# *DRAFT*

## EVALUATION OF POTENTIAL BENEFITS TO MARINE MAMMALS FROM PROPOSED MARINE PROTECTED AREAS IN THE MLPA NORTH CENTRAL COAST STUDY REGION, CALIFORNIA

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The objective of this evaluation is to assess what benefits associated with Goal 2 of the Marine Life Protection Act are achieved by the draft marine protected area (MPA) proposals as they apply to marine mammals. Draft proposed MPAs are evaluated for potential benefits, specifically for pinnipeds. Pinnipeds, which include seals and sea lions, are a subset of marine mammals that congregate onshore at traditional locations to rest at "haul out sites" and breed at "rookeries". These terrestrial sites fall within the intertidal or supratidal zone on the mainland and on islands. The terrestrial sites include a range of habitats on mainland coast and islands, which include a range of habitats such as hard rock, cobble, and sand. Cetaceans are not included in these analyses because they generally range widely at a scale larger than would benefit from coastal MPAs. Gray whales, for example, might migrate through MPAs along the coast, but likely do not reside within any MPA for more than a few days. The range of sea otters extends just to Half Moon Bay, within the south region, but there are no concentrations of otters within this subregion. Otters are mostly associated with kelp beds, and so in future analyses of proposals, we could review the spatial extent of kelp beds and potential otter habitat.

Pinnipeds would benefit from the placement of MPAs because of a reduction of disturbance from human activities on or adjacent to rookeries or haul out sites. Although MPAs do not restrict human access or vessel transit, the restrictions on allowable activities within MPAs may result in fewer extractive users that access these areas. Vessel traffic, including motorized and non-motorized, can cause significant levels of disturbance to marine mammals (e.g., Allen et al. 1985, Suryan and Harvey 1999, Grigg et al. 2002). Vessel noise, such as from loud engines and generators, caused many disturbances to pinnipeds at the Farallon Islands in the past (PRBO Conservation Science and USFWS, unpubl. data). Disturbances can lead to reductions in productivity or site abandonment. Disturbances at foraging areas can disrupt feeding activities and cause animals to leave the area, further prohibiting feeding and leading to costly additional energy expenditures.

## METHODS

Evaluations follow the methods described in "Methods Used to Evaluate Draft MPA Proposals in the North Central Coast Study Region (Draft)" from January 7, 2008. The document proposes to analyze benefits to 1) breeding areas, 2) resting areas, and 3) foraging areas. Because of time limitation, the analysis of the foraging component is pending and will be applied only in the final round of analyses. We expect that the foraging component will be similar to that of Brandt's Cormorants, which has many prey species in common with harbor seals. One change from the

draft methods document is that no rankings of level of benefit (e.g., high, medium, low, none) have been given because the variability in population sizes between species makes categorizations too subjective and potentially misleading. The activities associated with lower levels of protection are so varied, ranging from salmon fishing to abalone harvesting from shore, and the limited data on how such activities impact pinnipeds, makes it difficult to assess the potential benefits to pinnipeds conferred by MPAs with lower protection levels. The analyses, therefore, include only those pinniped haul out sites and rookeries that fall within the very high protection areas, state marine reserves (SMRs), and do not include MPAs with lower levels of protection.[1] This selection assumes that most activities that might affect pinnipeds would be reduced by the SMR status. We recognize, however, that protection of an area as a SMR does not address all potential sources of human activities. We also recognize that lower levels of protection could provide some measure of protection. These analyses, therefore, provide a summary of the added value to pinnipeds that would be achieved at the highest levels of protection under each proposal.

Population in this evaluation refers to the number of animals that use a site for breeding or resting. A haul out site is a location where seals come onshore to rest. A rookery is where seals come onshore to give birth, raise their young, and breed. Many sites serve as both haul outs and rookeries. A "hot spot" is an area where there is a major rookery or haul out area with high abundance and/or high diversity of species. For either rookery or haul out site, hot spots are identified that fall within each of the MPAs for each of the proposals.

**BREEDING COLONIES**

Data used for these analyses were from rookery survey data in the draft NOAA Biogeographic Assessment for the National Marine Sanctuaries (NOAA 2007), Mark Lowry from NOAA Fisheries, a report by Bonnell et al. 1983, and unpublished data provided by the U.S. Fish and Wildlife Service for the Farallon Islands. For rookeries, species most likely to benefit from MPAs include Steller sea lions, northern fur seals, northern elephant seals, and harbor seals. These species are most sensitive to disturbance from human activities when breeding.

