Environmental Assessment
FOR
the Issuance of Incidental Take Authorizations
to the Sonoma County Water Agency for
Russian River Estuary Management Activities

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Abstract: The National Marine Fisheries Service proposes to issue a one-year incidental harassment authorization and subsequent incidental take authorizations upon expiration of that IHA to the Sonoma County Water Agency for the incidental taking of small numbers of marine mammals in the wild, pursuant to the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1361 et seq.). These authorizations would allow the taking, by Level B harassment only, of harbor seals (*Phoca vitulina richardii*), California sea lions (*Zalophus californianus*), and northern elephant seals (*Mirounga angustirostris*) incidental to the Agency's Russian River Estuary Management Activities, specifically artificial breaching of a sandbar which forms at the mouth of the Russian River. The purposes of the Agency's activities are to comply with Reasonable and Prudent Measures contained within NMFS' 2008 Biological Opinion on the impacts of the Agency's estuary management program on federally-listed salmon and steelhead and to prevent flooding of low-lying communities within the Russian River Estuary.

Environmental Assessment for the Issuance of Incidental Take Authorizations to the Sonoma County Water Agency for Russian River Estuary Management Activities

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CHAPTER 1 PURPOSE OF AND NEED FOR ACTION

1.1 DESCRIPTION OF ACTION

On July 17, 2009, the National Marine Fisheries Service (NMFS), Permits, Conservation and Education Division received a request from the Sonoma County Water Agency (Agency), to take small numbers of marine mammals incidental to the Agency's Russian River Estuary water level management activities in Sonoma County, California, specifically operation of heavy equipment (e.g., bulldozers and excavators) on Goat Rock State Beach, the location of a year-round harbor seal haulout. NMFS proposes to issue a one year Incidental Harassment Authorization (IHA) in 2010 and, upon expiration of that IHA, subsequent Incidental Take Authorizations (ITAs). An ITA could be in the form of one-year IHAs or a 5-year rulemaking under which annual Letters of Authorization (LOAs) may be issued. Any ITA would allow the taking[1] by "level B harassment[2]" of small numbers of marine mammals in the wild pursuant to Section 101(a)(5)(A) or (D) of the Marine Mammal Protection Act of 1972, as amended (MMPA; 16 U.S.C. 1371 et seq.) and the regulations governing the taking and importing of marine mammals (50 CFR Part 216).

1.1.1 Background

Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. citizens who engage in a specified activity (other than commercial fishing) within a specified geographical region if certain findings are made and either regulations are issued or, if the taking is limited to harassment, a notice of a proposed authorization is provided to the public for review. Section 101(a)(5)(A) allows the Secretary to authorize the incidental, but not intentional, taking of small number of marine mammals for up to 5 years through regulations. Section 101(a)(5)(D) of the MMPA established an expedited process by which citizens of the United States can apply for a one-year authorization (IHA) to incidentally take small numbers of marine mammals by harassment. Unlike regulations, the expedited IHA process may not be used to authorize mortality or serious injury leading to mortality but may only authorize Level A (injurious) and Level B (behavioral) harassment. Authorization for incidental takings shall be granted if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the

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1 Under the MMPA, "take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." [16 U.S.C. 1362(18)(A)] The ESA defines "take" as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The term "harm" is further defined by regulations (50 CFR §222.102) as "an act which actually kills or injures fish or wildlife. Such an act may include significant habitat modification or degradation which actually kills or injures fish or wildlife by significantly impairing essential behavioral patterns including breeding, spawning, rearing, migrating, feeding, or sheltering."

2 Except with respect to certain activities not pertinent here, the MMPA defines "harassment" as "any act of pursuit, torment, or annoyance which (i) has the potential to injure a marine mammal or marine mammal stock in the wild [Level A harassment]; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering [Level B harassment]."

species or stock(s) for subsistence uses (where relevant), and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such takings are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as "...an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival."

1.1.2 Purpose and Need

The purpose and need of the proposed action is to ensure the Agency's compliance with the MMPA and its implementing regulations for authorization of incidental take by Level B harassment of three species of pinnipeds incidental to the activities associated with their estuary management activities. The Agency is required to implement the specified estuary management activities pursuant to NMFS 2008 Biological Opinion on "*Water Supply, Flood Control Operations, and Channel Maintenance conducted by the U.S. Army Corps of Engineers, the Sonoma County Water Agency, and the Mendocino County Russian River Flood Control and Water Conservation Improvement District in the Russian River Watershed"*.

The MMPA prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. As described in the Background section above, Sections 101(a)(5)(A) and (D) of the MMPA direct the Secretary of Commerce to allow, upon request, the incidental, but not intentional taking of marine mammals by U.S. Citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

For reasons described in this EA, NMFS has determined that the specified activities would not result in pinniped serious injury or mortality; however, because the activities are not limited to one year, issuance of either an IHA or regulations would be suitable for Agency compliance with the MMPA. Due to the Agency's immediate need to comply with the MMPA, NMFS has determined that initially an IHA issued through the expedited process is appropriate.

NMFS' decision of whether or not to issue the Agency an ITA is a major Federal action that requires an analysis of its effect on the human environment pursuant to the National Environmental Policy Act (NEPA) as implemented by the regulations published by the Council on Environmental Quality (CEQ regulations), 40 CFR Parts 1500-1508, and NOAA Administrative order 216-6, *Environmental Review procedures for Implementing the National Environmental Policy Act*. This EA contains the analysis necessary to determine whether NMFS' issuance of a one-year IHA and subsequent ITAs allowing the incidental take of small number of marine mammals associated with the estuary management activities would result in direct, indirect or cumulatively significant impacts to the human environment. While this EA considers the effects of issuing a one-year IHA followed by issuance of subsequent ITAs, the Agency would be required to apply for any future incidental take authorization and NMFS would re-evaluate potential impacts of issuing future ITAs at the time applications are received in accordance with both the MMPA and NEPA. These applications would also be accompanied by annual marine mammal monitoring reports. Should any impacts not identified in this EA emerge

from review of those documents, a supplemental EA would be prepared prior to NMFS's issuance of additional authorizations. The scope of NMFS's analysis in this EA is limited to the effects resulting from issuance of the IHA.

1.1.3 Objectives of the Russian River Estuary Management Activities

The Agency provides a functioning infrastructure and financial organization for regional water supply, wastewater management and flood control to Sonoma County, California. As described in the application, the primary objective of the specified activities is controlling flooding to low-lying residential communities built along the estuary. Since 1995, the Agency, with a permit from the U.S. Army Corps of Engineers (Corps), has breached the sandbar by making a narrow, deep cut down the middle of Goat Rock State Beach.

In 2007, the Corps and the Agency requested consultation with NMFS, under Section 7 of the ESA, on the impacts their Russian River management activities had on ESA listed fish species. In September 2008, NMFS issued the aforementioned Biological Opinion on the effects of water management activities throughout the Russian River on ESA listed salmonids. The analysis of the NMFS BiOp found current water management practices, including those at the mouth of the Russian River, were jeopardizing the continued existence of the threatened Central California Coast (CCC) steelhead (*Oncorhynchus mykiss*) Distinct Population Segment (DPS) and adversely modifying ESA designated critical habitat for CCC steelhead, for endangered CCC coho salmon (*O. kisutch*), and for threatened California Coast (CC) Chinook salmon (*O. tshawytscha*). As a result, NMFS included a Reasonable and Prudent Measure (RPA) in the BiOp that requires the Agency to modify the configuration in which they currently breach the beach in order to conserve beach sands and provide vital rearing habitat for ESA-listed steelhead and salmon populations in the Russian River. To meet these objectives, the Agency will continue to use bulldozers or excavators to manipulate the topography of the beach and breach a sandbar that forms at the mouth of the Russian River; however, the design of the cut will be altered to create viable fish rearing habitat. The presence and operation of this equipment will result in harassment to pinnipeds on the beach; hence, an MMPA authorization is warranted.

1.2 OTHER ENVIRONMENTAL ASSESSMENT THAT INFLUENCES SCOPE OF THIS EA

In addition to natural breaching, the County of Sonoma Public Works Department and local citizens mechanically breached the sandbar at the mouth of the Russian River prior to 1995. In 1995, the Agency became responsible for this activity. On July 22, 2005, the U.S. Army Corps of Engineers (Corps) issued Permit No. 285610N to the Agency to conduct breaching activities. For issuance of that permit, the Corps prepared a Decision Document constituting, among other things, an EA. The Corps' EA identified components of the action (e.g., bulldozing sand to certain levels, gradients, etc.) and impacts the Agency's action has on the human environment. In summary, the Corps' EA analyzes impacts to the social, economic, physical, and biological environment and concluded "that issuance of a permit authorizing the applicant's activities does not constitute a major Federal action that would significantly affect the quality of the human environment." On October 5, 2009, the Corps issued a modification to the permit to incorporate the implementation of the "Russian River Estuary Outlet Channel Adaptive

Management Plan Year 1." The Corps did not identify any impacts not already analyzed in their 2005 EA due to this modification; therefore, a supplemental EA was deemed unnecessary.

