

National Marine Fisheries Service

Request for Rulemaking and Letters of Authorization for Incidental Harassment of Marine Mammals

Russian River Estuary Management Project at Goat Rock State Beach and the Russian River Estuary



Requested by the Sonoma County Water Agency
404 Aviation Blvd
Santa Rosa, CA 95403

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1. PROJECT DESCRIPTION

The Russian River estuary (estuary) is located about 97 kilometers (km; 60 miles) northwest of San Francisco in Jenner, Sonoma County, California (Figure 1). The Russian River watershed encompasses 3,847 square kilometers (km) (1,485 square miles) in Sonoma, Mendocino, and Lake counties. The estuary extends from the mouth of the Russian River upstream approximately 10 to 11 km (6 to 7 miles) between Austin Creek and the community of Duncans Mills (Heckel 1994).

The estuary may close throughout the year as a result of a barrier beach forming across the mouth of the Russian River. The mouth is located at Goat Rock State Beach (California Department of Parks and Recreation). Closures may occur at any time of the year (Heckel 1994; Merritt Smith Consulting 1997, 1998, 1999, 2000; Sonoma County Water Agency [SCWA] and Merritt Smith Consulting 2001; SCWA 2012 - 2021). Closures result in formation of a lagoon behind the barrier beach and, as water surface levels rise in the estuary, flooding may occur. Natural breaching events occur when estuary water surface levels exceed the capability of the barrier beach to impound water, causing localized erosion of the barrier beach and creation of a tidal channel that reconnects the Russian River to the Pacific Ocean.

The barrier beach has also been artificially breached for decades; first by local citizens, then the County of Sonoma Public Works Department, and, since 1995, by the Sonoma County Water Agency (Sonoma Water). The purpose of artificially breaching the barrier beach is to minimize potential flood risk to low-lying properties along the estuary following formation of a barrier beach that closes the river mouth. In order to comply with the requirements of the Biological Opinion (NMFS 2008), Sonoma Water has implemented adaptive management of the Estuary since 2011 with the primary dual objectives of enhancing rearing habitat for juvenile salmonids, particularly steelhead, and managing Estuary water levels to minimize flood hazard. Rearing habitat may be enhanced by reducing tidal influence on the Estuary from May 15 to October 15 (referred to hereafter as the “lagoon management period”) to increase freshwater habitat available for rearing salmon and steelhead. Adaptive management requires 1) monitoring of biological productivity, water quality, and physical processes in the Estuary in response to the changes in management actions that control water surface elevations in the estuary-lagoon system; and 2) refinement of management actions to achieve desired water levels to support biological productivity, while simultaneously providing flood control for properties adjacent to the Estuary

From 2000 to 2020, a barrier beach formed during every month of the year, with the majority of breaching events occurred in the later part of the year (October through December) (Figure 3). The number of artificial breaching events varies each year (Table 1). The lowest number of breaching events in a year was zero, (occurring in 2006, 2011, and 2019) and the highest number was 15 attempted breaches (13 successful artificial breaching events) in 2009. It is difficult to predict how many artificial breaching events are required each year, but since 2000 there have been an average of five artificial breaching events annually.



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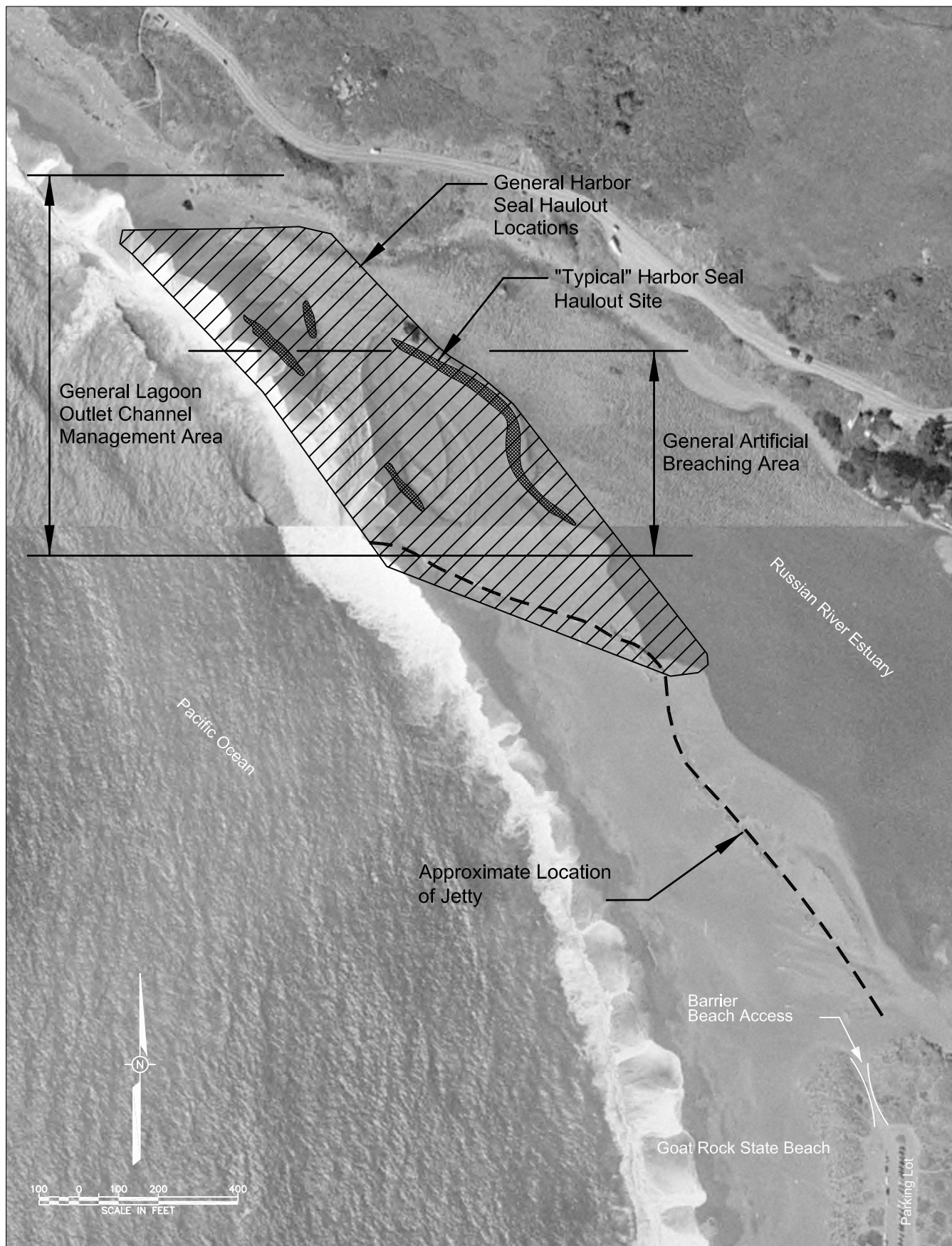


