, but in southeast Alaska herring is the most common prey item.²⁰ In southeast Alaska, Steller sea lions make high energetic investments to locate herring schools. One study notes that "abundant quantity and presence of some high quality prey (salmon, herring and eulachon) likely sustains the increasing population in southeast Alaska."²¹ The population of 4,000 Steller sea lion in central and northern California requires 78 tons of food each day (calculated using calorie content of herring and hake).^{22,23,24,25}

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California sea lion (Zalophus californianus) and harbor seal (phoca vitulina): The U.S. population of California sea lions increased 6.5% per year from 1983-2003, and may now be stabilized at about 238,000 individuals.²⁶ California sea lions in central California (Hurricane Point to Ano Nuevo Island) in 1999, numbering about 18,000 individuals, consumed about 8-10% of the sardine stock.²⁷ There are an estimated 34,233 harbor seals in California, which are known to target herring spawning aggregations or juvenile herring.

23

The 1998 Final Environmental Document (FED) and subsequent Final Supplemental Environmental Documents (FSEDs) lack any information on the energetic needs and prey preferences of marine mammals in California. The FED simply states that "California sea lions specialize on schooling, open-water fishes ... and may be one of the most significant of the mammalian predators of herring in California.... all of the smaller cetaceans are likely to be herring predators."

24

Birds

Herring and their roe provide a persistent, energy-rich, and aggregated food source for a wide suite of bird species. Adult herring are consumed by many birds along the coastline, including Brandt's and double-crested cormorants, brown pelicans, western grebes, terns, gulls and loons. In San Francisco Bay, young-of-the-year herring are also an important component of the diet of the endangered California least tern. Off the coast, marine birds including shearwaters, cormorants, common murre, auklets, puffins, marbled murrelet, and brown pelican feed on adult herring.^{28,29} In Prince William Sound, herring comprise approximately 50% of the prey volume of black-legged kittawakes and this species actively seeks out herring while foraging.³⁰

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Many other species specialize on herring roe, which is thought to substantially increase winter survival rates for birds that have access to this food resource. In British Columbia, aggregations of 50,000-300,000 waterbirds, including gulls, sea ducks, and other diving species, have been observed at herring spawning events. Pacific sea ducks are more dependent on herring than any other taxa of birds. For example, harlequin ducks aggregate in British Columbia only when feeding on herring spawn³¹ and long-tailed ducks³² and Steller's eiders³³ seek out and preferentially feed on herring roe.

25 cont.

Scoters in particular are highly dependent on herring roe for overwinter survival and breeding success. Scoters dramatically alter their movement and habitat use patterns in spring to take advantage of ephemeral and energy-rich herring roe, suggesting that this food resource is of particular importance to these species.^{34,35} Surf scoters have declined by 50-60% in the last 50 years³⁶ while greater and lesser scaup, two other diving ducks that depend on herring roe, have declined by 15%.³⁷ From southeast Alaska to California, the spatial extent of herring spawning has declined and in British Columbia waterbirds aggregate at increasingly fewer spawning sites.³⁸

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San Francisco Bay is a global Important Bird Area, supporting 50% of the wintering sea ducks along the Pacific Flyway (Alaska to Baja). This is in part because San Francisco Bay supports an estimated 90% of California's remaining herring stock,³⁹ which provides critical overwinter nutritional support for at least 20 species of waterbirds, including all members of the scoter group. San Francisco Bay supports about 50% of the total Pacific population of surf scoters and 40% of the total population of greater and lesser scaup.⁴⁰

27

Among other reasons, San Francisco Bay is critically important for waterbirds because of the spatially consistent and predictable foraging hotspots where herring spawn. Most herring spawning in San Francisco Bay takes place in greater Richardson Bay and to a lesser extent at Point Richmond. (see Figures 3a and 3b, showing CDFG herring team sampling locations in recent years that also represent the locations of major spawning events.) The vast majority of commercial herring catch originates in greater Richardson Bay (Figure 4), an area known to strongly attract and retain waterbirds. There is a winter seasonal closure on 900 acres of subtidal area leased by Audubon California and administered by the Richardson Bay Audubon Center. In most years 38 species of wintering waterbirds occur here, and in recent years, up to 9,300 waterbirds, including a high of 126 surf scoters, have been observed here.⁴¹ This overlap of a critical wintering waterbird site and commercial fishing activity should be explicitly considered in management, as there is a potential for interference competition at these consistent foraging hotspots. Similar considerations exist for Tomales Bay, an Important Bird Area for waterbirds.