Numbers of breeding pinnipeds within each subregion are shown in Table1. Evaluations include numbers of species (species diversity), numbers of pinnipeds, and percentages of subregional populations breeding within the MPAs proposed in each draft MPA proposal (Table 3). In this document, percentages cited are the percentages of the subregional populations only.

**HAUL OUT SITES**

Data used for analyses of haul out sites were from colony survey data in the draft NOAA Biogeographic Assessment for National Marine Sanctuaries, Mark Lowry from NOAA Fisheries, Bonnell et al. 1983, and data provided by the U.S. Fish and Wildlife Service for the Farallon Islands provided to the MLPA process. For haul out sites, species likely to benefit from MPAs

[1] The evaluation methodology for marine mammals differs from that used for the evaluation of potential benefits to marine birds. Given the more extensive data available on how human activities impact marine birds, state marine reserves, state marine conservation areas (SMCAs), and state marine parks (SMPs) are included in the marine birds evaluation.

include California sea lions, Steller sea lions, northern elephant seals, and harbor seals. Fur seals are not included because they are mostly at sea during the non-breeding season.

Numbers of pinnipeds within each subregion are shown in Table 2. Evaluations include numbers of species (species diversity), numbers of pinnipeds, and percentages of subregional haul-out populations breeding within the MPAs proposed in each draft MPA proposal (Table 4). In this document, percentages cited are the percentages of the subregional populations.

**FORAGING AREAS (analyses pending)**

Harbor seals are the only focal species most likely to benefit from increases to forage base. In nearshore areas, harbor seals focus foraging near their haul out or rookery sites, and may repeatedly visit specific foraging areas (Jones 1981, Harvey and Torok 1994, Harvey et al. 1995, Thompson et al. 1998). Harbor seals forage on whatever is locally abundant, and during the breeding season, feed close to rookeries. They feed over a variety of habitats where they pursue rockfish, anchovies, squid, and several other prey.

Other marine mammal species were not considered because their foraging ranges are broad and often in pelagic waters beyond the 3-mile state limit. For example, Steller sea lion females that are nursing pups at the South Farallon Islands rookery likely forage for multiple days and mainly beyond the 3 miles limit, averaging 15 miles on foraging trips. Northern elephant seals and Northern fur seals forage over deep waters far offshore (Loughlin et al. 1987, Le Boeuf and Laws 1994).

Because of time limitation, this component of the evaluation is still being completed and will be used in the final round of analyses only. To evaluate draft MPAs, GIS software will be used to create buffers along three miles of coast and to one mile offshore from rookeries in the north and south subregions. This is thought to encompass most of the harbor seal's foraging range. In the Farallon Islands subregion, buffers will include all areas within three miles of the islands' rookeries. (Draft NOAA Biogeographic Assessment).

Three miles-by-one mile colony buffers will be overlaid with proposed MPAs and the area of overlap determined. For each species, proportions of the foraging range overlapping proposed MPAs will be then weighted based on the proportion of the subregional population breeding at that colony.

## RESULTS

Five species of pinnipeds occur in the region (Steller sea lion, California sea lion, northern elephant seal, harbor seal, and northern fur seal), most of which breed at the Farallon Islands. The total number of mammals counted at rookeries within the north central coast study region is 7,923 and is broken down by species in Table 1. The total number of pinnipeds counted on haul out areas in the study region is 18,087 and is broken down by species in Table 2. Harbor seals are the most abundant and wide spread species and will be the species most likely to benefit from proposed MPAs. Harbor seal numbers are equally divided between the north and south regions,

but few harbor seals occur on the Farallon Islands. Although California sea lions do not breed in the area, except for a few animals on the South Farallon Islands, large numbers of non-breeders occur on the Farallon Islands and at several sites in the North Subregion. Northern elephant seals occur both at the Farallon Islands and at Point Reyes Headland. The elephant seal rookery at Point Reyes is around 1000 seals. Steller sea lions breed mostly on the Farallon Islands, but small groups also breed in the north subregion.