Figure 2. Russian River estuary breaching locations.

Purpose: Russian River Estuary Breaching
Datum: 1929 MSL
Property Owners Adjacent to Project:

SONOMA COUNTY WATER AGENCY
404 Aviation Boulevard
Santa Rosa, CA. 95403

In: Russian River
At: Jenner
County Of: Sonoma, CA.
Application By: SCWA

Figure 2

1.1 Biological Opinion and the Estuary

Sonoma Water and the U.S. Army Corps of Engineers (Corps) consulted with the National Marine Fisheries Service (NMFS) under Section 7 of the Endangered Species Act (ESA) regarding the potential effects of their operations and maintenance activities, including Sonoma Water's estuary breaching program, on federally-listed steelhead (*Oncorhynchus mykiss*), Coho Salmon (*O. kisutch*), and Chinook salmon (*O. tshawytscha*). As a result of this consultation, the NMFS issued the Russian River Biological Opinion (NMFS 2008) finding that artificially elevated inflows to the Russian River estuary during the low flow season (May through October) and historical artificial breaching practices have significant adverse effects on the Russian River's estuarine rearing habitat for steelhead. The historical method of artificial sandbar breaching, which is done in response to rising water levels behind the barrier beach, adversely affects the estuary's water quality and depths.

The historical artificial breaching practices create a tidal marine environment with shallow freshwater depths and high salinity. Salinity stratification contributes to low dissolved oxygen at the bottom in some areas. The Russian River Biological Opinion (NMFS 2008) concludes that the combination of high inflows and breaching practices impact rearing habitat because they interfere with natural processes that cause a freshwater lagoon to form behind the barrier beach. Fresh or brackish water lagoons at the mouths of many streams in central and southern California often provide depths and water quality that are highly favorable to the survival of rearing salmon and steelhead.

The Russian River Biological Opinion's Reasonable and Prudent Alternative (RPA) 2 (NMFS 2008) requires Sonoma Water 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 (formation of a fresh or brackish lagoon) for purposes of enhancing the quality of rearing habitat for juvenile (age-0+ and -1+) steelhead from May 15th to October 15th (lagoon management period). A program of potential, incremental steps are prescribed to accomplish this, including adaptive management of a lagoon outlet channel on the barrier beach.

Russian River Estuary Management Project at Goat Rock State Beach and the Russian River Estuary

