

Monterey Bay Whale Watch  
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Ms. Dorothy Lowman, Chair  
Pacific Fishery Management Council 1100 NE Ambassador Place, Suite 101 Portland, OR 97220

Re: H3 Anchovy Status

Dear Chair Lowman and Council Members:

I am writing to request the Council implement an emergency closure of the anchovy fishery off central California, especially Monterey Bay where nearly 100 percent of landings have occurred over the last 3 years. Our company previously sent in our concerns to your Council on October 16 and want to reiterate those concerns and add some additional information.

I own Monterey Bay Whale Watch and have operated year-round tours in Monterey Bay for 26 years. I attended U.C. Davis for a B.S. in Biology and obtained a master's in Marine Science from Moss Landing Marine Laboratories. Throughout the last 28 years myself and company biologists have continually collected data on the relative abundance, distribution, and behavioral ecology of various whale and dolphin species in Monterey Bay, and I have co-authored several scientific papers on these cetaceans. Myself and other marine biologists working for our company have consistently photo-identified individual humpback whales, blue whales, and killer whales since 1987. All the data and photos regarding the endangered humpback and blue whales were contributed to Cascadia Research over this period for use in their research on population estimates while under various contracts from NMFS. When I first began in the mid 80's there were around 400 humpback whales in the population that feeds off California and winters off Mexico; today there are close to 3,000 humpback whales in this group. The humpback whales have increased more than 6% per year during their recovery period after whaling was banned in the 1970's. The primary reason for such a successful recovery is entirely due to the cessation of whaling. This population is distinct from the Hawaii-Alaska population of humpback whales which has also rebounded.

Humpback whales eat 1-2 tons of food per day during the spring through late fall feeding season off California then must fast through the winter period where they mate and give birth off Mexico during winter. It is critical that the pregnant females obtain enough food to not only support themselves for several months of fasting but also supply their newborn calves with enough milk to survive the winter months and the migration to the feeding areas during spring. Humpback whales feed on both small schooling fish, primarily anchovies and sardines, and krill. Humpback whales feed primarily in coastal waters in search of dense areas of fish and/or krill primarily off California and into southern Washington.

Monterey Bay is widely known as a very important feeding area for these humpback whales as well as a high diversity of other marine mammals and seabirds. Monterey Bay is unique in that it contains the largest and deepest submarine canyon along the west coast and the only canyon that approaches so close to shore, allowing for a variety of deepwater species of animals and birds to occur within a few miles of shore. The deep canyon approaches within a quarter mile of shore west of Moss Landing (middle of Bay) and in Carmel Bay. The steepness and jagged bathymetric features near-shore provide an important habitat for schooling fish, squid, and krill depending on season and oceanographic conditions which vary considerably among years. Central California, with Monterey Bay, also is in a primary coastal upwelling system, only a few similar areas exist in the world. The coastal upwelling results in nutrient dense water advected into Monterey Bay, combined with local submarine canyon upwelling and productivity, primarily during spring through early fall which fuels the plankton blooms that result in a higher concentration of whales, dolphins, and seabirds compared to other areas off California. Monterey Bay and outer waters is a National Marine Sanctuary and recognized worldwide as an extremely special place which deserves monitoring and protection.

Just this summer, the BBC and PBS broadcasting companies produced “Big Blue Live”, a nature documentary composed of a series of 9 live broadcasts focusing on whales and marine animals from Monterey Bay to both Europe and throughout the U.S. This series was highly successful and brought worldwide attention to Monterey Bay and the animals that occur here. The highlight was the extremely large concentration of humpback whales that were feeding on large schools of anchovies primarily just west of Moss Landing from next to the surfline to within 5 miles of shore. The whales were often feeding in large (10-30 animals) cooperative groups along with hundreds of sea lions, several thousand long-beaked common dolphins and thousands of seabirds. Big Blue Live filmed from both vessels and a helicopter to capture amazing sequences of surface feeding (lunge feeding) groups of whales. This event put Monterey Bay on the map worldwide as far as offering some of the best whale watching in the world. Even before this broadcast, the Monterey County Convention and Visitor’s Bureau had started calling the area “The Whale Watching Capital of the World” in their promotions for Monterey Bay. Needless to say, after Big Blue Live aired, the Monterey Bay area was filled with people from both near and far wanting to witness the amazing events filmed for the show. This also filled all the motels and restaurants in the area providing a huge boost to the economy.