NMFS assessed the aforementioned Corps EA for its analysis pertaining to impacts on marine mammals from the Agency's management activities. The EA contained detailed information on the Agency's action (i.e., breaching the sandbar) and described that seals and sea lions on the beach may be impacted from the activity. However, it lacked sufficient detail on pinnipeds in terms of abundance, habitat use, and other potential impacts for NMFS' purposes of issuing an MMPA authorization. Because NMFS' action is issuance of an ITA allowing harassment to marine mammals, this EA analyzes impacts to this resource more closely. However, impacts to other components of the human environment (e.g., social and economical impacts, other wildlife) contained within the Corps' EA are relevant to the present analysis, and NMFS therefore incorporates the Corps' EA by reference.

1.3 SCOPING SUMMARY

The purpose of scoping is to identify those key issues of environmental concern related to the proposed action, as well as identify and eliminate from detailed study the issues that are not pertinent or that have been covered by prior environmental review. An additional purpose of the scoping process is to identify the concerns of the affected public and Federal agencies, states, and Indian tribes. This EA reflects issues identified by NMFS during review of the Agency's application and supporting materials, preparation of the proposed IHA, and public comment solicited through the process described below.

Under 50 CFR 216.104(b) of NMFS' implementing regulations for the MMPA, NMFS must, after deeming the application adequate and complete, publish in the *Federal Register* a notice of proposed IHA or receipt of a request for the implementation or re-implementation of regulations governing the incidental taking. Information gathered during the associated comment period is considered by NMFS in ensuring adequacy of preliminary determinations and proposed mitigation measures for IHAs and if appropriate, developing regulations governing the issuance of LOAs for the proposed activity. In accordance, a notice of proposed issuance of an IHA with intent to promulgate regulations was published in the *Federal Register* on November 12, 2009 (74 FR 58248). The application, monitoring plan, and proposed IHA notice was also made available for public review and comment for 30 days on the NMFS website and was provided to the Marine Mammal Commission. The foregoing process, consistent with the CEQ regulations, allowed NMFS to communicate important environmental information to the public related to issuance of the IHA and provided the public a meaningful opportunity to submit their comments and views for NMFS' consideration prior to making a final decision on whether or not to issue the IHA.

1.4 **APPLICABLE LAWS AND NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS**

This section summarizes federal, state, and local permits, licenses, approvals, and consultation requirements necessary to implement the proposed action, as well as who is responsible for obtaining them. Even when it is the applicant's responsibility to obtain such

permissions, NMFS is obligated under NEPA to ascertain whether the applicant is seeking other federal, state, or local approvals for their action.

1.4.1 National Environmental Policy Act

The National Environmental Policy Act (NEPA) was enacted in 1969 and requires preparation of an Environmental Impact Statement (EIS) for all "major" federal actions significantly affecting the quality of the human environment. A major federal action is generally an activity that is fully or partially funded, regulated, conducted, or approved by a federal agency. Preparation of an EA assists federal agencies in determining whether or not a major federal action may result in significant impacts to the human environment and results in an agency's Finding of No Significant Impact or publication of a Notice to Prepare an EIS. NMFS issuance of incidental take authorizations represents approval and regulation of activities. While NEPA does not dictate substantive requirements for permits, licenses, etc., it requires consideration of environmental issues in federal agency planning and decision-making. The CEQ regulations establish procedural provisions for federal agencies to follow when carrying out responsibilities under NEPA.

The CEQ regulations require federal agencies to publish their own procedures for implementing NEPA. NMFS has, through NAO 216-6, established NOAA's procedures for complying with NEPA. NAO 216-6 specifies that issuance of ITAs under the MMPA and ESA is among a category of actions that are generally exempted (categorically excluded) from further environmental review, except under extraordinary circumstances. When a proposed action that would otherwise be categorically excluded is the subject of public controversy based on potential environmental consequences, has uncertain environmental impacts or unknown risks, establishes a precedent or decision in principle about future proposals, may result in cumulatively significant impacts, or may have an adverse effect upon endangered or threatened species or their habitats, preparation of an EA or EIS is required. NMFS has prepared this EA in accordance with NEPA, its implementing regulations, and NOAA 216-6.

1.4.2 Endangered Species Act

Section 7 of the ESA requires consultation with the appropriate federal agency (either NMFS or the U.S. Fish and Wildlife Service (USFWS) for federal actions that "may affect" a listed species or adversely modify critical habitat. Section 7 requires federal agencies to use their authorities in furtherance of the purposes of the ESA by carrying out programs for the conservation of endangered and threatened species. Federal Agencies are further required to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any threatened or endangered species or result in destruction or adverse modification of habitat for such species. Formal consultation for actions likely to result in adverse effects to listed species is consummated by NMFS or the USFWS issuing a Biological Opinion (BiOp) which, among other things, makes a determination with respect to the action's likelihood to jeopardize listed species or result in adverse modification or destruction of critical habitat, and authorizes incidental take subject to specified reasonable and prudent measures. Regulations specify the procedural requirements for these consultations (50 Part CFR 402).

1.4.3. Marine Mammal Protection Act

The MMPA prohibits takes of all marine mammals in the U.S. (including territorial seas) with a few exceptions. Sections 101(a)(5)(A) and (D) of the MMPA (16 U.S.C. 1361 et seq.) direct the Secretary of Commerce (Secretary) to allow, upon request, the incidental, but not intentional, taking of small numbers of marine mammals by U.S. Citizens who engage in a specified activity (other than commercial fishing) if certain findings are made and regulations are issued or, if the taking is limited to harassment, notice of a proposed authorization is provided to the public for review.

Authorization for incidental takings may be granted for up to 5 years if NMFS finds that the taking will have a negligible impact on the species or stock(s), will not have an unmitigable adverse impact on the availability of the species or stock(s) for certain subsistence uses, and if the permissible methods of taking and requirements pertaining to the mitigation, monitoring and reporting of such taking are set forth. NMFS has defined "negligible impact" in 50 CFR 216.103 as: an impact resulting from the specified activity that cannot be reasonably expected to, and is not reasonably likely to, adversely affect the species or stock through effects on annual rates of recruitment or survival.

Under the MMPA, harassment is defined as any act of pursuit, torment, or annoyance which has the potential to: (i) injure a marine mammal or marine mammal stock in the wild (Level A harassment); or (ii) disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering (Level B harassment). An IHA may only authorize Level A and Level B harassment (*i.e.*, those that do not have the potential to result in serious injury or mortality), for a period of no more than one year, following a 30-day public review period. Alternatively, an incidental take authorization may be granted for a period of 5-years and may include take by serious injury and mortality. For both an IHA and regulations, authorization shall be granted if the Secretary finds that the taking will have a negligible impact on a species or stock, and that the IHA or regulations are prescribed setting forth the permissible methods of taking, the means of effecting the least practicable adverse impact, and requirements pertaining to monitoring and reporting. Upon rulemaking (i.e., defining regulations), Letters of Authorizations (LOAs) are issued each year to the Authorization holder.

1.4.4. Magnuson-Stevens Fishery Conservation and Management Act

Under the Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA), Congress defined Essential Fish Habitat (EFH) as “those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity” (16 U.S.C. 1802(10)). The EFH provisions of the MSFCMA offer resource managers means to accomplish the goal of giving heightened consideration to fish habitat in resource management. A federal agency proposing action with the potential to affect EFH must conduct an assessment of the impacts of the action on EFH. If the assessment reveals the potential for substantial adverse effects to EFH, the federal agency must consult with NMFS to develop conservation measures.

CHAPTER 2 ALTERNATIVES INCLUDING THE PROPOSED ACTION

This chapter describes the range of potential actions (alternatives) determined reasonable with respect to achieving the stated purpose and need, as well as alternatives eliminated from detailed study. This chapter also summarizes the expected outputs and any related mitigation of each alternative. One alternative is the "No Action" alternative where the proposed permit would not be issued. The No Action alternative establishes the baseline against which the action alternatives are compared and contrasted for environmental analyses. The Proposed Action alternative represents the proposed action (*i.e.*, issuance of an incidental take authorization with mitigation as proposed by the applicant and developed by NMFS). NMFS worked closely with the applicant on its mitigation and monitoring plan; therefore, NMFS recommendations have been incorporated into the Proposed Action Alternative. NMFS has not identified any other meaningful options that would be capable of achieving the stated purpose and need for issuance of the IHA. Therefore, there are no reasonable alternatives beyond the proposed action carried forward for full evaluation.

2.1 ALTERNATIVE 1 – NO ACTION

Under the No Action alternative, the existing level of water level management activities would continue and no ITA would be issued for the activities proposed by the applicant. The Agency would still carry out the specified activity, as allowed for in their Corps permit; however, they would not work under the mitigation and monitoring requirements set forth in the IHA. The Agency would not have legal coverage under the MMPA to harass pinnipeds incidental to those activities. If an ITA is not issued, the Agency could (a) carry out the activity despite MMPA restrictions on take; or (b) carry out the activity without harassing marine mammals (i.e., doing so when pinnipeds are not present). However, option "b" is not practical as delaying breaching events to times when pinnipeds are not present could subject adjacent low-lying communities to flooding, resulting in public safety hazards and economic implications.