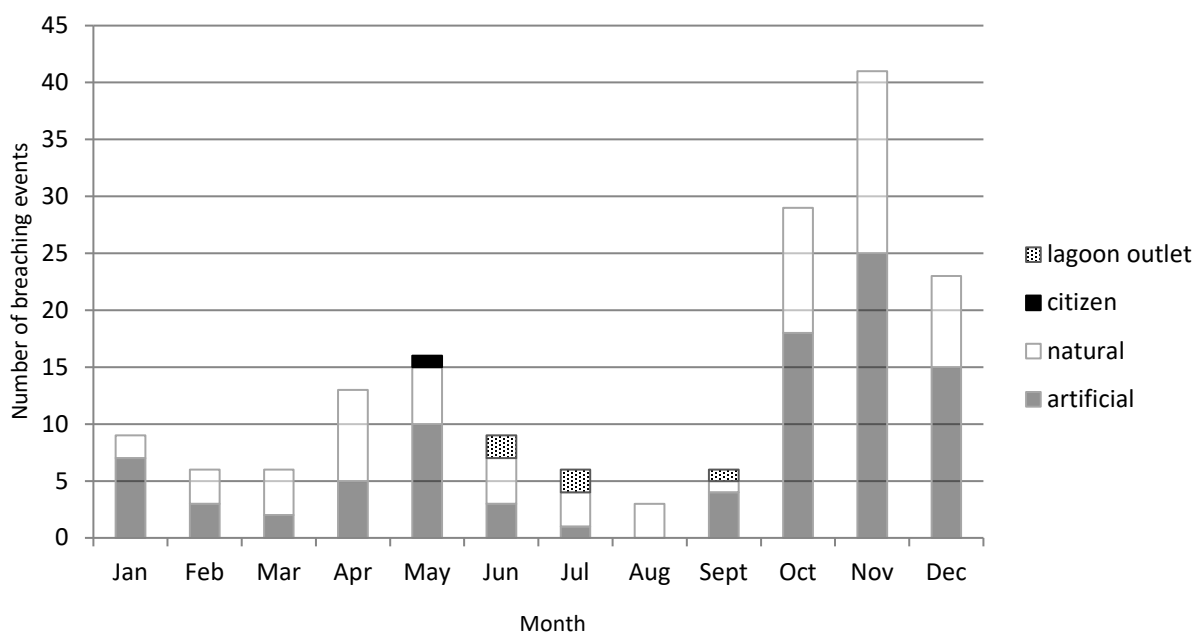


Figure 3. The number of Russian River estuary breaching events from 2000 to 2020, by month. Breaching events include artificial breaching and lagoon outlet channel implementation conducted by Sonoma Water, artificial breaching by private citizens and natural breaching of the sand bar.

Table 1. Beach management at the Russian River estuary from 2000 to 2020. Number of times managed by year and month, including artificial breaches by Sonoma Water, lagoon outlet channel implementation by Sonoma Water (denoted by {#}), natural or “self” breaches (denoted by [#]), and breaches conducted by private individuals, (denoted by (#)).

Month	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Monthly average ^a
January		1								1,[1]	1		1		2				[1]		1	1
February								2						1	[1]	[2]						1
March				[1]										[2]	1	1	[1]					1
April		2			[1]			3	[1]	[1]				[1]	[2]	[1]	[1]					1
May	1	3			1				5						[2]	[1]				[1]	[1],[1]	1
June	1		1	[1]						1			[1]	[1]		[1]	{2}					1
July									1		{1},[1]			[1]			[1]	{1}				1
August					[1]													[1]		[1]		1
September	1					1			1	1							[1]	{1}				1
October	2	2	[1]	2	(1)	1	[1]	[1]	1	4	2,[1]		[1]	1	1	[1]	1,[1]	1,[1]		[1]	[1]	2
November	4	[1]	3	1	(2)	2	[3]	2	1	4	[1]		[2]	1	1	3	2,[1]	[2]	[3]	[1]	1	2
December	2		1				[1]	2	1,[1]	4				1,[1]		[1]		1,[2]	1,[1]		2,[1]	1
TOTAL	11	9	6	5	6	4	5	10	12	17	6	0	5	10	10	11	11	10	6	4	8	
SCWA	11	8	5	3	1	4	0	9	10	15	3	0	1	4	5	4	5	4	1	0	4	

^a Monthly average rounded up to the nearest whole number

Harbor seals (*Phoca vitulina richardsi*) regularly haul out at the mouth of the Russian River (Jenner haul-out) (Figure 1). California sea lions (*Zalophus californianus*) and northern elephant seals (*Mirounga angustirostris*) are occasionally observed at the haul-out. There are also several known river resting areas at logs and rock piles in the Russian River estuary (Figure 1). Sonoma Water is applying for rulemaking and letters of authorization for incidental harassment of harbor seals, northern elephant seals, and California sea lions under the Marine Mammal Protection Act (MMPA) for activities associated with the Russian River Estuary Management Project. These activities include:

- excavation and maintenance of a lagoon outlet channel that would facilitate management of a barrier beach at the mouth of the Russian River and creation of a summer lagoon to improve rearing habitat for listed steelhead as required by the Russian River Biological Opinion (NMFS 2008);
- artificially breaching the barrier beach to minimize the potential for flooding of low-lying properties along the estuary;
- monitoring activities associated with the management actions described above; and
- biological and physical monitoring of the Russian River estuary as required by the Russian River Biological Opinion (NMFS 2008).

1.2 Lagoon outlet channel management

To comply with the Russian River Biological Opinion, Sonoma Water plans to adaptively manage water surface elevations between May 15th and October 15th (lagoon management period) after a barrier beach forms and creates a lagoon. Modifications to the barrier beach would be small departures from the existing beach and channel topography at the time of closure, and the new channel would be similar to the channel configurations resulting from previous breaching practices and consistent with natural processes. Any sand excavated from the channel would be placed on the adjacent beach and graded to depths of approximately 1-2 feet higher than the existing grade. The placed sand would be distributed in such a way as to minimize changes to beach topography. If the time available for excavation is limited by uncontrollable factors such as tides, waves, seal use, or days when operations are forbidden, sand placed on the north side of the channel may be left in piles up to 3 feet high and not blended into the existing beach topography. The piles may need to remain un-graded on the north side because equipment access to this side is more difficult and may slow down operations. The outlet channel would be constructed to dimensions that do not significantly depart from channels that have been historically observed at the site.

The adaptive lagoon outlet channel management plan seeks to work with natural processes and site conditions to maintain an outlet channel that reduces tidal inflow of saline water into the estuary (ESA 2021). To avoid tidal inflow and maintain a lagoon system that would not flood properties adjacent to the estuary, Sonoma Water would create and maintain a shallow, “perched” outlet channel that would not be excavated as deeply, narrowly, or with as steep a gradient as typical artificial breaching pilot channels, which are designed to allow the current velocities to erode a wider and deeper channel and downcut into the barrier beach.