The Farallon Islands are highly significant to marine mammals. Five species of pinniped with several thousand animals haul out, and all species breed there, although the number is modest. The site is the only rookery for northern fur seals between the California Channel Islands and Alaska. The National Marine Fisheries Service (NMFS) recognizes the site as a rookery and critical habitat for Steller sea lions, the only one in the north central coast study region. A moderate sized elephant seal rookery and haul out occurs on the South Island and accounts for around 100 pups per year; however, several hundred to over 1000 use the site as a haul out.

Table 1. Numbers of breeding pinnipeds of 4 species within each of the three bioregions of the NCCSR.[1]

| Subregion | No. Species | Total | Hot spots | Steller sea lion | Northern fur seal | Northern elephant seal | Harbor seal |
|---|---|---|---|---|---|---|---|
| North | 2 | 3300 | 8 | 72 | 0 | 0 | 3228 |
| South | 2 | 4089 | 6 | 0 | 0 | 1000 | 3089 |
| Farallon Islands | 4 | 534 | 2 | 244 | 100 | 100 | 90 |
| Total | 4 | 7923 | 16 | 316 | 100 | 1100 | 6407 |

Table 2. Number of pinnipeds occurring at haul out sites within each of the three bioregions of the NCCSR.[1]

| Subregion | No. Species | Total | Steller sea lion | California sea lion | Northern fur seal | Northern elephant seal | Harbor seal |
|---|---|---|---|---|---|---|---|
| North | 3 | 7157 | 125 | 2191 | 0 | 0 | 4841 |
| South | 4 | 7440 | 36 | 1075 | 0 | 2000 | 4329 |
| Farallon Islands | 5 | 3490 | 200 | 2000 | 100 | 1000 | 90 |
| Total | 5 | 18087 | 361 | 5266 | 100 | 3000 | 9260 |

Sixteen "hot spots" are distributed throughout the region (Table 1, Appendix 1). These sites are characterized by diverse and/or abundant species. Examples include the North and South Farallon Islands, Fish Rocks, Bodega Rock, and Point Reyes Headland. Several hot spots such as the Farallon Islands and Point Reyes Headland fell within the boundaries of proposed MPAs in each of the draft proposals. Some hot spots did not fall within proposed MPA boundaries such as Fish Rocks, Bodega Rock, or Tomales Point (Bird Rock). Bodega Rock and Tomales Point are examples of sites that are adjacent to harbors that would likely preclude inclusion in an MPA. All proposals included Southeast Farallon Islands, and most included North Farallon Islands. In the north region, there was consistency in inclusion of Point Arena, and Black Point area, Bodega Head, and the Russian River mouth. Of these locations, pinniped rookeries are mostly

within the Black Point area and the Russian River. In the south region there was consistency in the selection of Point Reyes Headland, Drakes Bay, and the Fitzgerald area. Of these locations, pinniped colonies fall within all three locations. Three of the five proposals included Duxbury to Double Point as an SMR, which contributes more species (2) and abundance within proposed MPA boundaries.

## DRAFT PROPOSAL 1 (EC)

Draft Proposal 1 includes 10 marine mammal "hot spots" within the boundaries of proposed SMRs, such as the Farallon Islands, Sea Ranch to Salt Point, Russian River, Point Reyes Headland Reserve, Drakes Estero, Double Point, Bolinas Lagoon, and Fitzgerald Marine Reserve. The total number of marine mammals at rookeries within all proposed SMRs is 5066 and at haul out sites is 10587, and is broken down by species (Tables 3 and 4).

Proposed SMRs in the north subregion include 24% of the pinniped rookeries, and 19% of all haul out sites in that subregion. The proposed SMRs in the south subregion include 92% of the pinniped rookery numbers, and 80% of the haul out numbers for the south subregion. Proposed SMRs in the Farallon Islands subregion include 100% of the pinniped rookery and haul out numbers in that subregion.

## DRAFT PROPOSAL 2 (JD)

Draft Proposal 2 includes 6 marine mammal "hot spots", within the boundaries of proposed SMRs, such as the South Farallon Islands, Point Reyes Headland Reserve, Drakes Estero, and Fitzgerald Marine Reserve. The total number of mammals at rookeries within all proposed SMRs is 3618 and at haul out sites is 8752, and is broken down by species (Tables 3 and 4).