28

Other taxa that tend to forage on prey other than, or in addition to, herring shed light on the high volume of prey consumed by apex predators:

- In British Columbia, total annual consumption of herring by 13 predators averaged 61,000 tons from 1973-2008. This is over 25% of the estimated maximum carrying capacity for herring in British Columbia.⁴²
- The common murre population between Cape Blanco and Pt Conception, numbering ~1.5 million birds, requires over 170,000 tons of prey pre year, primarily Market squid, shiner surfperch, midshipman, rockfish, anchovies, sardines and herring.⁴³

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Pacific Herring Are in Decline and California's Stocks Are Stressed or Unassessed

The San Francisco Bay stock, where commercial fishing activity still takes place, is manifesting signs of stress in the form of severe age class truncation, low biomass, and reduced size at age.

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Age Class Truncation

The severe age class truncation of Pacific herring shows no sign of improvement, despite several years of improved biomass after historic lows in 2006-2009. Eight-year-old fish disappeared after 1982-1983, seven-year-olds disappeared after 1998-1999, six-year-olds disappeared in 2010-2011, five-year-olds were almost undetectable in 2010-2011, and four-year-olds were at or near historic lows in the three seasons starting in 2008-2009 (Figures 6a and b). Age-class truncation is a well-documented sign of stress in fish stocks.⁴⁴

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The 2011-2012 FSED (which also serves as FSED for 2012-2013 commercial season) notes that:

"The numbers and proportion of older herring remain well below historical averages and is of concern because these older fish historically supported the commercial fishery. The successive cohorts that would normally support a commercial fishery (herring age four, five, and six), have shown poor survival. Low survival of these older age classes places additional burden on abundant cohorts like the 2007-08 year class to support the San Francisco Bay fishery and to fulfill the ecosystem role of herring. This is the primary reason the Department recommends a five percent quota for the commercial herring fishery."

This trend has also been observed in Tomales and Humboldt Bays. While discussing a downward trend in landings relative to harvest quota for Humboldt Bay, the 2005 FSED notes that "a long-time Humboldt Bay herring permittee attributed these low landings to a disproportionate amount of small herring entering the bay, which were unavailable to commercial 2 ¼-in. mesh nets. Landing data from the Department's research nets appear to support this observation as approximately 91 percent (by number) of the herring caught during the 2004-05 season were captured in meshes 2-in. or less." Humboldt Bay stocks have not been assessed since 2005-2006.

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The Department does not offer an explanation for state-wide age class truncation, nor a plan for addressing the cause and improving age structure in this population. One possibility is that predators may be consuming the majority of the older herring⁴⁵ that tend to occur on the continental shelf and outer coast.⁴⁶

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In addition to the age-class truncation reported in the FSEDs, CDFG notes that “more two-year-olds are sexually mature, and more fish are smaller-at-age than in past years.”⁴⁷ This important detail, an indicator of stressed stocks in schooling pelagic species,⁴⁸ is not reported in the FSEDs.

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Reduced Biomass

The Department has characterized the stock as “recovering” despite the lack of significant improvement in biomass between 2010-2011 and 2011-2012 (~57,000 tons and ~61,000 tons, respectively).(Figure 6c) It is notable and worrisome that highly favorable ocean conditions in 2009-2010 failed to support strong recruitment of two-year-olds in 2010-2011. Also, the Department measures recovery against estimated spawning biomass from the early 1970s. This is not an acceptable historical baseline against which to measure recovery, considering that the 1970s were years of heavy over-exploitation when quotas approached or reached 20%. It is, rather, a shifting baseline nested in a long-term declining trend; for example, in 2007 the average historic biomass was 52,302 tons, in 2011 it was 49,327 tons. Again, this highlights the need for estimates of unfished biomass and reference points based on best estimates of abundance prior to fishing pressure.

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The 2007 FSED is the last in which Tomales Bay, Humboldt Bay, Monterey Bay and Crescent City are included in the Environmental Setting. The Department ceased survey work in these areas following the 2005-2006 season. Regardless, the Commission continues to authorize substantial commercial fishing in these areas.