Active management of estuarine/lagoon water levels would commence when ocean side wave action pushes sand landward to form a natural barrier beach across the river's mouth. When this happens, Sonoma Water would monitor lagoon water surface elevation, as river inflow to the newly closed lagoon builds up behind the barrier beach, causing water surface elevation to rise in the lagoon. The goal is to manage lagoon water surface elevations between 4 and 9 feet National Geodetic Vertical Datum (NGVD)¹, which is high enough to enhance fish habitat (NMFS 2008) while also minimizing flood hazard to low-lying structures adjacent to the estuary (Heckel 1994).

The outlet channel would be excavated and maintained with one or two pieces of heavy machinery (*e.g.*, excavator or bulldozer). The outlet channel would be excavated with a bed elevation 0.5 to 2.0 feet below the lagoon water surface elevation along its entire length to allow outflow from the lagoon to pass over the sandbar. The outlet channel dimensions are estimated to be approximately 30-feet wide, based on a wide and short channel alignment that would minimize scour potential and potential constraints of the acceptable excavation volumes under regulatory permits. The outlet channel would be cut into the top of the naturally-formed barrier beach. The outlet channel bed slope would be minimized to reduce the potential for bed scour and unintentional breaching of the sandbar. The outlet channel width and length estimates are consistent with historical river mouth widths and lengths observed within the lagoon management period (Behrens 2008).

The channel's length is estimated to vary from 100 to 400 feet, consistent with historical channel lengths observed within the management period (Behrens 2008). Length would be a function of the channel's planform alignment². Planform alignment of the channel would vary within the region in which the channel has been observed to naturally occur (Figure 2). The southern extent of this region would be the jetty and would extend approximately 1,500 feet to the northwest. Various channel locations may be pursued in an effort to adapt other project variables, such as bed slope, bed elevation and channel width, and to take advantage of site features such as areas of reduced wave energy. For example, alignment at the start of the management period may follow the northward alignment typically observed at this time of year to take advantage of the low berm crest elevation along this alignment. However, the channel may migrate from this initial alignment. If the channel then closes, alternative channel alignments within the region shown in Figure 2 may be implemented to test the relationship of mouth location on channel stability.

¹ Water surface elevations are measured by Sonoma Water's gauge located at the State Parks Visitor Center in Jenner.

² Planform alignment is the centerline alignment of the channel in planimetric view.

The strategy for outlet channel configuration and modifications would be an incremental approach that seeks to minimize the risk of uncontrolled breaching, which returns the estuary to tidal conditions. The precise number of outlet channel implementation events would depend on uncontrollable variables such as seasonal ocean wave conditions (*e.g.*, wave heights and lengths), river inflows, and the success of previous excavations (*e.g.*, the success of selected channel widths and meander patterns) in forming an outlet channel that effectively maintains lagoon water surface elevations. It is predicted that up to three successive outlet channel excavations, at increasingly higher beach elevations, may be necessary, with the result being a “perched” lagoon. The goal is to develop an outlet channel that supports a stable “perched” lagoon with water surface elevations at approximately 7 feet NGVD for several months. Stable conditions imply that river inflow into the lagoon would be approximately the same as outflow through the outlet channel and that net sand deposition or erosion does not impair the outlet channel’s function.

In the event that a “perched” outlet channel fails (*i.e.*, erodes the barrier beach and forms a tidal inlet), Sonoma Water would resume adaptive management of the outlet channel’s width, slope, and alignment in consultation with NMFS and California Department of Fish and Wildlife (CDFW) after ocean wave action naturally reforms a barrier beach and closes the river’s mouth during the lagoon management period.

Additional details regarding the development of the adaptive lagoon outlet channel management plan may be found in *Russian River Estuary Adaptive Beach Management Plan 2021* (ESA 2021) attached to this application.

1.2.1 Lagoon outlet channel implementation and maintenance

Sonoma Water would contact California Department of Parks and Recreation (State Park) lifeguards, as well as State Park District headquarters and the Monte Rio Fire Protection District, within 24 hours prior to excavating and maintaining the lagoon outlet channel to minimize potential hazards to beach visitors. Signs and barriers would be posted 750 feet of each side of the outlet channel for 24 hours prior to and after excavation events to warn beach visitors of the hazards of the area and the presence of pinnipeds on the beach. Notifications for the general public would also be posted at the State Park’s Jenner visitor’s center boat launch and in other locations along the estuary.

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 of Highway 1 (Figure 2). Equipment would be off-loaded in the parking lot and driven north onto the beach via an existing access point. Sonoma Water crews would approach the seal haul-out ahead of the heavy equipment to minimize the potential for flushes to result in a stampede, a particular concern during pupping season. Sonoma Water staff would avoid walking or driving equipment through the seal haul-out. Crews on foot would take caution to approach the haul-out 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 (Sonoma Water staff or regulatory agency staff) to observe the activities. Sonoma Water staff would be followed by the equipment, which would then be followed by a Sonoma Water 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.

Creating and maintaining the outlet channel would probably employ one or two pieces of heavy equipment (*e.g.*, excavator or bulldozer) to move sand on the beach. At the start of the management period (late spring or early summer), when configuring the outlet channel for the first time that year, machinery may operate on up to 2 consecutive working days. As technical staff and maintenance crews gain more experience with implementing the outlet channel and observing its response, it may be possible to reduce the frequency of maintenance during the remainder of the management season. In consideration of the beach environment, effort would be made to minimize the amount and frequency of mechanical intervention, thereby reducing disturbances to seals and other wildlife, as well as State Park's visitors on the beach.