Proposed SMRs in the north subregion include 24% of the pinniped rookeries, and 10% of the haul out sites in that subregion. Proposed SMRs in the south subregion include 62% of the pinniped rookeries, and 65% of the haul out numbers in that subregion. Proposed SMRs in the Farallon Islands subregion include 54% of the pinniped rookeries, and 97% of the haul out numbers in the subregion. The North Farallon Islands and the northwest corner of the South East Farallon do not fall within a proposed SMR.

## DRAFT PROPOSAL 3 (TC)

Draft Proposal 3 includes 8 marine mammal "hot spots" within the boundaries of proposed SMRs, including the Farallon Islands, Point Reyes Headland Reserve, Drakes Estero, and Fitzgerald Marine Reserve. The total number of marine mammals at rookeries within all proposed SMRs is 4845 and at haul out sites is 9993, and is broken down by species (Tables 3 and 4)

Proposed SMRs in the north subregion include 10% of the pinniped rookeries, and 8% of the haul out sites in the subregion. Proposed SMRs in the south subregion include 98% of the pinniped rookery numbers, and 83% of the haul out numbers in the subregion. Proposed SMRs in the Farallon Islands subregion inlcude 100% of the pinniped rookeries and haul out sites in the subregion. Both North and South Farallon Islands are included in proposed SMRs.

## DRAFT PROPOSAL 4 (JC)

Proposal 4 includes 8 marine mammal "hot spots" within the boundaries of proposed SMRs, such as the Farallon Islands, Point Reyes Headland Reserve, Drakes Estero, and Fitzgerald Marine Reserve. The total number of marine mammals at rookeries within all proposed SMRs is 4742 and at haul out sites is 10309, and is broken down by species (Tables 3 and 4).

Proposed SMRs in the north subregion include 22% of the pinniped rookeries, and 15% of the haul out sites in the subregion. Proposed SMRs in the south subregion include 86% of the pinniped rookery numbers, and 80% of the haul out numbers in the subregion. Proposed SMRs in the Farallon Islands subregion include 100% of the pinniped rookery numbers and haul out numbers in the subregion. Both North and South Farallon Islands are included in proposed SMRs.

## DRAFT EXTERNAL PROPOSAL A

Draft External Proposal A includes 7 marine mammal "hot spots" within the boundaries of proposed MPAs such as the South Farallon Islands, Point Reyes Headland Reserve, Russian River, and Fitzgerald Marine Reserve. The total number of marine mammals at rookeries within the proposed SMRs is 3271 and at haul out sites is 8573, and is broken down by species (Tables 3 and 4).

Proposed SMRs in the north subregion include 24% of the pinniped rookeries, and 14% of the haul out sites in the subregion. Proposed SMRs in the south subregion include 51% of the pinniped rookery numbers, and 57% of the haul out numbers in the subregion. Proposed SMRs in the Farallon Islands subregion include 77% of the pinniped rookery numbers and 97% haul out numbers in the subregion. North Farallon Island is not included in a proposed SMR.

Table 3. Comparison between proposals of numbers and percentages of pinnipeds breeding within proposed MPAs in each subregion, North Central Coast Study Region. A harsh mark (-) means that the species does not breed in the region. [1]