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Tomales Bay: This site was historically the focal point for herring harvest in the greater Bay Area, with periods of heavy fishing to supply a canned fish market in California and the overseas herring roe market. Herring stocks declined nearly 20% in Tomales Bay from 1972-2005 and show a clear declining trend between the first and second half of this 33-year time period (Figure 7). The last year that estimated biomass exceeded 5000 tons was in 1986 and prior to that biomass estimates were as high as 22,000 tons. The 1993 to 2006 average estimated spawning biomass in Tomales Bay was 3712 tons.⁴⁹ Yet, the Commission has been authorizing a 350 ton quota, almost 10% of the estimated current standing biomass.

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Humboldt Bay: From 1974 to 2007 average herring biomass estimates for Humboldt Bay averaged just under 400 tons (Figure 8) and returns have weakened noticeably since 2000. The last biomass estimate for Humboldt Bay was seven tons in 2007, the year of near-historic low returns in San Francisco Bay. Trends in biomass for Humboldt Bay were nearly the reverse of those observed in San Francisco Bay, with strong returns in the mid-1990s when San Francisco Bay stocks were depressed and poor returns in the mid-2000s when San Francisco Bay stocks were stronger. The Commission is authorizing a

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quota of 60 tons for Humboldt Bay; this is eight times the total biomass from the Department's assessment in 2007. Sixty tons is also 15% of the average biomass estimate of 400 tons since 1974.

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Crescent City: The FED and FSEDs do not appear to contain information on stock assessments conducted in Crescent City. The 1998 FED contains a map of the coastal area open to commercial fisheries and the Commission has authorized a 30 ton quota for this area, despite a lack of information on spawning biomass.

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Monterey Bay: From 1947 through 1972, landings of herring caught on the coast in Monterey Bay normally exceeded that of San Francisco Bay, with a high of 2951 tons caught in 1952 (Figure 9). This stock is no longer assessed, open ocean fishing is no longer allowed, and there is no information available on current spawning areas of herring in the region of Monterey Bay. The FED notes that spawning historically occurred in Elkhorn Slough, also an Important Bird Area.

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Stochastic events

Management of the herring fishery must take into account the stochastic nature of herring productivity, as well as the cumulative effects of the fishery with other natural and anthropogenic stressors. In particular, a major goal of herring management should be to maintain the resilience of the stock in the face of unexpected events. In 2007, the container ship Cosco Busan released 54,000 gallons of bunker fuel oil into San Francisco Bay, causing unexpectedly high mortality in Pacific herring embryos and contributing to recent population declines. Ultimately, the effects of fishing pressure and this type of event are cumulative, rather than separate effects, as a healthier herring stock is more robust to unexpected impacts than an already depleted one.

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Management Deficiencies

Insufficient grounds for finding of No Significant Impact

FSEDs (generated from 1999-2000 to 2011-2012) fail to adequately describe herring predators (Affected Resources) in central California, and their energetic needs relative to herring, and therefore provide insufficient grounds for findings of No Significant Impact.

The FED contains general information on herring predators in central and northern California, but is outdated and lacks detail on current status and dietary requirements in the context of herring abundance (described in part above) that should inform a consideration of significant impact. Subsequent FSEDs contain approximately one page on the role of herring as forage, and fail to include current, updated or additional information. For example, the FED, in its finding of No Significant Impact on birds and marine mammals, states that "direct feeding by birds on herring roe has only been reported in the ornithological literature as a limited or incidental, late-winter activity... mitigation in recognition of the importance of herring as a forage item for birds is provided by setting conservative exploitation rates ... no additional mitigation is

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proposed for impacts to bird (and marine mammal) populations because they are expected to be localized, short-term and less than significant.”

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This 1998 finding, approved each year in FSEDs through the certification process, fails to take into account new information on the importance of herring and roe to ducks, seabirds, marine mammals and salmonids. The FED and FSEDs conclude No Significant Impact without attempting to acknowledge or account for the energetic requirements of herring-dependent scoters, or the status of many other predators of herring in central California, such as whether these predators are able to feed on alternative prey sources, the availability of those alternative prey sources, or the consequences of feeding on prey with lower energy density than herring.