Currently, when water levels rise in the lagoon to a point that threatens flooding (approximately 7 ft), the Agency will mechanically cut a deep, narrow pilot channel through the sandbar, usually straight down the beach (Figure 1b). The Agency uses heavy equipment (e.g., 1-2 bulldozers or excavators) to make the cut at a sufficient depth to allow river flows to begin transporting sand to the ocean. The sand is placed onto the beach adjacent to the pilot channel. After the pilot channel is dug, the last upstream portion of the sandbar would be removed, allowing river water to flow to the ocean. The size of the pilot channel varies depending on the height of the sandbar to be breached, the tide level, and the water surface elevation in the estuary. Current methods typically result in a channel 100 feet long, 25 feet wide, and 6-8 feet deep (Corps and SCWA 2004, NMFS 2005). The amount of sand moved ranges from less than 100 cubic yards to approximately 1,000 cubic yards. In total, to breach the sandbar, bulldozers and excavators are operating for approximately 2.5 hours but can run from 1 to, in extreme cases, 7 hours. This breaching process results in 10-20 thousand cubic inches of sand to be blown offshore and causes the lagoon to return to a tidal system reconnected to the ocean with a nearly marine salinity of >28 parts per thousand as far upstream as the mouth of Sheephouse Creek.

This practice also causes the estuary to become very shallow, subject to water quality dynamics that are neither natural nor optimal for the survival of large numbers of small, juvenile steelhead and salmonids and adversely modifies their critical habitat. Because this action takes place at a harbor seal haulout, pinnipeds have the potential to be harassed during breaching activities.

Figure 1a and 1b. Visual example of topography when the estuary is (a) closed (*i.e.*, the sandbar is present) and when it is (b) open (*i.e.*, the sandbar is breached).

1(a) Estuary Closed

1(b) Estuary Open (breached sandbar from current method)

From 1996 to 2008, the barrier beach was breached, either naturally or mechanically, during every month of the year with the majority of breaching events occurring in the fall (October and November), followed by the spring (April, May, and June) and the month of September (Table 1). The number of artificial breaching events varies each year. The lowest number of breaching events occurred in 2004 (1 event) and the highest number (11 events) occurred in 2000. It is difficult to predict how many artificial breaching events are required each year, but there have been an average of 6 artificial breaching events annually over the last 13 years.

NMFS does not consider the No Action alternative a reasonable alternative which could be selected for implementation. Due to the location and nature of the necessary breaching activities, which can not cease due to flooding potential, pinnipeds will be harassed due to water level management activities. The Agency has requested an IHA under the MMPA, and, as such, NMFS must issue one if certain findings are made. Through the IHA process, NMFS has determined an IHA is appropriate given the implementation and certain mitigation and monitoring measures are set forth.

Table 1. Breaching of the Russian River Estuary from 1996 to 2008. Number of times breached by year and month, including artificial breaches by SCWA, natural breaches (denoted by [#]), and breaches conducted by private individuals without a Corps permit, denoted by (#).

Month	**Year**												
	1996	**1997**	**1998***	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
January						1							
February												2	
March		1, [1]						[1]					
April		[1]				2			[1]			3	[1]
May		1, [1]			1	3			1				5
June		2		1	1		1	[1]					
July	1			1									1
August	(2)	1							[1]				
September	1, (1)	2	4	1	1					1			1
October	1	1	3	2	2	2	[1]	2	(1)	1	[1]	[1]	1
November	[1]	1	1	1, [1]	4	[1]	3	1	(2)	2	[3]	2	1
December					2		1				[1]	2	1, [1]
TOTAL	7	12	8	7	11	9	6	5	6	4	5	10	12
SCWA	3	9	8	6	11	8	5	3	1	4	0	9	10

* Type of breach was not recorded for 1998. All breaching events for 1998 would be treated as done by SCWA.

2.2 ALTERNATIVE 2 – PROPOSED ACTION (ISSUANCE OF INCIDENTAL TAKE AUTHORIZATIONS WITH PROPOSED CONDITIONS)

Under the Proposed Action alternative, a one-year IHA followed by subsequent MMPA authorizations (up to 5 years) would be issued for the specified activity as proposed by the applicant and contain mitigation measures developed by NMFS throughout the IHA process. In addition, the Agency would undertake a monitoring program to determine impacts of breaching activities on harbor seals on Goat Rock State Beach. Any future ITA application would be evaluated by NMFS for MMPA compliance.

When ocean waves transport sand onto the beach, a sandbar builds up across the river's mouth. In turn, a lagoon, with water input from the Russian River and rain, forms behind the sandbar that is hydraulically isolated from the marine environment, except for occasional wave overwash. When this happens, the estuary is considered "closed" (Figure 1a). Freshwater inflow from upstream and rain causes this lagoon to gain slowly in volume and depth. Although the natural closures may occur at anytime of the year, the mouth usually closes during the spring, summer, and fall (Heckel 1994; Merritt Smith Consulting 1997, 1998, 1999, 2000; Sonoma County Water Agency and Merritt Smith Consulting 2001). Natural breaching events occur when estuary water surface levels exceed the height of the barrier beach and overtop it, scouring an outlet channel that reconnects the Russian River to the Pacific Ocean. In addition, some water seeps through the sand, slowly lowering water levels. However, artificially alleviating the water level is often required to avoid flooding of the low-lying residential community built along the estuary.

NMFS 2008 BiOp found that the current breaching method is jeopardizing the continued existed of ESA-listed fish by destroying rearing habitat (i.e., essentially eliminating the lagoon by creating a highly saline and shallow environment). Therefore, the Agency is implementing RPA 2 in the BiOp that states that beach sands must be conserved and rearing habitat made available. To do this, the Agency would deviate from the current breaching method by altering the cut angle and width. This will allow freshwater to flow into the ocean with lower velocity but not vice versa, maintaining a freshwater environment in a lagoon of sufficient depth, and conserve beach sands. The Agency predicts that this work will take 1-2 days and the level of activity would be very similar to that during current breaching practices. Currently, after the Agency breaches the sandbar, harbor seals are present in greater numbers than when the beach is "closed." Seals will typically haul out on one or both sides of the newly formed cut (Figure 2). It is expected that under the proposed action, seals will continue to use the haulout in a similar manner.

Figure 2. An open estuary with typical seal haulout locations. Photo dated October 8, 2003 (taken from Behrens, unpubl.; photo courtesy of Elinor Twohy).

Estuary water level management events, no matter the cut configuration, would typically be conducted on outgoing tides to maximize the elevation head difference between the estuary water surface and the ocean. During all events, the barrier beach would be accessed from the paved parking lot at Goat Rock State Beach, located at the end of Goat Rock Road off Highway 1. Equipment would be off-loaded in the parking lot and driven north onto the beach via an existing access point. Agency crews would approach the haulout ahead of the heavy equipment to minimize the potential for seal flushes to result in a stampede. Agency staff would avoid walking or driving equipment through the seal haulout. Crews on foot would take caution to approach the haulout slowly and to make an effort to be seen from a distance, if possible, rather than appearing suddenly at the top of the sandbar. Personnel on the beach would include up to two equipment operators, three safety team members on the beach (one on each side of the channel observing the equipment operators, and one at the barrier to warn beach visitors away from the activities), and one safety team member at the overlook on Highway 1 above the beach. Occasionally, there would be two or more additional people on the beach (Agency staff or regulatory agency staff) on the beach to observe the activities. Agency staff would be followed by the equipment, which would then be followed by an Agency vehicle (typically, a small pickup truck; the vehicle would be parked at the previously posted signs and barriers on the south side of the excavation location). Equipment would be driven slowly on the beach and care would be taken to minimize the number of shut downs and start ups when the equipment is on the beach.

Although similar to current breaching methods, there is a level of uncertainty about the system and its response to the modified outlet channel management, therefore, the Agency has adopted the adaptive management approach specified in the BO and created the Agency's *Draft Russian River Estuary Outlet Channel Adaptive Management Plan* (AGENCY, 2009). A year-end evaluation to assess actual channel performance will be conducted, annually, and if needed, a revised management for subsequent years would be prepared. Any future work plan would be evaluated during the IHA/regulations process.

The Agency has proposed mitigation measures as part of the proposed action to avoid, minimize and reduce adverse impact to hauled out seal and sea lions to the lowest level practical and avoid potential for injury. Crews on foot would take caution to approach the haulout slowly and to make an effort to be seen by the seals from a distance, if possible, rather than appearing suddenly at the top of the sandbar and equipment would be driven slowly on the beach and care would be taken to minimize the number of shut downs and start ups when the equipment is on the beach. The Agency has been voluntarily implementing these measures and they, through voluntary monitoring, have been proven effective at eliminating serious injury and mortality and reducing impacts to pinnipeds hauled out on the beach at the mouth of the Russian River during breaching events. For example, no stampedes have been observed since Agency staff began slowly and cautiously approaching the haulout on foot ahead of bulldozing equipment.