| Name | No. Species | Total Pinnipeds | Total Pinn Pct | Harbor Seal | Harbor Seal Pct | Steller Sea Lion | Steller Sea Lion Pct | Northern Fur Seal | Northern Fur Seal Pct | Northern Elephant Seal | Northern Elephant Seal Pct |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **North subregion** | | | | | | | | | | | |
| Proposal 1 | 1 | 787 | 24% | 787 | 24% | 0 | 0 | - | - | - | - |
| Proposal 2 | 1 | 781 | 24% | 781 | 24% | 0 | 0 | - | - | - | - |
| Proposal 3 | 1 | 319 | 10% | 319 | 10% | 0 | 0 | - | - | - | - |
| Proposal 4 | 1 | 710 | 22% | 710 | 22% | 0 | 0 | - | - | - | - |
| External Proposal A | 1 | 781 | 24% | 781 | 24% | 0 | 0 | - | - | - | - |
| | | | | | | | | | | | |
| **South subregion** | | | | | | | | | | | |
| Proposal 1 | 2 | 3745 | 92% | 2745 | 89% | - | - | - | - | 1000 | 100% |
| Proposal 2 | 2 | 2547 | 62% | 1547 | 50% | - | - | - | - | 1000 | 100% |
| Proposal 3 | 2 | 3992 | 98% | 2992 | 97% | - | - | - | - | 1000 | 100% |
| Proposal 4 | 2 | 3498 | 86% | 2498 | 81% | - | - | - | - | 1000 | 100% |
| External Proposal A | 2 | 2078 | 51% | 1078 | 35% | - | - | - | - | 1000 | 100% |
| | | | | | | | | | | | |
| **Farallon Is subregion** | | | | | | | | | | | |
| Proposal 1 | 4 | 534 | 100% | 90 | 100% | 244 | 100% | 100 | 100% | 100 | 100% |
| Proposal 2 | 3 | 290 | 54% | 90 | 100% | 0 | 0% | 100 | 100% | 100 | 100% |
| Proposal 3 | 4 | 534 | 100% | 90 | 100% | 244 | 100% | 100 | 100% | 100 | 100% |
| Proposal 4 | 4 | 534 | 100% | 90 | 100% | 244 | 100% | 100 | 100% | 100 | 100% |
| External Proposal A | 12 | 412 | 77% | 90 | 100% | 122 | 50% | 100 | 100% | 100 | 100% |

Table 4. Comparison between proposals of numbers and percentages of pinnipeds at haul out sites within proposed MPAs with high protection level (SMR) in each subregion, North Central Coast Study Region. A harsh mark (-) means that the species does not haul out in the region.[1] Fur seals are not included because they are mostly at sea during the non-breeding season.

| Name | No. Species | Total Pinnipeds[2] | Total Pinn Pct | California Sea Lion | California Sea Lion Pct | Steller Sea Lion | Steller Sea Lion Pct | Northern Elephant Seal | Northern Elephant Seal Pct | Harbor Seal | Harbor Seal Pct | Hot Spots |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **North subregion** | | | | | | | | | | | | |
| Proposal 1 | 3 | 1325 | 19% | 4 | 1% | 2 | 2% | - | - | 1319 | 27% | 3 |
| Proposal 2 | 1 | 696 | 10% | 0 | 0% | 0 | 0% | - | - | 696 | 14% | 2 |
| Proposal 3 | 2 | 561 | 8% | 0 | 0 | 2 | 2% | - | - | 559 | 12% | 1 |
| Proposal 4 | 3 | 1084 | 15% | 4 | 1% | 2 | 2% | - | - | 1078 | 22% | 2 |
| External Proposal A | 2 | 1013 | 14% | 2 | 0.1% | 0 | 0 | - | - | 1009 | 21% | 2 |
| **South subregion** | | | | | | | | | | | | |
| Proposal 1 | 4 | 5972 | 80% | 949 | 88% | 32 | 89% | 2000 | 100% | 2991 | 69% | 5 |
| Proposal 2 | 4 | 4866 | 65% | 949 | 88% | 32 | 88% | 2000 | 100% | 1885 | 44% | 3 |
| Proposal 3 | 4 | 6142 | 83% | 949 | 88% | 32 | 88% | 2000 | 100% | 3161 | 73% | 5 |
| Proposal 4 | 4 | 5935 | 80% | 961 | 89% | 32 | 88% | 2000 | 100% | 2942 | 68% | 4 |
| External Proposal A | 4 | 4270 | 57% | 849 | 78% | 32 | 88% | 2000 | 100% | 1389 | 32% | 4 |
| **Farallon Is subregion** | | | | | | | | | | | | |
| Proposal 1 | 4 | 3290 | 100% | 2000 | 100% | 200 | 100% | 1000 | 100% | 90 | 100% | 2 |
| Proposal 2 | 4 | 3190 | 97% | 2000 | 100% | 100 | 50% | 1000 | 100% | 90 | 100% | 1 |
| Proposal 3 | 4 | 3290 | 100% | 2000 | 100% | 200 | 100% | 1000 | 100% | 90 | 100% | 2 |
| Proposal 4 | 4 | 3290 | 100% | 2000 | 100% | 200 | 100% | 1000 | 100% | 90 | 100% | 2 |
| External Proposal A | 4 | 3290 | 97% | 2000 | 100% | 100 | 50% | 1000 | 100% | 90 | 100% | 1 |

[2] Total pinnipeds at haul out sites within MPAs with high level of protection. Low or medium level of protection assumes more likely disturbance from more allowed activities.