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These documents also define a conservative exploitation rate as up to 20% of estimated biomass, for which there is no clear justification or evidence. Recent scientific studies of forage fish fishing strategies demonstrate that traditional concepts of “conservative exploitation rates” for single species can cause widespread impacts on predators and include recommendations that fishing rates do not exceed ½ of FMSY levels and that management plans utilize “hockey stick” harvest rules where at least 40% of unfished biomass is set-aside. These studies represent the best available science and call for significantly revised definitions of conservative exploitation rates.^{50, 51, 52}

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The proposed 4.7% estimated biomass harvest level (2,854 tons) for 2012-2013 equals 30-35% of the highest reported harvest rates (about 8500 tons) since 1916 (Figures 5a and 5b).

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Procedural violations of CEQA

An EIR has never been conducted for the commercial fishery. Instead the State has taken a “functional equivalent” approach to the commercial herring fishery. The 2011-2012 FSED states that:

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“An alternative to the EIR/ND requirement exists for State agencies for activities that include protection of the environment as part of their regulatory program. Under this alternative, an agency may request certification of its regulatory program from the Secretary for Natural Resources. With certification, an agency may prepare functional equivalent environmental documents in lieu of EIRs or NDs. A functional equivalent, Final Environmental Document for Pacific Herring Commercial Fishing Regulations, was certified by the Commission on August 28, 1998. A new FED is required: (1) when subsequent changes are proposed in the project requiring important revisions of the previous FED due to new significant environmental impacts not considered in a previous FED; or (2) when new information of substantial importance to the project becomes available (Section 15162, Title 14, CCR and Public Resources Code (PRC) Section 21166). The CEQA lead agency may choose to prepare a supplement to a FED instead of a new FED, if only minor additions or changes are necessary, to make the previous FED adequately apply to the project in the changed situation. The draft supplemental document is given the same notice and public review given to a draft environmental document, and may be circulated by itself without the previous FED. The lead agency when deciding whether to approve the proposed project, considers the

previous FED as revised by the supplemental environmental document (Section 15163, Title 14, CCR)."

According to the state's requirements for a "functional equivalent" approach, a new FED is clearly needed to satisfy (1) and (2). In the 14 years since the publication of the FED, substantial new information of importance to the project is available, and new potentially significant environmental impacts have not been considered. As previously discussed, some of those deficiencies that need to be addressed include the importance of herring as forage, the severe age class truncation of the stock, and a lack of assessment effort in Tomales Bay and Crescent City.

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Other new information includes the known and projected impact of climate change. More frequent and intense storms are likely to affect the availability of vegetative substrate, in particular the red algae *Gracilaria*, which may be the most important spawning substrate for herring in central California. The FED notes that Richardson Bay was the primary subtidal spawning area in the Bay in the 1970s and early 1980s, until "storm action during the 1982-1983 El Nino is thought to have removed much of the *Gracilaria* from this area. Despite the loss of subtidal vegetation, Pacific herring have continued to spawn in Richardson Bay, often on pilings and boat bottoms in marinas as well as on eelgrass." Audubon California's own observations of spawning substrate in Richardson Bay, both with DFG herring staff and independently (Figure 10), support the idea that *Gracilaria* is the preferred spawning substrate, but this has yet to be definitively confirmed. The 2002 FSED also supports this conclusion, stating that for Tomales Bay "70% of total spawning escapement was estimated to have occurred on *Gracilaria*. Herring displayed a preference for *Gracilaria* as a spawning substrate. This was especially noticeable in areas where both types of vegetation occurred simultaneously."

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Additionally, more erratic and flashy patterns of precipitation are likely to affect spawning conditions due to the influence of salinity on spawning intensity and duration. For example, spawning biomass in Tomales Bay began to decline drastically in the late 1980s as a result of what would become a six-year drought. Drought conditions in Tomales Bay were thought to be the primary cause of the decline in spawning biomass. Without normal rainfall, bay salinities remain high and are not conducive for spawning. Poor spawning conditions may have led a large portion of herring to temporarily abandon Tomales Bay until conditions improved.⁵³

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In addition to the deficiencies of the "functional equivalent" documents, the process for public input is poorly organized and communicated. There is no supplemental information provided on the rationale for the proposed 2012-2013 quota of 5% estimated 2011-2012 biomass. Critical information that should be aggregated and made easily accessible to the public should include, at a minimum: 2011-2012 estimated biomass, size-frequency distribution from the research catch and samples of commercial catches, the relationship of gill net mesh size and other aspects of authorized fishing gear to management goals, and the status and timeline for development of a fishery management plan in accordance with the California Marine Life Management Act. Other critical information that has not been publicly available includes notice of public forums, such as the annual meeting of the Commission's herring committee, at which many important discussions and decisions take place.