The quantity of sand moved would depend on antecedent beach topography. Excavation volumes would not exceed 2,000 cubic yards. Any sand excavated from the channel would be immediately placed on the adjacent beach within the wave wash zone to promote natural removal to minimize changes to beach topography outside the outlet channel.

Sonoma Water anticipates that lagoon outlet channel management activities would occur in accordance with the Russian River Biological Opinion and that they would primarily occur between May 15th and October 15th. However, if estuary water surface elevations rise above 7.0 feet (at the Jenner gauge) during the lagoon management period, Sonoma Water may consult with NMFS and CDFW regarding artificially breaching the sandbar to alleviate potential flooding, as discussed in the Biological Opinion and described below.

1.3 Artificial breaching

Artificial breaching activities occur on the closed sandbar when a barrier beach is formed. Sonoma Water mechanically breaches the sandbar to alleviate potential flooding of low-lying shoreline properties near the town of Jenner. For more than a decade, breaching has been performed in accordance with the *Russian River Estuary Study 1992-1993* (Heckel 1994) when the estuary water surface level is between 4.5 and 7.0 feet as read at the Jenner gauge (located at the Jenner Visitor's Center). Sonoma Water would contact State Parks lifeguards, as well as State Park District headquarters and the Monte Rio Fire Protection District, within 24 hours prior to breaching activities to minimize potential hazards to beach visitors. Signs and barriers would be posted 750 feet of each side of the pilot channel for 24 hours prior to and after breaching events to warn beach visitors of the hazards of the breaching area and the presence of pinnipeds on the beach. Notifications for the general public would also be posted at the Jenner visitor's center boat launch and in other locations along the estuary.

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 of Highway 1 (Figure 2). Equipment would be off-loaded in the parking lot and driven north onto the beach via an existing access point. Sonoma Water crews would approach the seal haul-out ahead of the heavy equipment to minimize the potential for flushes to result in a stampede, a particular concern during pupping season. Sonoma Water staff would avoid walking or driving equipment through the seal haul-out. Crews on foot would take caution to approach the haul-out 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 an equipment operator, 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 breaching 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 (Sonoma Water staff or regulatory agency staff) to observe breaching activities. Sonoma Water staff would be followed by the equipment, which would then be followed by a Sonoma Water 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.

Breaching activities would typically be conducted on outgoing tides to maximize the elevation head difference between the estuary water surface and the ocean. A cut in the barrier beach would be created at a sufficient depth to allow river flows to begin transporting sand to the ocean. Excavated sand would be 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. A typical channel would be approximately 100 feet long, 25 feet wide and 6 feet deep. The amount of sand moved would range from less than 100 cubic yards to approximately 1,000 cubic yards.

Sonoma Water anticipates that artificial breaching activities would occur in accordance with the Russian River Biological Opinion and that they would primarily occur from October 16th to May 14th. However, if estuary water surface elevations rise above 7.0 feet (at the Jenner gauge) during the lagoon management period (May 15th through October 15th), Sonoma Water could artificially breach the sandbar to alleviate potential flooding, as discussed in the Biological Opinion. The Biological Opinion incidental take statement estimates that Sonoma Water may need to artificially breach the sandbar “twice per year between May 15 and October 15 during the first three years covered by this opinion, and once per year between May 15 and October 15 during years 4-15 covered by this opinion” (NMFS 2008). Sonoma Water is currently in the thirteenth year covered by the Biological Opinion.

1.4 Monitoring

Implementation of the lagoon outlet channel adaptive management plan would require monitoring to measure changes in the beach and channel elevation, lengths, and widths, as well as flow velocities and observations of the bed structure (to identify bed forms and depth-dependent grain size distribution indicative of armoring) in the channel. In addition to the activities described for the lagoon outlet channel adaptive management plan, Sonoma Water is required by the Russian River Biological Opinion and other state and federal permits to collect biological, water quality, and physical habitat data in conjunction with estuary management. Fisheries sampling, water quality monitoring, invertebrate sampling, and physical habitat measurements require the use of boats and nets in the estuary. Boating and other monitoring activities occur in the vicinity of river haul-outs (see Figure 1, and Mortenson 2009). Table 2 provides a summary of the monitoring tasks and the frequency of their implementation.

2. DATES, DURATION AND SPECIFIED GEOGRAPHIC REGION

The anticipated marine mammal disturbance from project activity would occur at the mouth of the Russian River (38.450833, -123.129873) in Jenner, California. The Russian River estuary is located about 97 km (60 miles) northwest of San Francisco. The harbor seals primarily haul out on the estuary-side of the beach (Figures 1 and 2) to the north of the concrete-capped portion of the jetty.

The estuary closes throughout the year as a result of a sandbar forming at the mouth of the Russian River. To facilitate summer lagoon management, Sonoma Water would construct the lagoon outlet channel after the first natural barrier beach closure, but the lagoon would generally be managed from May 15th to October 15th (Table 3). It is anticipated that the outlet channel implementation would be a 2-day event with initial construction of the lagoon outlet channel taking one day of work, and subsequent adjustments to the outlet channel on the second day. Subsequent maintenance would occur approximately weekly through October 15th. Artificial breaching activities would generally occur between October 16th and May 14th (Table 3). Biological and physical habitat monitoring can occur at any time of year, but generally occurs from mid-April through December, with the exception of topographic surveys that occur year round (Table 3).

Table 2. Monitoring tasks associated with Russian River Estuary Management with potential to disturb pinnipeds.