NMFS has also worked with the Agency to develop appropriate mitigation during the pupping season to minimize the potential of pup abandonment. These mitigation measures are also part of the proposed action. The following mitigation measures apply only during the pupping season (April 1- June 15): (1) If a pup less than one week old is on the beach where heavy machinery would be used or on the path used to access the work location, the breaching event will be delayed until the pup has left the site or the latest day possible to prevent flooding while still maintaining an outlet channel. Pups less than one week old should be characterized by weighing up to 15kg, thin for their body length, or presence of an umbilicus or natal pelage. If there is any question to the pup's age, the event should be delayed until the pup has left the beach. The Agency shall coordinate with the local National Park Service's established seal monitoring program to determine if pups less than one week old are on the beach prior to a breaching event; (2) A water level management event may not occur for more than two consecutive days unless flooding threats can not be controlled; (3) The Agency must maintain a one week (7 day) "no work" period between water level management events (unless flooding is a threat to the low-lying residential community) to allow for adequate disturbance recovery period. During the "no-work" period, equipment must be removed from the beach; (4) During the pupping season (April 1- June 15), no more than three water level management events may occur within any given month and no more than six events may occur throughout the entire pupping season; (5) If, during monitoring, the marine mammal observers sight any pup which is considered to be abandoned, the NMFS stranding response network shall be called immediately. Observers are not to approach or move the pup.

Monitoring and Reporting

In order to issue an ITA for an activity, Section 101(a)(5)(D) of the MMPA states that NMFS must set forth "requirements pertaining to the monitoring and reporting of such taking."

The MMPA implementing regulations at 50 CFR § 216.104 (a)(13) indicate that requests for IHAs must include the suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species and of the level of taking or impacts on populations of marine mammals that are expected to be present.

The Agency's Russian River Estuary Management Activities Pinniped Monitoring Plan describes the monitoring efforts that shall take place during the IHA effective period. This Plan can be found on the NMFS website at http://www.nmfs.noaa.gov/pr/permits/incidental.htm. In summary, monitoring includes the following:

Event Monitoring

During the pupping season (March 15- June 30), the Agency will conduct a one-day pre-lagoon outlet channel survey to determine the number of animals on the beach and if any pups are present (April 1- June 15). The Agency will scan the beach for pups the morning of the breaching event prior to crews or equipment on the beach one hour prior to accessing the beach. If any pups less than one week old are sighted at the breaching site or on a path to the breaching site, breaching activities will be delayed until the pup has left those areas. Monitoring will continue for the duration of the breaching event to determine how many animals have been taken and end one hour after equipment leaves the beach. Pinnipeds will be monitored from the overlook on the bluff along Highway 1 adjacent to the haulout with high-powered spotting scopes.

In addition to work days, seal counts will also be conducted twice monthly when no machinery is on the beach to determine if any long terms impacts are occurring at the haulout. On these days, seals will be counted in ½ hour increments starting early in the morning (e.g., dawn) and ending eight hours later, weather permitting. This baseline information will also provide the Agency with details so that they may plan estuary management activities around prime seal haulout times in the future. Census days will be scheduled to capture a low and high tide each in the morning and afternoon.

For all counts, the following information would be recorded in 30 minute intervals from an overlook on a bluff to avoid harassment from the monitoring: (1) seal counts, by species; (2) behavior; (3) time, source and duration of disturbance; (4) estimated distances between source and seals; (5) weather conditions (e.g., temperature, wind, etc.); and (5) tide levels and estuary water surface elevation. The method and disturbance behavior would be recorded following Mortenson (2006) (Table 2). In summary, Level 1 indicates an alert reaction where the seal may turn its head towards the disturbance; Level 2 involves movement from short distances to many meters but does not enter water; and a Level 3 reaction includes flight or flushing to the water. In an attempt to understand possible relationship between use of the Jenner haulout and nearby coastal and river haulouts, several other haulouts in the estuary, which were extensively monitored from 1994-1999, would also be monitored (see Figure 2 in the IHA application for locations of these haulouts).

Table 1: Disturbance Rating Scale and Description (following Mortenson (2006)).

Level	Type of Response	Definition
1	Alert	Seal head orientation in response to disturbance. This may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, or changing from a lying to a sitting position.
2	Moving	Movements away from the source of disturbance, ranging from short withdrawals over short distances to hurried retreats many meters in length.
3	Flight	All retreats (flushes) to the water, another group of seals, or over the beach.

Long Term Monitoring

In addition to monitoring on event days, pinnipeds at the Jenner haulout would be counted twice monthly for the term of the IHA in the same manner as described above. In an attempt to understand if seals from the Jenner haulout are displaced to coastal and river haulouts nearby when the mouth remains closed in the summer, several other haulouts, on the coast and in the Russian River Estuary, would be monitored (Figure 2). These haulouts include North Jenner and Odin Cove to the north, Pocked Rock, Kabemali, and Rock Point to the south, and Jenner logs, Patty's Rock, and Chalanchawi in the Russian River Estuary. Each of these coastal and river haulouts would be monitored concurrent with monitoring of outlet channel construction and maintenance activities. This would provide an opportunity to assess qualitatively if these haulouts are being used by seals displaced from the Jenner haulout during lagoon outlet channel excavation and maintenance. This monitoring would not provide definitive results that individuals from the Jenner haulout are displaced to the coastal and river haulouts as individual seals would not be marked; however, it would useful to track general trends in haulout use during lagoon outlet channel excavation and maintenance.

Figure 2: Pinniped haulout site locations within the Russian River Estuary and surrounding region.

A report summarizing all marine mammal monitoring data would be prepared and distributed to the NMFS, California State Parks, and Stewards of the Coasts and Redwoods. The report would also be available to the public on the Agency's website. The annual report would include an executive summary, monitoring methodology, tabulation of estuary management events, summary of monitoring results, and discussion of problems noted and proposed remedial measures.

CHAPTER 3 AFFECTED ENVIRONMENT

This chapter presents baseline information necessary for consideration of the alternatives, and describes the resources that would be affected by the alternatives, as well as environmental components that would affect the alternatives if they were to be implemented. The effects of the alternatives on the environment are discussed in Chapter 4.

3.1 SOCIAL AND ECONOMIC ENVIRONMENT

Economic and social factors are listed in the definition of effects in the NEPA regulations. However, the definition of human environment states "economic and social effects are not intended by themselves to require preparation of an EIS." An EA must include a discussion of a proposed action's economic and social effects when these effects are related to effects on the natural or physical environment.

The proposed action is issuance of ITAs allowing the harassment of pinnipeds incidental to the Agency's management activities. All social and economic impacts to the human environment from carrying out the estuary management activities have been addressed in section 5 of the Corps 2005 EA and are incorporated here by reference. The only relevant social and economic impact that is considered due to authorizing harassment to marine mammals is potential effects on the recreational and commercial seal watching at the Jenner haulout.

Seal watching is common on at the Jenner haulout year round. Stewards' Seal Watch Public Education Program provides private docent-led seal watch adventures at a suggested donation of $5-10. Local residents also enjoy the seals at the Jenner haulout as evident by the voluntary monitoring programs. Commercial kayaking tours incorporate seal sightings into their wildlife viewing agenda. Recreational kayakers and beach walkers also enjoy the seals; however, there is no large commercial seal watching industry (*e.g.*, southern resident killer whale watching industry) involving substantial revenue.

3.2 PHYSICAL ENIVORNMENT

The Russian River springs from the Laughlin Range about 5 mi (8 km) east of Willits in Mendocino County. It flows generally southward to join the East Fork Russian River just below Lake Mendocino. East of Healdsburg, Maacama Creek joins the Russian River. After a series of sweeping bends, the river flows under U.S. Route 101 and receives water from Lake Sonoma via Dry Creek. The river then turns westward and empties into the Pacific Ocean between Jenner and Goat Rock Beach. The estuary itself is located about 97 kilometers (km; 60 miles) northwest of San Francisco in Jenner, Sonoma County, California (Figure 3). The Russian River watershed encompasses 3,847 square kilometers (km) (1,485 square miles) in Sonoma, Mendocino, and Lake County.

Figure 3. The Russian River

The physical characteristics of the Russian River mouth channel opening affect tidal exchange between the Pacific Ocean and the estuary. Whether the river mouth is open or closed is largely related to ocean conditions and to seasonal rainfall and rainfall intensity. Historical accounts indicate that the estuary remains open during periods of low wave intensity and moderate to high freshwater river inflows. If the scouring action of the tidal flows through the channel is less than the rate of deposition of sand in the channel, due to longshore or cross-shore sand transport along the coast, the mouth of the estuary begins to close as the sandbar extends across the channel. Closures usually occur during the spring, summer, and fall when the river inflow is low. The mouth is often open during late fall through winter, and is often closed during summer through early fall. Although the Agency cannot precisely predict the amount and timing of future Agency breaching actions because surface water elevations in the estuary and storm conditions are variable throughout the winter, spring, and fall months; it is likely events would occur at roughly the same frequency and times as in the recent past. Since 1995, the majority of breaching events has occurred from September to November followed by April through May.