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Overall, the FED and FSEDs fail to fully and accurately inform decision-makers and the public of the environmental consequences of proposed actions, and therefore do not satisfy the basic requirements of CEQA. Courts have invalidated EIRs as a matter of law due to the omission of information about a project's setting that undermined accurate analysis of environmental effects. An accurate description of the environmental setting also is critical because existing conditions normally constitute the baseline for determining the significance of environmental impacts.⁵⁴

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Recommendations

At the October 2012 meeting, we urge the Commission to:

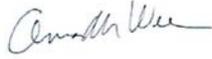
- Set a sac roe quota of no more than 4.7% of the 2011-2012 estimated biomass, as is recommended by the Department, but do not certify the FSED, in light of CEQA violations. } 56
- Close commercial fisheries in Tomales Bay and Crescent City pending an assessment of stocks in these areas. } 57
- Freeze the commercial fishing harvest at no more than 5% or less of the estimated biomass until the identified deficiencies in this letter are resolved, particularly the completion of a new FMP. } 58
- Require the Department to develop an EIR (or, at a minimum, a new FED) that fulfills CEQA requirements. } 59
- Consider retiring latent permits, and other mechanisms, to prevent fishery expansion. } 60
- Acknowledge and support the fresh fish quota and markets. } 61
- Make good faith efforts to identify funds for the Department's herring program staff to undertake essential activities in support of a robust EIR, including, but not limited to: assess stock status in Tomales Bay and Crescent City; convene experts to evaluate the severe age class truncation of the San Francisco Bay stock; map essential spawning and buffer habitat in these areas. } 62
- Inform the public as to the timeline and status of the development of a Fishery Management Plan under the Marine Life Management Act, and reasons for the delay in developing an FMP. } 63

In order for the Department to justify the 4.7% harvest rate as conservative, it must consider and describe for public review its justification in the context of the whole ecosystem and the newly available scientific benchmarks established by recent studies. Specifically, the Department should: } 64

- Account for how much herring are needed by predators and integrate forage reserves into the harvest quota. As we describe above, there exists sufficient data to develop these estimates. } 65
- Clearly describe the management goals for Pacific herring, including target and limit reference points for herring biomass. } 66
- Determine how quotas, mesh sizes, areas closures, and other recommendations, will help reverse the severe age class truncation of the SF Bay stock and recover the population to specified target levels. } 67
- Assess the cumulative impacts of the functional disappearance of other historically important herring spawning stocks in Tomales and Monterey Bays and possibly other areas of California. } 68
- Consider the coastwide depletion of herring stocks from California through British Columbia, which has reduced the cumulative availability of herring to predators. } 69
- Develop an estimate of historic unfished biomass in order to establish a baseline against which current stock status can be measured. } 70
- Integrate, minimally, coarse descriptions of the known and potential impact of climate change on herring stocks in California. } 71
- Immediately resume development of a Fishery Management Plan for the commercial herring fishery. } 72
- Clearly post opportunities for public involvement as per CEQA. } 73
- Make essential ecological, socioeconomic, and other relevant information available for public review. } 74
- Assess herring management of other U.S. states and British Columbia to identify best practices. } 75
- Apply the recommendations in the literature discussed above, to the management of Pacific herring, including the establishment of a harvest threshold cutoff and other reference points. } 76

Please include this letter in the administrative record of proceedings for the management of the California commercial herring fishery. Thank you for the opportunity to comment, and please feel free to contact us with any questions or concerns.