However, even though the summer’s television broadcasts through BBC and PBS provided a huge surge to the local economy; increased attention and more visitors had already occurred in Monterey since fall of 2013 when we first documented the massive schools of anchovies heading up the coast and entering Monterey Bay where they stayed and reproduced for three years until October 2015 corresponding to the start of anchovy fishing since the previous winter. During fall of 2013 we hosted the New York Times, CBS Evening News, and other local television and newspaper reporters. The media was all here due to the very large (60 to 250+ whales/day) concentration of humpback whales that followed the anchovies into Monterey Bay and stayed for nearly three feeding seasons. The publicity resulted in more people coming to Monterey Bay to go whale watching than ever before. Similar events have happened over the last 25 years while I have worked in the Bay, such as several large krill events that attracted many blue whales and a few other large fish events with humpback whales. But this event was unique in that it lasted for 3 years and large numbers of whales occurred daily during late summer and fall since 2013. No

previous event has ever lasted so long and was so consistent on a daily basis. The public was awestruck and word spread through social media that Monterey Bay was **THE** place to go whale watching for an experience of a lifetime. This amazing event of natural abundance of predators and prey lasted until early October of 2015. Early October is when commercial fishing began for anchovies and within a week the number of whales went from 70 plus to 25 to less than 10 a few weeks later after around 3,000 tons of fish were taken from the same small area (less than 2 miles) where the large concentration of whales and other marine life were feeding. Without the regular publicity and social media reports due to the drastic drop in whales, the number of passengers on every company's whale watching vessels were greatly reduced. Our company is carrying close to 75 percent less people than we had compared to the last two seasons at the same time of year - mid October to mid-November.

In addition to the large concentration of humpback whales (60 to 250+/day), we also observed up to 3,000 plus sea lions, up to 5,000 plus long beaked common dolphins, thousands of common murrelets, pelicans, cormorants, sooty shearwaters, black vented shearwaters, pink footed shearwaters, and gulls occurred in multi-species feeding aggregations on a daily basis. Given that the same individual whales or other marine animals were not present everyday, but instead many more individuals fed in Monterey Bay over the last 3 years combined, easily over half the humpback whale population. This massive concentration of animals on a regular basis with over a thousand plus different whales using this anchovy resource, clearly indicates that Monterey Bay provided an abundant and predictable food source for many thousands of animals of different species. Whales move around a lot along the coast looking for the best feeding opportunities with abundant prey. The food in Monterey Bay was clearly better than elsewhere as evidence of number of whales here and lack of other areas along the coast with similar concentrations. Such an important food source for so many endangered humpback whales should not be disturbed especially in years of low krill abundance and unsettled environmental factors like we see now. Therefore, the fishing effort that occurred in October of 2015 combined with the large take of over 13,000 tons in winter of 2015 disrupted the whales by seriously reducing their prey causing them to leave much earlier than they would have if the fish had not been taken. Since no one knows if any other major feeding areas exist, these whales could have found little prey after their main source was depleted by fishing in Monterey Bay (all anchovy fishing effort occurred in Monterey Bay, over 15,000 tons), leaving the whales to migrate to Mexico without enough blubber to survive winter and raise calves. This is a real possibility given we have never seen such a concentration of fish or whales before.

Since we document the species, number, specific locations, behaviors, and environmental conditions as well as our effort or track line during our trips, of all whales and dolphins, other marine mammals and seabirds associated with the whales, we can clearly say based on this data as well as clear visual impressions that commercial fishing for anchovies had an extremely negative impact on the large concentration of endangered humpback whales that had been feeding in Monterey Bay since September 2013.

Wildlife viewing has become big business world wide over the last 20 years and whale watching is one of the fastest growing and largest grossing ocean going businesses worldwide. This trend continues to increase as the public is much less interested in going to marine parks with captive whales and is very much interested in the oceans and protecting the resources and the whales.

The public and especially young people are aware of the huge problem with garbage/plastics in the oceans, concerns about over-fishing and eating sustainable seafood as promoted by the Monterey Bay Aquarium in their Sea Watch program. We at Monterey Bay Whale Watch help inform the public about the whales and marine life they see on our trips and threats that occur to them and to the oceans, and take out many school groups each year filled with kids who care about what's happening in the sea and how to help. Paul Nicklin's photo of thousands of dumped anchovies in Monterey Bay on National Geographic's instagram alerted the public to the immediate problem we witnessed on the Bay, commercial anchovy fishing directly resulted in the decrease of fish available for the whales causing most of the whales to leave. This was important to let the public know about this problem for the whales and for the whale watching industry in Monterey Bay. Your council received close to 10,000 emails regarding the anchovy issue and the public's concern for the whales that were impacted by direct competition with their food source.