Table 5. Hot spots for pinnipeds in the North Central Coast Study Region included within the boundaries of draft MPA proposals.

| Hot Spot Location | Proposal 1 (EC) | Proposal 2 (JD) | Proposal 3 (TC) | Proposal 4 (JC) | Proposal External A |
|---|---|---|---|---|---|
| **North subregion** | | | | | |
| Fish Rocks | | | | | |
| Black Point Area | Sea Ranch to Salt Point SMR | Black Point SMR | Black Point SMR | Black Point to Salt Point SMR | Black Point SMR |
| Fort Ross Reef/Rocks | | | | | |
| Russian Gulch | | | | | |
| Russian River | Russian River SMR | Russian River SMR[1] | Russian River SMCA | Russian River SMR | Russian River SMR |
| Bodega Rock | | | | | |
| Tomales Bay – Clam Island | Tomales Bay South SMRMA | | | | |
| Tomales Point-Bird Rock | | | | | |
| **South subregion** | | | | | |
| Point Reyes | Point Reyes Headland SMR | Point Reyes SMR | Point Reyes SMR | Point Reyes SMR | Point Reyes SMR |
| Drakes Bay | Drakes-Limantour Estero SMR | Drakes Bay SMR | Drakes Estero SMR | Drakes Estero SMR | Limantour SMR[1] |
| Double Point –Duxbury Reef | Double Point SMR | | Duxbury SMR | Double Point SMR | |
| Bolinas Lagoon | Bolinas Lagoon SMR | | Bolinas Lagoon SMR | | Bolinas Lagoon SMR |
| Fitzgerald Marine Reserve | Fitzgerald SMR | Fitzgerald SMR | Moss Beach SMR | Fitzgerald Devils Slide SMR | Fitzgerald SMR |
| Cowell Ranch – Miramonte Pt | | | | | |
| **Farallon Islands subregion** | | | | | |
| North Farallon Islands | N. Farallon Island SMR | | N. Farallon SMR | N. Farallon SMR | |
| South Farallon Islands | S.E. Farallon SMR | S.E. Farallon SMR [2] | S.E. Farallon SMR | S.E. Farallon SMR | S.E. Farallon SMR |

[1]Limantour Estero under SMR but not Drakes Estero
[2] Part of island included in proposed MPA.

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**Appendix 1.** List of "hot spots" for marine mammals in the north central coast study region. Hot spot designation is based on species diversity and/or abundance of a species at a specific location.

| **Hot Spot** | **SubRegion** |
|---|---|
| North Farallon | Farallon Islands |
| South Farallon | Farallon Islands |
| Cowell Ranch | South |
| Fitzgerald Marine Reserve | South |
| Bolinas Lagoon | South |
| Double Point | South |
| Drakes Bay | South |
| Point Reyes Headland | South |
| Tomales Point/Bird Rock | North |
| Bodega Rock | North |
| Tomales Bay-Clam/Seal Is | North |
| Russian River | North |
| Russian Gulch | North |
| Fort Ross Reef/Rocks | North |
| Black Point Area | North |
| Fish Rocks | North |

**Appendix 2.** Known important prey items of harbor seal in California.

| **Fish** |
|---|
| Rockfish *Sebastes* spp. |
| Pacific sandlance *Ammodytes hexapterus* |
| Plainfin midshipman *Porichthys notatus* |
| Speckled sanddab *Citharichthys stigmaeus* |
| Northern anchovy *Engraulis mordax* |
| Pacific herring *Clupea pallasi* |
| Jack smelt Atherinopsis californiencsis |
| Pacific staghorn sculpin *Leptocottus armatus* |
| Sculpin spp. (Cottidae) |
| Pacific tomcod *Microgadus proximus* |
| Pacific hake *Merluccius productus* |
| Shiner perch *Cymatogaster aggregata* |
| Spotted cusk-eel *Chilara taylori* |
| *Pleuronectid* spp. (Flatfish) |
| Salmon spp. |
| Lamprey *Lampetra tridentata* |
| Hagfish *Myxine glutinosa* |
| **Invertebrates** |
| Mysid shrimp *Spirontocaris* sp. |
| Market squid *Loligo opalescens* |
| Octopus spp. nearshore |