Sincerely,



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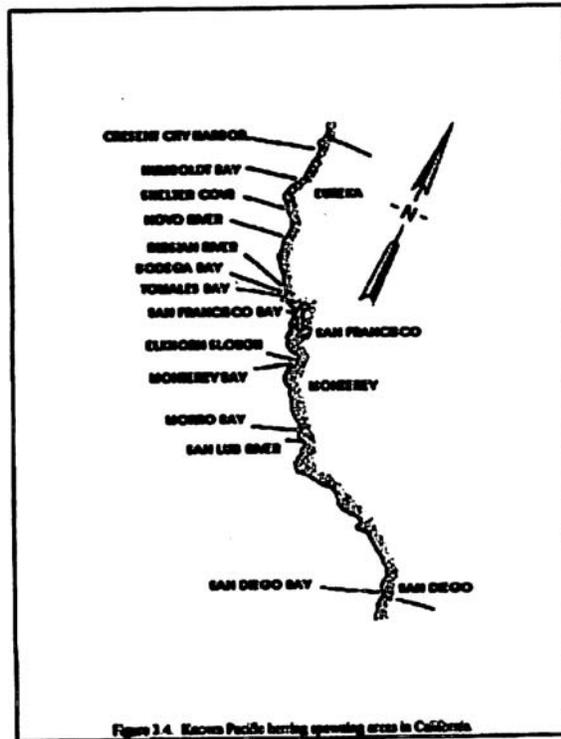
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Figure 1. Known herring spawning locations in California. (Source: FED)

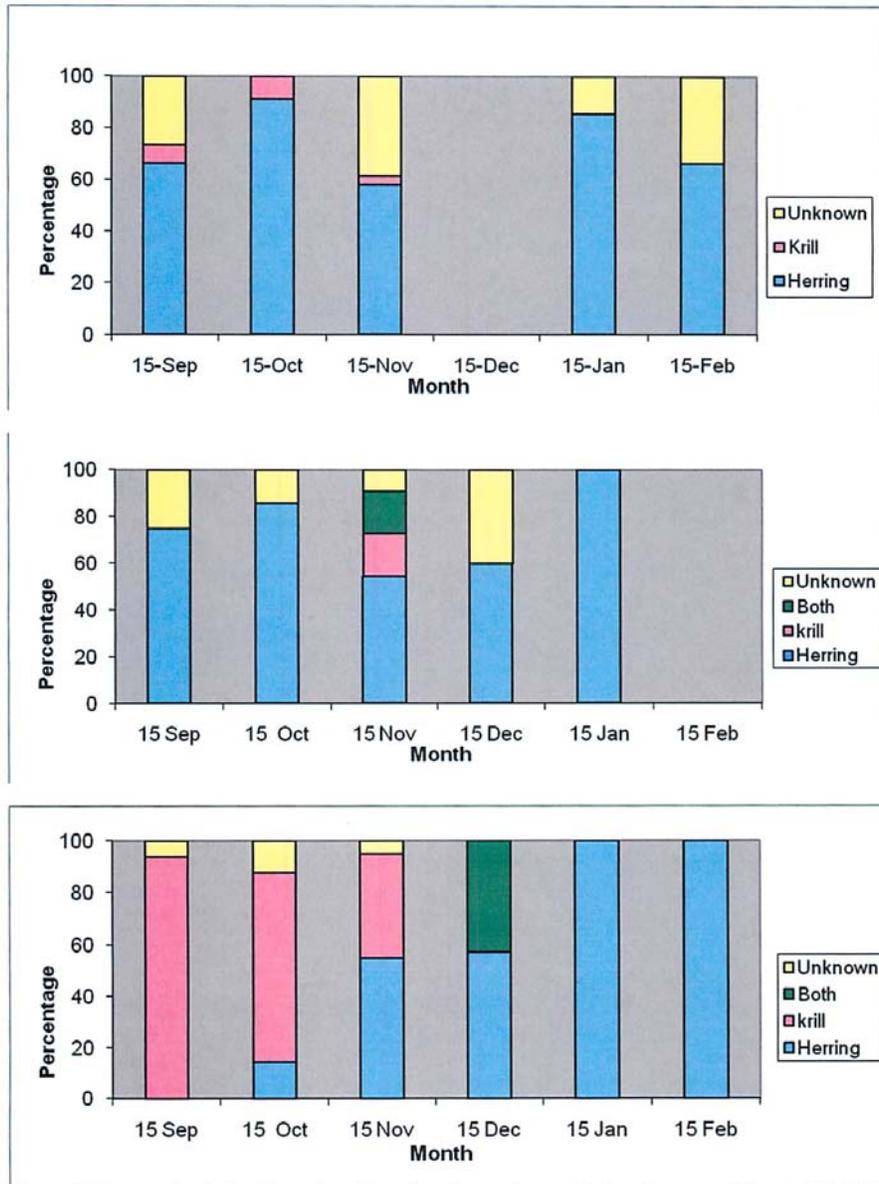


Figure 2. Humpback whale diet at three locations in southeast Alaska. (Source: Rice et al 2010).