What we find really distressing besides the obvious effect of fishing which reduced the prey dramatically causing the whales to leave, is that only 5 fishermen/boats were fishing anchovies in Monterey Bay. This fishery cannot be important to fisherman in the big picture as so few are fishing anchovy and the price is very low at \$100/ton. I have heard from other purse seine fishermen who say they would not bother with anchovy as price is so low. The most distressing part is that just a few boats caused the whales to leave as their prey was taken, but greatly affected the whole Monterey economy as the best whale watching Ever - that brought thousands of people daily to Monterey Bay supplying hotels, restaurants, shops etc was basically destroyed. The amount of money the anchovies were worth alive and available to the whales was multi-millions of dollars, spilling over from the 16 whale watching vessels operating in the Bay carrying from 40 to 150 people each, 3 times a day, to the hotels, restaurants, and other tourist activities. Even the city of Monterey, proudly announced the outcome of Big Blue Live at the city council meeting I attending in September. They recognized the value of these whales alive and the huge positive effect the whales brought to the local economy.

I have pointed out the above information about the huge boost to the economy in the Monterey area because I would like to discuss the guidelines listed in the Federal Register regarding justification for Emergency Closure of the anchovy fishery. As quoted in summary from the Federal Register the following reasons would justify closure:

*"1) Ecological - A) to prevent overfishing or B) to prevent other serious damage to the fishery resource or habitat;"*

My response to this is with very limited data from NMFS on the anchovies in Monterey Bay, or along the coast - our observations suggested that the anchovies moved into the Bay on September 1, 2013 (we tracked the massive fish schools and over 100 humpback whales from Pt. Sur up the coast over 3 days and into Monterey Bay, over the inner Bay's canyon west of Moss Landing) and stayed for three whale feeding seasons until now. This movement corresponded to the start of the "warm water blob" off the coast and we suggest that the fish living in the colder deep water canyon nearshore with jagged bathymetric features and local upwelling providing a sustainable habitat for these fish that seemed "trapped" by the warm water boundary, and were reproducing in the Bay as evidence from small fry we observed during springs. At the start the fish schools were so massive over inner Monterey Bay as clearly observed and photographed from our vessel's depth sounders, often extending in thick "carpet layers" for easily over a mile.

The fact that some fishing (3,000 tons) occurred during October 2013 just after the mass influx did not significantly reduce the whales as there was still lots of fish left, compared to over 15,000 tons taken in Bay during 2015. During this first season the fish were so abundant that there were often over 200 whales, and over 3,000 sea lions feeding in huge cooperative groups, something never observed before. The whales appeared to follow the sea lions by taking advantage of the huge number of sea lions to herd the fish in tighter balls which provided an advantage for the gulp feeding whales. We have a paper in progress on this unique multi-species feeding event from 2013-2015. The end of this event occurred during the 3rd whale feeding season when fishing started in early October for anchovies. This greatly reduced the remaining fish as clearly seen from our depth sounders and therefore reduced the number of whales from 70 on day before fishing to just a few after several weeks of fishing.

We feel based on our observations that the amount of fish taken was too much in 2015, i.e. overfished for the area given the amount of predators present and biomass they needed to stay in the area. Very few areas of fish were observed on our depth sounders and photographed after the month of fishing. Also there was clear damage to the resource in this area. Since no one was able to answer simple biological questions about the anchovies in Monterey Bay including - are the fish that entered the Bay in September 2013 reproducing in the Bay each year and replenishing the area with more fish (as we feel is true) or were new fish migrating into the Bay throughout this period? I asked several people at NMFS and Cal Fish and Wildlife and both said they did not know the answer, but was a great question.

The second emergency justification in Federal Register:

*“2) Economic - to prevent significant direct economic loss or to preserve a significant economic opportunity that otherwise might be foregone.”*

I have already pointed out in my above comments that our whale watching business, those of others, and the local economy took a hit when the whales left during October. Plus the long term loss that taking these fish out of Monterey Bay, and specifically out of the same small area each day, where both fisherman and whales want the same resource. Given these fish likely were reproducing in the Bay and already had lasted 3 years until over 15,000 tons were taken in 2015 seriously reduced the remaining fish to the point where they may not rebound for years to come, greatly affecting whale watching industry. Humpback whales also feed on krill but with changing and warming ocean conditions the last few years have seen little krill in Monterey Bay and other coastal areas leaving the whales few alternatives. This clearly fits the emergency closure justification.