3.2.1 Sanctuaries, Parks, Historic Sites, etc.

Based on the Agency's review of survey data on file with various City, State, and Federal agencies and the Corps 205 EA, no historic or archaeological resources are known to occur on-site or in the project vicinity. Since the exposed bars are comprised of sediments recently deposited by high water-flow events, the proposed bar skimming work would not likely uncover intact archaeological resources. Therefore, it is reasonable to assume, no historic or archeological resources exist within the action area.

Goat Rock State Beach, where bulldozing and excavation would occur, is owned and managed by the California Department of Parks and Recreation. This beach is subject to continuing marine erosion as well as windborne erosion, thus creating a situation where an average of one to three feet per year of land mass is lost,http://en.wikipedia.org/wiki/Goat_Rock_Beach - cite_note-Sloan-0#cite_note-Sloan-0 except for the hardest of outcrop formations. In winters of heavy storms this value can be yet higher. Over the last geologic epoch the land has been subject to uplift, a process combined with marine erosion, which has created a marine terrace above the entire extent of the beach. The mouth of the Russian River is located at the northern terminus of Goat Rock Beach and at the southern end of this crescent shaped expanse is the massive Goat Rock, an iconic outcrop of the Sonoma Coast, which is barely attached to the mainland by a narrow isthmus.

Goat Rock Beach is often frequented by beachcombing visitors, surfers, waders, and kayakers, especially during the summer months. However, these uses are moderated by the rip current generated by a steep gradient into the water that leads to an underwater trench parallel to the waterline. The beach is also a regular resting ground for gulls, harbor seals, and sea lions, the latter two species sometimes hauling out of the Pacific Ocean. The state of California recommends that a 50-yard (46 m) distance be preserved between human visitors and the seasonal marine mammals.

3.2.2 Essential Fish Habitat

Essential Fish Habitat (EFH) means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity. For the purpose of interpreting the definition of EFH, "waters" include aquatic areas that are used by fish and their associated physical, chemical, and biological properties and may include areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' entire life cycle.

The Russian River Basin occurs within essential fish habitat for the Pacific Salmon Fishery that includes both coho and chinook salmon. Essential fish habitat for these species essentially corresponds to the constituent habitat elements of designated critical habitat. Components of EFH and an analysis of impacts on EFH from the specified activities are detailed in the NMFS' 2007 Russian River BO. The proposed action includes authorizing harassment to marine mammals that does not affect EFH; therefore, EFH will not be discussed further in this EA.

3.2.3 Marine Mammal Habitat

Goat Rock State Beach hosts what is known as the Jenner harbor seal haulout. Occasionally California sea lions and northern elephant seals may use the haulout as a resting place; however, sightings of these species usually involve only one or a couple of animals. The beach is managed by the California Department of Parks and Recreation. Tide range on the beach is approximately 6 feet and is diurnal (Erskian and Lipps 1977). Sediments are fluvial (gravels and cobbles), marine sands (Erskian and Lipps 1977), and fine silts and mud in some areas of the estuary (NMFS staff observations 2007). During high tide, as with other haulout sites, less beach area is available for seal use.

The estuary may close throughout the year as a result of a barrier beach forming across the mouth of the Russian River. Although closures may occur at anytime of the year, the mouth usually closes during the spring, summer, and fall (Heckel 1994; Merritt Smith Consulting 1997, 1998, 1999, 2000; Sonoma County Water Agency and Merritt Smith Consulting 2001). Closures result in ponding of the Russian River behind the barrier beach, providing habitat for ESA-listed salmon and steelhead. In turn, seals and sea lions may forage in this naturally created lagoon system. However, should water levels rise too high, flooding of low lying communities may occur requiring artificial breaching if natural breaching does not occur. Based on seal

monitoring data, more seals are present after the Agency breaches the sandbar than when the beach is "closed."

There is no marine mammal critical habitat designated in the action area, as no ESA-listed marine mammal species are present. Therefore, issuance of ITAs would not impact marine mammal critical habitat.

3.3 BIOLOGICAL ENVIRONMENT

The Corps 2005 EA includes a description of wildlife and their seasonal biological functions (e.g., bird migration). All species descriptions in that EA are incorporated by reference here and are summarized below. Additional information on some species, in particularly marine mammals, has also been added here to provide more detail about species population and biological functions within the action area. This information is helpful in assessing impacts to marine mammals from the proposed action.

3.3.1 Fish

The Russian River Estuary is home to a variety of fish species including salmon, steelhead, and other important recreational fish species such as American shad and smallmouth bass. In terms of conservation, much attention is given to three ESA-listed species of fish that use the estuary as vital rearing habitat. As discussed in Chapter 1 of this EA, these are the CCC steelhead, CCC coho salmon, and CC chinook salmon. The BiOp prepared by NMFS in 2008, addresses these species in detail and the impacts of the Agency's previous management strategies. Again, that BiOp determined that should the Agency continue its water level management actions unchanged, they could result in the jeopardy of the existence of these species.

Salmon and steelhead within the action area are available for harbor seal consumption. Stomach content analysis revealed that seals at the Jenner haulout are not foraging on adults but juveniles and smolt life stages of these fish are consumed (Hanson 1993). The Hanson (1993) study also reported that juvenile/smolt salmonid remains found in seal scat on the sandbar at the mouth increase in frequency when the mouth is closed (i.e., when the lagoon forms). Maintaining the lagoon for extended periods, as the proposed action would allow for, may result in increased availability of these fish as prey.

3.3.2 Marine Mammals

Marine mammals at the Jenner haulout have been consistently monitored since 1985. Local residents formed the Stewards Seal Watch Program to conduct weekend seal counts and monitor human activity on the beach. The Agency started monitoring seals during breaching events from 1996-2000 and, more recently; Goat Rock State Park volunteer docents started helping Seal Watch with census collection. Therefore, an extensive data set of harbor seal abundance and presence of other species of pinnipeds is available. Since seal monitoring began in the mid-1980s, three pinniped species have been sighted using the Jenner haulout. The most abundant species is the harbor seal with the occasional sighting of California sea lions or

northern elephant seals. The MMPA authorization application provides a detailed description of these species and is summarized here.

3.3.2.1 Harbor Seals

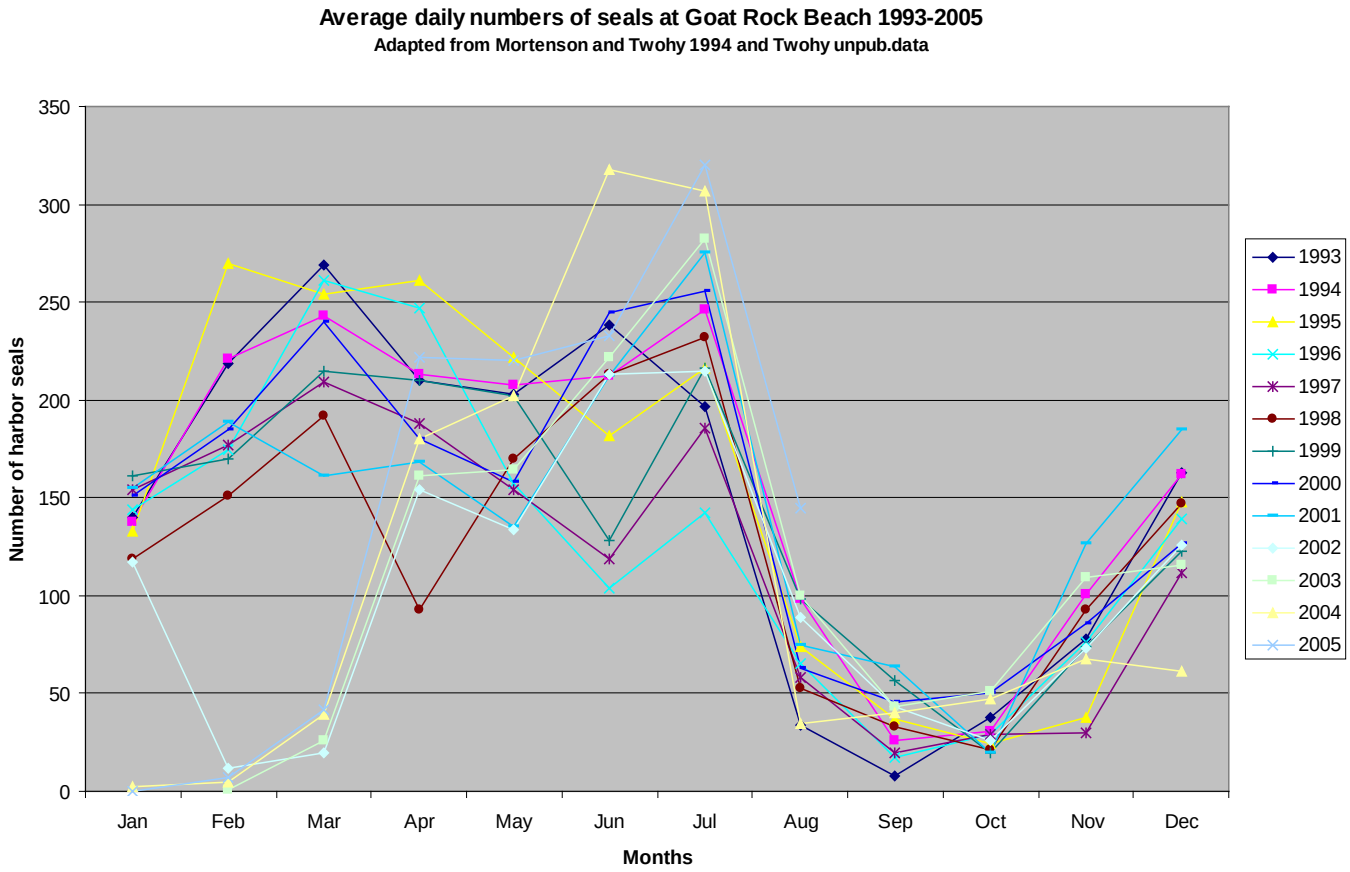
Harbor seals (*Phoca vitulina*) are widely distributed in the North Atlantic and North Pacific and are divided into two subspecies: *P. v. stejnegeri* in the western North Pacific, near Japan, and *P. v. richardsi* in the eastern North Pacific. The latter inhabits near-shore coastal and estuarine areas from Baja California, Mexico, to the Pribilof Islands in Alaska. Based on the most recent harbor seal counts and Hanan's revised correction factor, the harbor seal population in California is estimated to number 34,233 with a minimum population estimate of 31,600 (Caretta et al., 2005). Counts of harbor seals in California showed a rapid increase from approximately 1972 (when the MMPA was passed) to 1990. Net production rates appeared to have declined from 1982 to 1994. Although earlier analyses were equivocal (Hanan 1996) and there has been no formal determination that the California stock has reached its Optimal Sustainable Population level (defined in the MMPA), the decrease in population growth rate has occurred at the same time as a decrease in human-caused mortality and may be an indication that the population is reaching its environmental carrying capacity. California harbor seals are not listed under the ESA or depleted under the MMPA.