Task	Description	Field Activities	Frequency
Lagoon Outlet Channel Management on the Barrier Beach			
Discharge Measurements	Collected within the outlet channel to verify the channel's conveyance.	2 field staff to complete cross sectional flow velocity surveys using flow meter attached to a wading rod with electronic data logger (beeps); bank pins to be installed on either bank, and fiberglass measuring tape stretched from bank to bank.	Every 2 weeks
Outlet Channel Bed Structure	Observe the bed for bed forms and depth-dependent grain size distribution indicative of armoring. Sediment sampler used.	2 field staff to collect sediment sample from the surface of the channel bed.	Monthly
Outlet channel topography	Collect outlet channel elevation and width	2 field staff would capture outlet channel features using a prism mounted on a survey rod.	Monthly
Biological and Physical Habitat Monitoring in the Estuary			
Fisheries seining	Deploy seine to collect fish at up to 10 locations in the estuary	One or two boats with approximately 6 field staff	Monthly
Invertebrate/salmonid prey study	Collection of benthic invertebrates and zooplankton	Two boats with 5-7 field staff	Monthly
Water quality	Collection of temperature, dissolved oxygen, conductivity, pH, depth, nutrient and bacteriological samples	A boat with 2 or 3 field staff, 6 datasonde arrays submerged in estuary at various locations from mouth to Duncans Mills.	Weekly
SCWA topographic survey of sandbar	Survey of sandbar height and widths	2 field staff on beach equipped with a survey rod.	1-2 times Monthly
Bodega Marine Lab (BML) circulation and water quality (under contract w/SCWA)	Survey of cross sectional velocity data in estuary and collection of temperature and salinity profile data at various locations from mouth to Duncans Mills.	A boat with 2 or 3 field staff, collecting cross sectional data from mouth to Duncans Mills.	2-3 times Monthly

Table 3. Estimated annual frequency and duration of Russian River estuary management activities with potential to disturb pinnipeds.

Task and Dates	Duration and Frequency	Potential No. of Take Events
Lagoon Outlet Channel Management on the Sandbar (May 15 to October 15)		
Excavation of outlet channel	Up to 3 events estimated; each event completed in 1 to 2 days as necessary	3 ^a
Maintenance of outlet channel	1 day per week	May-1; June-4; July-4; Aug-4; Sept-4; Oct-1 (18 total)
Outlet channel discharge & bed structure measurements	Discharge: ½ day every 2 weeks Structure: ½ day per month (taken on same day as discharge measurements)	10 ^b
Outlet channel topography	1 day per month	
Artificial Breaching on the Sandbar (October 16 to May 14)		
October	Averages ½ day per breaching event	2 ^c
November		2
December		1
January		1
February		1
March		1
April		1
May		1
		10 events maximum
Biological and Physical Habitat Monitoring in the Estuary		
SCWA topographic survey of sandbar	1 per month Jan-Apr, 2 per month May-Dec, averages ½ day each survey	20
Fisheries seining	4 days, monthly from May to October	24 ^d
Invertebrate/salmonid prey study	1 day monthly from May to October (during a mouth closure an additional 1 to 2 sampling events per month could be conducted)	18 ^d
Water quality	2 days, every week from May 15 to October 15	44 ^d
BML circulation and water quality monitoring (under contract w/SCWA)	1 day, 2-3 times monthly from May to November	21

^a For implementation of the lagoon outlet channel it may be necessary to return on a second day if the initial outlet channel closes after the first day, disturbances would be recorded on any day lagoon outlet channel excavation occurs. For the remaining activities, an event is defined as a single day on which an activity occurs. Some events may include multiple activities.

^b The lagoon outlet channel discharge, bed structure, and channel topography monitoring would occur on the same day each month. The outlet channel discharge is collected every 2 weeks and would require an additional ½ day of work.

^c The number of events is the monthly average number of bar closure events from 2000 to 2020 (Table 1). The average number of breaching events from 2000 to 2020 is 5 events/year and the most that occurred in a single year was 15 (Table 1).

^d Assumption is that pinnipeds may be encountered once per event and flush from river haul-out in the Estuary.

3. SPECIES AND NUMBER OF MARINE MAMMALS WITHIN THE REGION

3.1 Species typically found within the area

The species of marine mammals that are likely to occur in the project area include the following pinnipeds: harbor seals, California sea lions, and northern elephant seals. Earlier literature reports sightings of sea lions during the months from December to June, likely foraging, but their numbers are normally low (Hanson 1993). Our data includes observations of sea lions in and around the estuary in all months of the year. These sea lions were rarely observed hauled out on land at the Russian River. Since 2015 juvenile and adult male California sea lions were observed on the Jenner haul out on twelve occasions. A few of these observations included juvenile animals that appeared in poor body condition. More typically adult male sea lions are seen and heard in the waters adjacent to the haul out. Since 2013 only four sub-adult elephant seals have been observed on the Jenner haul out. In one case the same individual was observed multiple times over a period of two months.