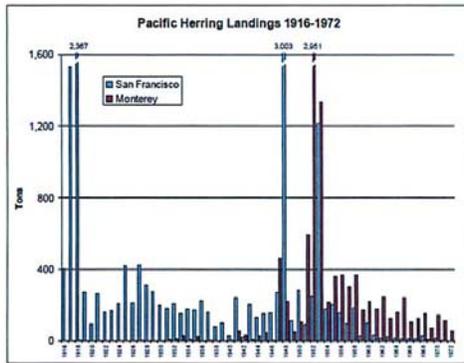
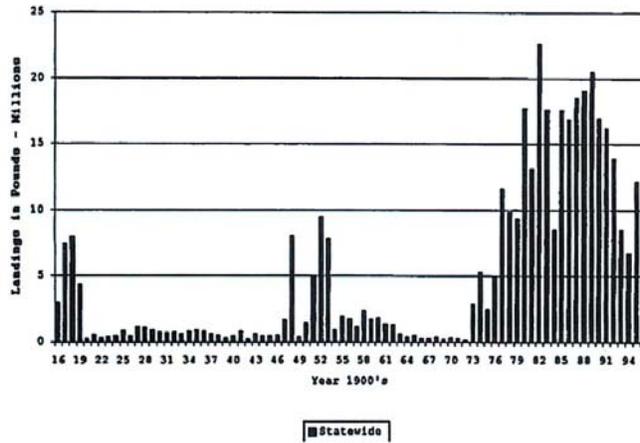


Figures 3a and 3b. Recent locations of CDFG herring spawn sampling locations in San Francisco Bay. Source: Ryan Bartling, Department of Fish and Game.

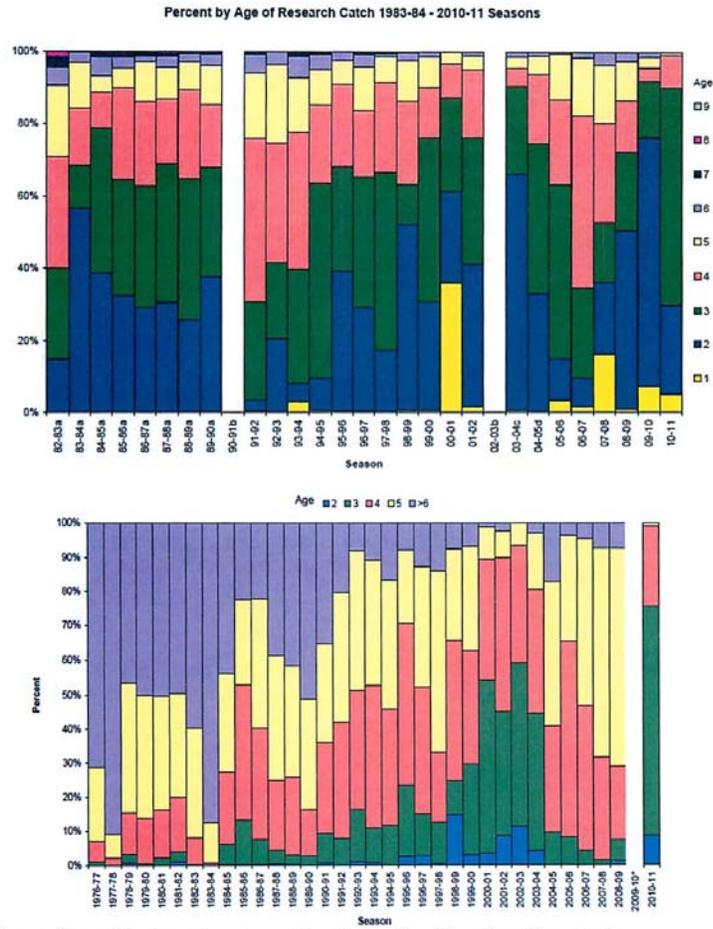
#	Approximate Spawn/Catch Date	Location	Submerged Veg.	Shoreline	Spawn Total	Gill		Biomass Total
						net	HEOK	
1	December 4-4, 2010	Richardson Bay	39		39			39
2	December 7-8, 2010	Burlingame W/Front		77				77
3	December 22-23, 2010	Richardson Bay	2,241		2,241			2,241
4	December 29, 2010	Coyote Point		189	189			189
5	January 10-11, 2011	Richardson Bay	27,485		27,485	246		27,731
6	January 18-20, 2011	San Francisco W/Front		9,484	9,484	746		10,230
7	January 24-27, 2011	Paradise to GG Bridge	7,806	2,429	10,235	734		10,969
8	February 4-7, 2011	Point Richmond (includes Richardson Bay)	3,855	106	4,052			4,052
9	February 27-28, 2011	Point Richmond	153	3	156			156
10	March 6, 2011	Richardson Bay	1,397		1,397			1,397
n	spawn events = 10	Total In Tons	42,976	12,379	65,356	1,727	0	57,082