On land, harbor seals haul out on rocky outcrops, mudflats, sandbars and sandy beaches with unrestricted access to water and with minimal human presence. In California, approximately 400-600 harbor seal haulout sites are widely distributed along the mainland and on offshore islands, including intertidal sandbars, rocky shores and beaches (Hanan 1996; Lowry et al. 2005). The Jenner haulout is the largest in Sonoma County, comprising of approximately 18% of the harbor seal population found there (M. DeAngelis, pers. comm.). There are also several known haulouts in the Russian River Estuary at logs and rock outcroppings in the river. Haulout sites provide vital resting, pupping, and molting habitat. These seals do not make extensive pelagic migrations, but can travel 300-500 km on occasion to find food or suitable breeding areas (Herder 1986; D. Hanan unpublished data). At the Jenner haulout, pups are observed from mid to late March until late June, and sometimes into early July (Mortenson 2009). The peak of pupping season is considered mid-May.

As described above, the Jenner haulout has been exclusively monitoring since 1985. Local residents also began monthly seal counts in 1987, with nearby haulouts added to the counts thereafter. These data indicate that harbor seals regularly haul out at the mouth of the Russian River, with the greatest numbers observed in late winter and mid-summer with California sea lions and elephant seals only occasionally observed at the river mouth. During these counts, diurnal patterns were discovered and it was noted whether the mouth of the River was open or closed off to the Pacific Ocean. The information that has emerged from these data sets is that the Jenner haulout is atypical in terms of the time of year and time of day that the peak numbers of harbor seals are present. The number of seals at the Jenner haulout peak in later winter (January/February) and remain high until August/ September (Figure 3). At other haulouts, numbers usually peak during the pupping and molting season (spring and summer). In general, monitoring studies have found that the optimum time to census seals is afternoon low tides (Allen 1987, Pauli and Terhune 1987). Based on previous monitoring efforts, it is known that

harbor seals haul out at the mouth of the Russian River at various times of day, with the highest counts in the afternoon, except in the fall (Mortenson and Twohy 1993, Mortenson 1996).

Figure 3. Average daily counts of harbor seals at Goat Rock Beach Park from 1993-2005.



Harbor seals feed opportunistically in shallow waters on fish, crustaceans, and cephalopods. Foraging occurs in shallow littoral waters, and common prey items include flounder, sole, hake, codfish, sculpin, anchovy and herring (California Department of Fish and Game 2005). Harbor seals are typically solitary while foraging, although small groups have been observed.

Harbor seal hearing, along with all other pinniped species, is dependent upon the medium (i.e., air or water) in which they receive the sound. The Agency's management activities would affect pinnipeds on the beach, not in the water; therefore, underwater hearing thresholds will not be discussed here. However, hearing in pinnipeds in air is often compared to that in water. In air, pinniped hearing capabilities are greatly reduced from that in water. For example, harbor seal hearing is 25–30 dB keener underwater than in air (Kastak and Schusterman, 1994). Data suggest differences in the functional hearing range among otariids ("eared seals" such sea lions and fur seals) and phocids ("true seals" such as the harbor seal and northern elephant seal) (Southall et al., 2007); however, for purposes of this EA, these families are lumped together as data is limited and specific hearing thresholds are not necessary to distinguish for purposes of

analyzing impacts from the proposed action. In general, pinnipeds in-air hearing lies within the 75 Hz to 30 kHz frequency range.

Pinnipeds have excellent eyesight underwater, enhanced by large round eyes. Similar to hearing; however, a seal or sea lion's visual perception is inferior on land. Although little data exists on best visual area and retinal resolution, it is assumed that pinniped sight on land is not as good as a human's visual capabilities (Mass 2003). There is no designated visual distance threshold to which seal and sea lions are known to react. NMFS has not established any distance thresholds for harassment caused by visual awareness of a disturbance source (e.g., presence of an approaching or operating bulldozer).

3.3.2.2 California Sea Lions

California sea lions range from southern Mexico to British Columbia, Canada. The entire U.S. population has been estimated at 238,000, and grew at a rate of approximately 6.52% annually between 1975 and 2005 (Carretta *et al.* 2007). The species is not listed under the Endangered Species Act and is not "depleted" or listed as "strategic" stock under the MMPA. Sea lions can be found at sea from the surf zone out to near shore and pelagic waters. On land, the sea lions are found resting and breeding in groups of various sizes, and haul out on rocky surfaces and outcroppings and beaches, as well as manmade structures such as jetties and beaches. Sea lions prefer haul out sites and rookeries near abundant food supplies, with easy access to water; although sea lions occasionally travel up rivers and bays in search of food.

Sea lions exhibit seasonal migration patterns organized around their breeding patterns. California sea lions breed at large rookeries on the Channel Islands in southern California, and on both sides of the Baja California peninsula, typically from May to August. Females tend to remain close to the rookeries throughout the year, while males migrate north after the breeding season in the late summer, and then migrate back south to the breeding grounds in the spring (California Department of Fish and Game 1990). No established rookeries are known north of Point Reyes, California, but large numbers of sub adult and non-breeding or post-breeding male California sea lions are found throughout the Pacific Northwest. There is a mean seasonal pattern of peak numbers occurring in the northwest during fall, but local areas show high annual and seasonal variability.

Solitary California sea lions were occasionally observed between the river mouth and the Jenner visitor's center during bar-open conditions in the Russian River Estuary (Merritt Smith Consulting 1999 and 2000). A single sea lion was hauled out during post-breaching monitoring on September 6, 2000 (Sonoma County Water Agency and Merritt Smith Consulting 2001).

There are limited data on species-specific hearing and vision in pinnipeds on land; therefore, the description on these senses provided under section 3.3.2.1 is applicable for California sea lions.

3.3.2.3 Northern Elephant Seals

The population of northern elephant seals in California is estimated at 124,000 (Caretta 2007). Northern elephant seals breed and give birth in California (U.S.) and Baja California

(Mexico), primarily on offshore islands (Stewart *et al.* 1994), from December to March (Stewart and Huber 1993). Males feed near the eastern Aleutian Islands and in the Gulf of Alaska, and females feed further south, south of 45~ (Stewart and Huber 1993, Le Boeuf *et al.* 1993). Adults return to land between March and August to molt, with males returning later than females. Adults return to their feeding areas again between their spring/summer molting and their winter breeding seasons. Adult male elephant seals breed with harems of females in from mid December through March in dense rookeries on the San Miguel Island, Santa Barbara Island, San Nicolas Islands, San Simeon Island, Southeast Farallon Island, Afio Nuevo Island, on the mainland at Año Nuevo (San Mateo Co.), and the Point Reyes Peninsula (California Department of Fish and Game 2001). From April to November, they feed at sea or haul out to molt at rookeries. They are not listed as "endangered" or "threatened" under the Endangered Species Act nor as "depleted" or "strategic" under the MMPA.

Elephant seals at the mouth of the Russian River have been observed randomly from since monitoring began in 1987. For example, from 1992-1995, one or two elephant seals were counted during the censuses conducted in May, with occasional records during the fall and winter (Mortenson and Follis 1997). In 2006 and 2007, a single male northern elephant seal has been present at the mouth of the Russian River harbor seal haul out site, during the late winter and spring of each year. The elephant seal was believed to be a juvenile or sub-adult male when it first began using the area as a haul out site. It has been observed harassing harbor seals hauled out at the mouth of the Russian River.