The number of harbor seals at the Russian River varies throughout the year (Figure 4). Observations of harbor seals have been recorded extensively since 1972 at the mouth of the Russian River, where several local residents, working independently or under the guidance of the Stewards of the Coast and Redwoods, have recorded the harbor seal population at the mouth and within the Russian River. It is believed that harbor seals established the haul-out site at the Russian River in 1972 (*i.e.*, the first known records) and their numbers at the site have steadily grown (Hanan and Beeson 1994, Mortenson and Twohy 1994, SCWA 2015, 2016, 2017, 2018). Pups are born at the Jenner haul-out beginning in March and continuing into May. Pups are counted during surveys through June, after which time it becomes difficult to distinguish pups from sub-adult seals. Peak seal abundance is typically during the summer molting period (Figure 4). Abundance of seals on the Jenner haul-out declines in the fall after the molting season is complete, but seals are present at Jenner and locally year round. The number of harbor seals at this haul-out has fluctuated from year to year (Figure 5). Based on the most recent statewide harbor seals counts from May to July of 2012 the state population is estimated at 30,968 seals (Carretta *et al.* 2015), which is lower than the 2009 and 2004 statewide estimates (Harvey and Goley 2011, Lowry *et al.* 2008).

3.2 Species with low likelihood of occurrence

Northern fur seals (*Callorhinus ursinus*), Guadalupe fur seals (*Arctocephalus townsendi*), and Steller sea lions (*Eumetopias jubatus*) have the potential to occur at Goat Rock State Beach in Jenner along the Sonoma County Coast. While no observations of these species have been made at the project area they have been observed on beaches in Sonoma County. Since 2019 four northern fur seals and four Guadalupe fur seals stranded in Sonoma County and were brought to The Marine Mammal Center in Sausalito, CA (TMMC 2021). Stellar sea lions occur at Sea Lion Rocks just off shore of Fort Ross, about 12 kilometers north of the Russian River mouth in Jenner (J. Mortenson, personal communication, April 5, 2016). These species are not expected to occur at the project area and therefore would not be affected by the proposed activities.

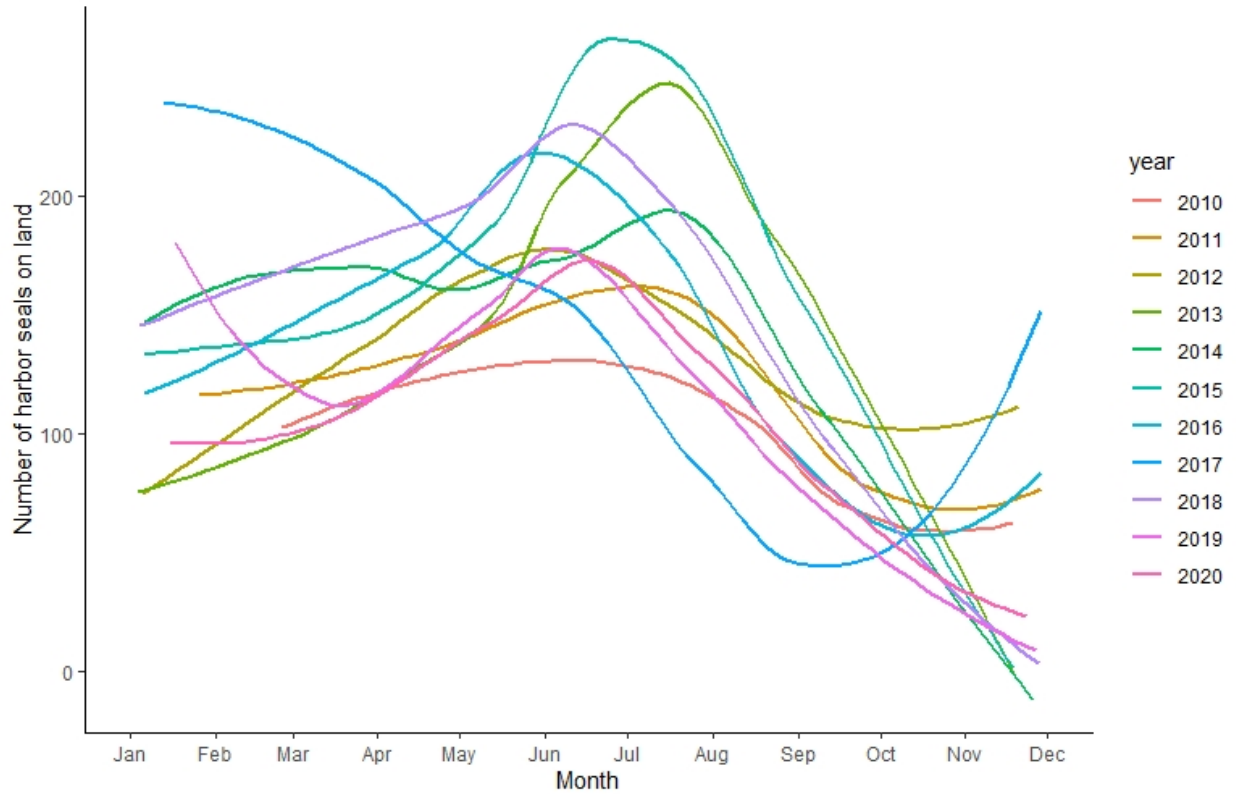


Figure 4. Seasonal trends in harbor seal abundance at the Jenner haul-out (Goat Rock State Beach) during Sonoma Water baseline surveys from 2010 to 2020.