Figure 4. 2010-2011 San Francisco Bay herring biomass estimate .

Figure 3.13. Annual landings of Pacific herring in California.



Figures 5a and b. Pacific herring historic landings data, Sources: FED (a) and Tom Grenier (b)



Figures 6a and b. Age class truncation in the San Francisco Bay stock.

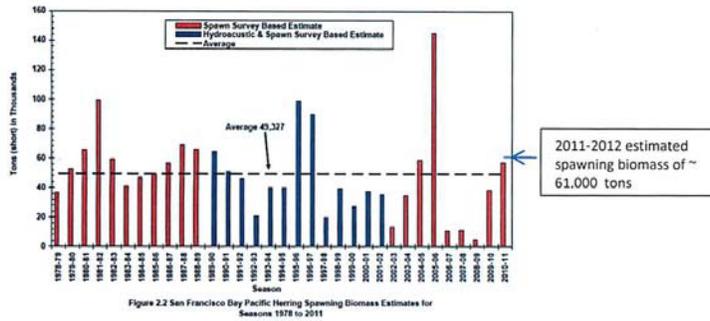


Figure 6c. Pacific herring biomass estimates for San Francisco Bay. 2011-2012 estimate added.

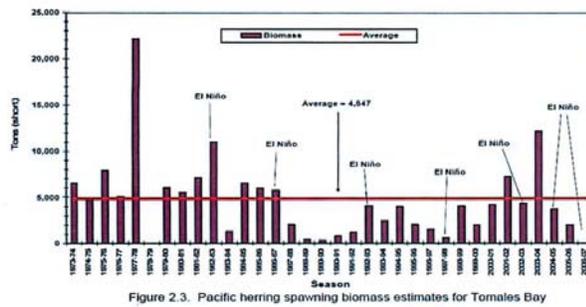


Figure 7. Pacific herring biomass estimates for Tomales Bay, for seasons surveyed.

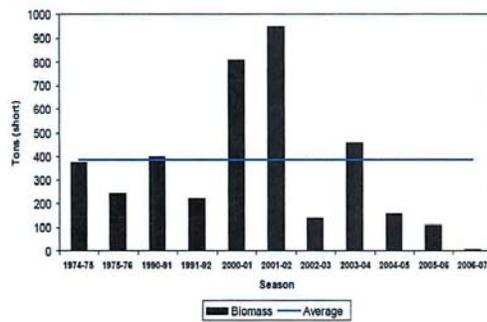


Figure 8. Pacific herring biomass estimates for Humboldt Bay, for seasons surveyed.

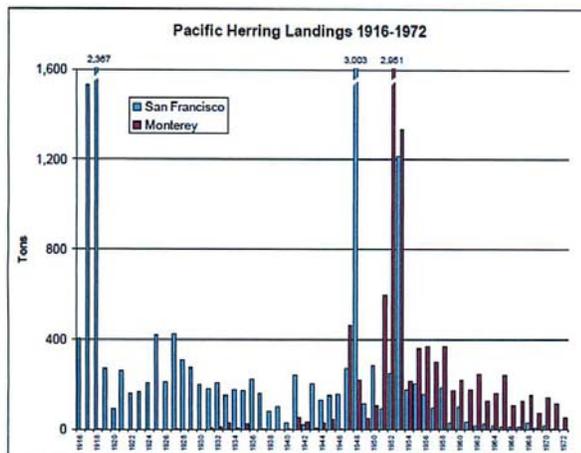


Figure 9. Pacific herring landings in Monterey Bay and San Francisco Bay, 1916-1972



Figure 10. Herring eggs on *Gracilaria* in Audubon Richardson Bay Sanctuary, 2011. Egg density was much higher than on eelgrass. Photo by Anna Weinstein and Lara Martin.

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