There are limited data on species-specific hearing and vision in pinnipeds on land; therefore, the description on these senses provided under section 3.3.2.1 is applicable for northern elephant seals.

CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

This chapter represents the scientific and analytic basis for comparison of the direct, indirect, and cumulative effects of the alternatives. Regulations for implementing the provisions of NEPA require consideration of both the context and intensity of a proposed action (40 CFR Parts 1500-1508).

4.1. EFFECTS OF ALTERNATIVE 1: NO ACTION

The proposed action is issuance of an incidental take authorization under the MMPA allowing the take of pinnipeds incidental to the Agency's estuary management activities. The activities themselves are authorized under a Corps permit. The impacts to pinnipeds under the no action alternative are similar to those under the preferred alternative since the IHA application is based on specified activities established by historic water level management actions. Those impacts, therefore are not repeated here.

The MMPA authorization solely authorizes harassment of pinnipeds from the action. Should an MMPA permit be denied, the Agency would still be authorized to conduct the activities; however, should pinnipeds be harassed, this would be illegal under the MMPA. As an alternative, the Agency could conduct breaching only when pinnipeds were absent from the haulout; however, seal presence is a daily occurrence at the haulout therefore this option is not practical to prevent flooding of developed communities adjacent to the estuary. If flooding occurs, it could result in fiscal and physical loss and possibly endanger local residents. In addition, restricting constructing and managing the lagoon to times when pinnipeds are not present would result in not maintaining high quality habitat designed to foster growth and development of ESA-listed fish species.

4.2 EFFECTS OF ALTERNATIVE 2: ISSUANCE OF INCIDENTAL TAKE AUTHORIZATIONS

This section describes potential impacts to the human environment from issuance of MMPA authorizations allowing the harassment of marine mammals incidental to the Agency's estuary management activities. As such, impacts described here are only related to those that involve marine mammals. The Corps' 2005 EA prepared for issuance of the permit to carry out the management activities includes an assessment of all other activity-related impacts including all impacts to ESA species and is incorporated here by reference.

4.2.1 Effects to the Social and Economic Environment

While the presence of heavy equipment on the beach would likely flush seals into the water, this activity is short-term, has been occurring for years, and monitoring data indicates seals return within 1 day of activity cessation and do not support any indication of abundance decline. In addition, harassment would be minimized by such factors as conducting lagoon management during high tide when seals would likely not be on the beach or on the beach in low numbers and minimizing the number of breaching events per year. As such, NMFS anticipates

seals would be present for recreational and commercial viewing at times when equipment is not on the beach. Individual human health and safety are also not affected as any staff required under an ITA (e.g., those tasked with specifically observing reactions of pinnipeds to breaching activities) would not approach pinnipeds; therefore, no chance of injury to staff (e.g., bites) or transmission of zoonotic disease (e.g., seal finger) is possible. Because the proposed action is limited to authorizing harassment to pinnipeds, there would also be no impacts to local communities and populations, such as those from noise and water pollution, risk of exposure to disease and hazardous materials, or increasing risk of damage from natural disasters. Therefore, significant impacts to the social and economic environment would not occur from the proposed action.

4.2.2 Effects on Marine Mammals

As noted, the effects of the proposed action (preferred alternative) are similar to no action. They only differ in that the proposed action includes additional mitigation and monitoring measures. As discussed below, these measures are anticipated to minimize impacts to marine mammals. Thus, the primary distinction in effect between the no action alternative and the proposed action (preferred alternative) is the effect on marine mammals resulting from implementation of mitigation. NMFS anticipates a net beneficial effect to marine mammals as a result of implementing mitigation measures.

The Jenner haulout has been extensively monitored since the mid 1980s. The Stewards' Seal Watch Public Education Program began in 1985, with volunteers working in up to four-hour shifts on the beach at the river mouth where they monitor marine mammals and human interaction. State Parks volunteer docents assist the public in safeguarding this local harbor seal habitat, the largest on the Sonoma Coast. Docents are available at Goat Rock State Beach on weekends during the annual pupping and molting season (March through Labor Day weekend) when the seals are most vulnerable to public interactions. In addition to public outreach, the volunteers record the numbers of visitors and seals on the beach, other species of wildlife observed, and the number of boats and kayaks present.

In addition to local resident monitoring efforts, the Agency monitored biological and water quality conditions before, during, and after artificial breaching events from 1996 to 2000. In all five years of monitoring, the number of pinnipeds hauled out at the mouth of the estuary declined when the barrier beach was closed and increased soon after it was breached (Sonoma County Water Agency and Merritt Smith Consulting 2001).

While seals are often alerted to distance sources of disturbance, such as the sound of trucks on nearby Highway 1, they primarily flush off the beach as a result of disturbances directly on the beach. Sources of disturbance included beach goers and kayakers who are more prevalent in the later morning and early afternoon hours. On artificial breaching days, many pinnipeds usually abandon the haulout prior to the crew and bulldozer reaching the breaching location due to disturbance from visitors already on the beach. Remaining pinnipeds will usually flush as the crew approaches ahead of the heavy equipment; however, more recent monitoring efforts by the Agency indicate not all seals are flushing and some are just moving away from the sandbar. Some seals that do flush are returning to the beach while equipment is operating;

hauling out and crossing the sandbar to the south of the equipment, back and forth from the estuary and ocean. Once breaching is complete, equipment is removed and crews leave the beach and pinnipeds generally return to the haulout within hours to one day.

While harassment to pinnipeds hauled out on the beach would occur regardless of the cut design specifications, some factors in the plan do affect levels of harassment. For example, the management plan calls for most work to occur at high tide to reduce the scour potential associated with the initial outflow at the time of breaching. Because seals are not usually hauled out during this time in greatest abundance (as there is less beach to occupy) harassment would be minimized.

Estuary management activities that could affect pinnipeds could occur year round, including the pupping season. However, NMFS has identified numerous mitigation measures designed to minimize impacts to pups (see Mitigation section in Chapter 3). Pupping normally occurs at the Russian River from March until late June, and sometimes into early July (Mortenson 2009). Harbor seal pups are particularly precocious, swimming and diving immediately after birth and throughout the lactation period, unlike most other phocids that normally enter the sea only after weaning (Lawson and Renouff, 1985; Cottrell et al., 2002; Burns et al., 2005). NMFS recognizes the critical bonding time needed between a harbor seal mom and her pup to ensure pup survival and maximize pup health. Harbor seals pups are weaned from their mother within approximately 4 weeks; however, the most critical bonding time is immediately (minutes) after birth. Lawson and Renouf (1987) conducted an in-depth study to investigate harbor seal mother/pup bonds in response to natural and anthropogenic disturbance. In summary, they found that a mutual bond is developed within 5 minutes of birth and both the mother and pup play a role in maintaining contact with each other. The study showed a bilateral bond, both on land and in the water, and that mothers would often wait for or return to their pup if it did not follow them. Pups would follow or not move away from mothers as they approached. Most notably, mothers demonstrated overt attention to their pups while in the water and during times of disturbance on the nursery. Increased involvement by the mothers in keeping the pairs together during disturbances became obvious as they would wait for, or return to their young if the pups fell behind.

Harbor seal pups in California have been the subject of countless research studies. Research activities often include capture and handling of very young pups and separating pups from their mothers for short periods of time. Scientists report they have disturbed seals during capture and then leave the area within approximately an hour. Seals return to the haul-out site within minutes of the scientists leaving the beach (M. DeAngelis, pers. comm., Jan. 12), further demonstrating harbor seal pup resilience to disturbance.

Harbor seal mother/pup pairs have a characteristic distribution in the Russian River. There is a continuum, with a gradual, rather than abrupt change in the relative mix of seal age classes along the estuary to the mouth of the river with mom and pups picking out coves upriver, especially north of Haystack Rock, and juveniles and adults being more abundant closer the river mouth (pers. comm., M. DeAngeliss, December 16). One component of the Agency's monitoring plan is to assess seal numbers at other nearby haulouts to understand better the relationship between upriver haulouts and the Jenner haulout. Because mothers and pups tend to

inhabit the upriver haulouts more so than near the mouth of the river, where machinery would work, many pups would not be disturbed by the Agency's action.

Chronic human disturbance may play a role in reduced fitness and survival for any marine or terrestrial animal. However, studies have shown the main factors influencing harbor seal pup birth weight and survival is maternal age and body mass with younger, thinner moms producing more vulnerable pups (Bowen 1993, Coltman, 1998).

To avoid stampeding, which could possibly lead to pup mortality, Agency staff would avoid walking or driving equipment through the haulout. Crews on foot would take caution to approach the haulout slowly and to make an effort to be seen from a distance, if possible, rather than appearing suddenly at the top of the sand dunes. Agency staff would avoid walking or driving equipment through the haulout. Crews on foot would take caution to approach the haulout slowly and to make an effort to be seen from a distance, if possible, rather than appearing suddenly at the top of the beach.