The third emergency justification in Federal Register:

*“3) Social - to prevent significant community impacts or conflict between user groups.”*

This also clearly fits our request for closure. There was clear conflict between the fisherman and whales and therefore whale watching boats as previously described. The few boats that fished for anchovies during October 2015 caused our whale watching business and other local businesses to decrease. The amount of fish taken was too much and resulted in the departure of the whales. We compared before and after fishing (see our first letter to council in October) to show the dramatic reduction in fish.

The last and fourth reason to justify closure:

*“4) Public Health - to prevent significant adverse effects to health of participants in a fishery or to the consumers of seafood products.”*

Here is yet another reason that fits the closure in the case of anchovies. The level of domoic acid is very high in the fish. The fish went to Australia to feed blue fin tunas, is that ethical to sell to a foreign country and feed to tuna that will be consumed by humans?

Lastly, we are including a few graphs (see bottom) to show the comparison between the number of whales and the landing of anchovies by month. The graphs display Humpback Whale sightings on one graph, and with the same parameters, anchovy landings in metric tons. All landings are primarily from Monterey Bay. Humpback Whale sightings are based on number of whales sighted on our morning departure everyday of each month during our whale watch trips. The 2012 graphs show a low anchovy year overall based on low whale sightings and low landings. The 2013 graphs show an extended whale season, indicating a local abundance of anchovy. High numbers of anchovies were landed late in the Humpback Whale season also in 2013. The 2014 graphs show most of the Humpback Whales leaving the area for migration with an above average numbers of whales sighted in December. This was the first year that I have ever documented around 30 whales present daily through the winter months, showing that the feeding on the anchovies was more important than migrating. Anchovy landings are low and don't begin until late in the Humpback Whale season in 2014, lowering the competitive pressure for resources compared to 2015. The 2015 graphs show that a sharp increase in anchovy landings is correlated with a dramatic drop in Humpback Whale sightings. The whales generally decrease in December as most whales migrate to Mexico for the winter.

I have read all the other comments submitted and it seems clear that there are many opinions and no clear cut scientific data specific to anchovy. Richard Parrish states that anchovy biomass changes by large amounts up and down over just a few years based on the MacCall paper. **The recent information provided by SWFSC says “while the increased recruitment signals are positive, it is premature to assess their overall contribution to the stock without conducting a formal stock assessment.”** There are many variables to consider and difficult to make comparisons and relate them to current conditions. The last few years have been highly unusual with “warm water blob” and now El Nino. There are suggestions that the anchovies have shifted north resulting in bias of samples collected in southern California. Our observations show that long-beaked common dolphins, who prey on anchovies, are now sighted nearly daily in large schools of 500 to over 5,000 in Monterey Bay over last 2 years corresponding with warmer water. These dolphins in addition to the humpback whales require a significant amount of anchovies and other prey, however their appearance corresponded with the warm water and influx of fish. During late summer and early fall 2015, these dolphins were observed nearly daily feeding on anchovies among the humpback whales. The dolphins shifted north based on changes in prey distribution. This increase in predators to Monterey Bay also must be considered in the fishing quota and supports more reason to close the fishery until all these factors - environment, number of predators, and information on distribution and abundance of anchovy off the coast are evaluated. We strongly feel that the amount of natural predators were so great, requiring a massive amount of fish to support them, with their presence alone indicating the huge importance of the anchovy concentration in Monterey Bay to these animals, that the fishing effort was too great in this small area and should be stopped.

With these shifts of species related to environmental factors and the uncertainty of these effects on anchovies along with the lack of a proper assessment since 1995, we urge the council to close the anchovy fishery until such a scientific survey is conducted. Given our observations of how the fishing in October of 2015 corresponded to a drastic reduction in large fish schools seen on our depth sounders and the resulting exit of nearly all the humpback whales that had been feeding in the Bay, and how what happened in Monterey Bay outlined in my above comments fits the emergency closure justifications in the Federal Register.

Sincerely, Nancy Black Marine Biologist/Owner