As discussed earlier, the Agency monitored seal reaction during breaching events from 1996-2000. Seals are usually alerted to the presence of the heavy equipment on the barrier beach well before it approaches the haulout due to the equipment's noise. Seals would typically flush into the water in response to approaching crew and equipment. Equipment has been driven slowly on the beach and care has been taken to minimize the number of shut downs and start ups when the equipment is on the beach. Once breaching was completed, equipment and crews left the beach and pinnipeds returned to the haulout within one day.

The take numbers authorized in the IHA are based on Agency monitoring from 1996-2000. The average number of harbor seals harassed during these events were compared with the number of events predicted for the effective date of the IHA. It is anticipated that the level of taking authorized in the IHA will be equal to less than that during previous breaching events, as the Agency will now adhere to mitigation and monitoring measures set forth in the IHA (the proposed action). The 2010-2011 IHA will authorize the taking, by Level B harassment only, of 1,120 harbor seals, 16 California sea lions, and 10 northern elephant seals. Take numbers in future MMPA authorizations will be based upon population estimates and results of monitoring during the current IHA.

Based on these extensive monitoring sets, NMFS has determined that impact to pinnipeds on the beach during estuary management activities would be limited to short-term (*i.e.*, one day or less) behavioral harassment in the form of alertness or flushing. Because crews would approach the beach slowly and cautiously ahead of equipment, stampeding is not expected. Further, the lack of evidence of permanent abandonment of the haulout despite the Agency breaching the beach for years indicates long term or permanent abandonment of the haulout is unlikely. No long-term impacts are anticipated. An analysis of variance (ANOVA) test showed no significant difference in average monthly seal counts between 1993-2002 ($p= 0.743$), despite the Agency breaching the sandbar since 1995.

4.2.3 Effects on Marine Mammal Habitat

The purpose of the lagoon outlet channel management and artificial breaching activities is to alleviate flood risk to low-lying properties near on the estuary but in a manner which improves summer rearing habitat for juvenile salmonid and steelhead in the Russian River estuary from late spring to early fall. Making a cut through or across the sandbar would create artificial "open" conditions, resulting in physical alterations of the Jenner haulout (see Figures 1a-c in Chapter 2). No new structures or mechanical devices, temporary or permanent, will be a part of the outlet channel implementation. Impacts would be limited to times when machinery is on the beach, a maximum of two days per week during daylight hours only.

Abundance data collected over the years show a sharp increase in seal numbers after the sandbar has been breached. If this is due to people not having as much access to parts of the beach due to the deep channel or physical/biological reasons is unclear. However, breaching the sandbar proves to be advantageous for the seals. In addition, creating a lagoon during late spring to fall will increase the concentration of juvenile and smelt salmon, a prey resource for seals (Hanson 1993). Therefore, no adverse impacts to marine mammal habitat are anticipated outside of machinery working on the beach.

4.3 SUMMARY OF COMPLIANCE WITH APPLICABLE LAWS, NECESSARY FEDERAL PERMITS, LICENSES, AND ENTITLEMENTS

As summarized below, NMFS has determined that the proposed action is consistent with the purposes, policies, and applicable requirements of the MMPA and NMFS regulations. NMFS issuance of ITAs would be consistent with the MMPA.

4.3.1 National Environmental Policy Act

This EA serves as NMFS' compliance with NEPA and procedures contained within CEQ's implementing regulations and NAO 216-6.

4.3.2 Endangered Species Act

No ESA listed marine mammals occur within the action area; therefore, NMFS' Office of Protected Resources did not request Section 7 consultation under the ESA. However, as described in section 1.4., it is NMFS responsibility to ensure that the Agency has complied with other environmental laws. In 2008, the Agency and the U.S. Army Corps of Engineers (Corps) consulted with NMFS under Section 7 of the Endangered Species Act (ESA) regarding the' potential effects of their operations and maintenance activities, including the Agency's estuary management program, on federally-listed CCC steelhead, CCC coho salmon, and Coastal CC Chinook salmon. As a result of this consultation, the NMFS issued the Russian River BiOp finding that artificially elevated inflows to the Russian River Estuary during the low flow season (May through October) and historic artificial breaching practices have adverse effects on the Russian River's estuarine rearing habitat for steelhead, coho salmon, and Chinook salmon (NMFS 2008) due to increased salinity levels and decreased water depths behind the barrier beach. As a result of this finding, the BiOp's Reasonable and Prudent Alternatives (RPAs) (NMFS 2008) requires the Agency to collaborate with NMFS and to modify estuary water level management in order to reduce marine influence (high salinity and tidal inflow) and promote a

higher water surface elevation in the estuary *(i.e.*, formation of a fresh or brackish lagoon) for purposes of enhancing the quality of rearing habitat for juvenile (age 0+ and 1+) salmon and steelhead.

4.3.3 Marine Mammal Protection Act

The Agency submitted an ITA application consistent with applicable issuance criteria in the MMPA and NMFS implementing regulations. The views and opinions of scientists or other persons or organizations knowledgeable of the marine mammals that are the subject of the application or of other matters germane to the application were considered, and support NMFS's determinations regarding the application. In summary, NMFS has determined that the proposed action will result in short-term behavioral changes to pinniped behavior (e.g., alertness, flushing) in response to Agency crew and equipment working on the beach. Hence, the Agency's specified activities will result in the incidental take of small numbers of marine mammals, by Level B harassment only, and that the total taking will have a negligible impact on the affected species or stocks.

Any incidental take authorization issued to the Agency would contain standard terms and conditions stipulated in the MMPA and NMFS's regulations. As required by the MMPA, the authorization would specify: (1) the effective date of the authorization; (2) the number and kinds (species and stock) of marine mammals that may be taken; (3) the manner in which they may be taken; (4) appropriate mitigation measures designed to minimize impacts to affected marine mammals; and (5) a monitoring plan designed to detect impacts or lack thereof.

4.3.4. Magnuson-Stevens Fishery Conservation and Management Act

Consultation with NMFS' Habitat Conservation Division on impacts to EFH was included in NMFS' BiOp issued on September 24, 2008. The Agency's estuary management activities would occur within EFH for various Federally-managed fish species within Pacific Salmon Fishery Management Plan (FMP), the Coastal Pelagics FMP, and the Pacific Groundfish FMP. Recall that Section 7 and EFH consultation evaluated the Agency's current breaching methods (i.e., creating a deep, narrow cuts resulting in a tidal estuary) as that was the proposed action. NMFS found that the Agency's proposed action adversely affected EFH for the above listed fisheries and hence provided seven EFH conservation recommendations, including creation of a lagoon outlet channel. Implementing RPA 2 of the BiOp would alleviate these impacts.

4.4 MITIGATION AND MONITORING MEASURES

The Agency included a series of proposed mitigation and monitoring measures in their MMPA application, which are described in section 2.2. As required under the MMPA, NMFS considered the Agency's proposed mitigation to effect the least practicable adverse impact on marine mammals, as well as proposed monitoring and reporting procedures. NMFS identified additional mitigation measures beyond those proposed in the MMPA application to minimize impacts to pinnipeds during the pupping season. These mitigation measures would be included in the first year IHA and monitoring during that year would assess the need to modify them in

the future; hence are also part of the proposed action.

Since NMFS has a duty to issue an IHA in a manner effecting the least practicable impact on marine mammal species, NMFS has included the means for doing so in the proposed action. NMFS has identified no additional feasible mitigation measures beyond those included in the IHA and proposed action.

4.5 CUMULATIVE EFFECTS

Cumulative effects are defined those that result from incremental impacts of a proposed action when added to other past, present, and reasonably foreseeable future actions, regardless of which agency (federal or nonfederal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions that take place over a period of time.

As discussed, the action area is a highly used recreational spot for both local and tourist kayakers and beach walkers. Several outfitters run kayak trips around the area and Goat Rock Beach Park host seal watching tours for a nominal donation. Human use of the Jenner haulout is limited to these activities. The Agency's activities would not interfere with these uses as they have been conducted for decades with no impact to the recreational use at the Jenner haulout.

There is only one other potential management activity that could occur within the action area: the removal of the jetty as described in section 2.1.2 in NMFS' 2008 BO. In summary, if adaptive management of the outlet channel is not able to reliably achieve the targeted annual and seasonal estuary management water surface elevations by the end of 2010, the Agency will draft a study plan for analyzing the effects and role of the Russian River jetty at Jenner on beach permeability, seasonal sand storage and transport, seasonal flood risk, and seasonal water surface elevations in the Russian River Estuary. If the Jetty compromises the formation of a closed barrier beach in the spring and summer, and removal of the jetty does not appreciably increase flood risk, the Corps shall design a plan for removal of the jetty and fund its implementation. However, no plans for jetty removal have been made at this time.

NMFS does not expect issuance of ITAs to the Agency to result in cumulatively significant adverse effects to affected species and stock(s) of marine mammals when combined with the above-described activities. Should NMFS receive an application from applicants requesting authorization to take marine mammals incidental to specified activities in the action area, NMFS would also consider cumulative impacts to the affected species or stock, as required under NEPA.

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