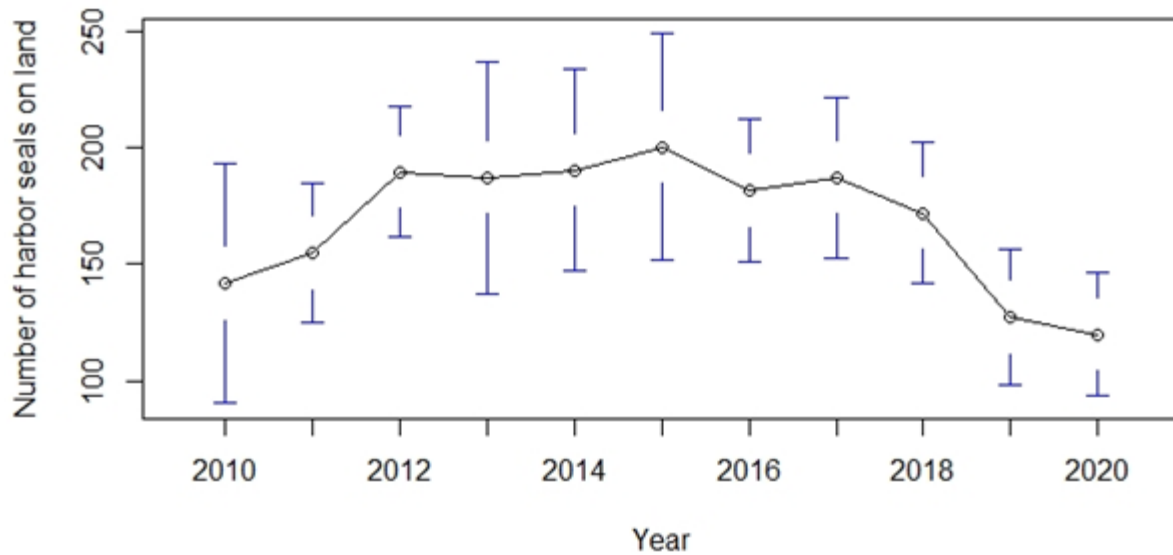


Figure 5. Average maximum count of harbor seals per survey day by year at the Jenner haul-out (Goat Rock State Beach), recorded during Sonoma Water baseline surveys from 2010 to 2020. Bars represent 95% confidence intervals around the mean.

4. STATUS AND DISTRIBUTION OF AFFECTED SPECIES

4.1 Pacific harbor seals-California stock

Pacific harbor seals (*Phoca vitulina richardsi*) range from Cedros Island (Baja California) along the Pacific coasts of the United States, Canada and Alaska, through the Aleutian Islands to the Pribilof Islands. In California, approximately 400-500 harbor seal haul-out sites are widely distributed along the mainland and on offshore islands, including intertidal sandbars, rocky shores and beaches (Hanan 1996). California harbor seals are not listed under the ESA or considered strategic under the MMPA.

Currently the California harbor seal population is estimated to be 30,968 with the minimum population estimated to be 27,348 (Carretta *et al.* 2015). 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 decline 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 (Carretta *et al.* 2012).

In general, harbor seals do not undertake long migrations, but do travel 150-300 km on occasion to find food or suitable breeding areas (Pitcher and McAllister 1981, Herder 1986, Gemmer 2002). Harbor seals are rarely found in pelagic waters and typically stay within the tidal and intertidal zones. On land, harbor seals haul out on rocky outcrops, mudflats, sandbars and sandy beaches with unrestricted access to water and with minimal human presence. Haul-out sites are important resting sites for harbor seals. 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.

Seasonal variation in the abundance of harbor seals at their haul-out locations is commonly observed throughout their range (Allen *et al.* 1989, Stewart and Yochem 1994, Gemmer 2002). Peak haul-out abundance typically occurs during their annual molt, which occurs in mid-July in California. Abundance of seals on their haul-outs is also high during the pupping season when females come ashore to give birth. Pupping at the Russian River haul-out begins in March and pups are most abundant in mid-May. Seal abundance is lower during the fall and winter months when seals may spend more time foraging at sea and winter storms and low ambient temperatures make coming ashore less desirable.

Mortenson (1996) observed pups were first seen at the Jenner haul-out in late March, with maximum counts in May. In this study, pups were not counted separately from other age-classes at the haul-out after August due to the difficulty in discriminating pups from small

yearlings (Mortenson 1996). Hanson (1993) observed during her study from August 1989 to July 1991 that pupping began at the Jenner haul-out in mid-April, with a maximum number of pups observed during the first two weeks of May. Sonoma Water monitors have observed newborn pups on Goat Rock State Beach as early as February 28th, more typically pups are first observed in April (SCWA 2021). The February observation was unusual and most likely the pup was born prematurely. Our observations correspond with the peaks observed at Point Reyes, where the first viable pups are born around the first to second week of March and the peak is the last week of April to early May (Codde and Allen 2020, J. Mortenson and S. Allen, personal communication). Pupping season is defined as March 15 to June 30 at the Jenner haul-out by the Pinniped Monitoring Plan (SCWA and Stewards 2021).

Harbor seals have many haul-out sites in Northern California, with approximately 6 primary mainland haul-out sites and possibly a total of 17 haul-out sites, if smaller areas are considered, in Sonoma County (Figure 6). The Russian River haul-out in Jenner is the largest in Sonoma County, comprising approximately 18% of the harbor seal population found there (M. DeAngelis, personal communication). Harbor seals may also rest on logs and rock outcroppings in the Russian River estuary. Monitoring efforts are particularly strong in the Point Reyes area, located in Marin County, south of Sonoma County, at the Russian River, and the Gualala River area (south near Sea Ranch). Further north, seals are known to have numerous haul-out sites, but monitoring efforts are sparse in the stretch of coastline between the Gualala River area and Humboldt Bay (Figures 7 and 8).

Observations at the Jenner haul-out indicate that the number of seals present declined during bar closed (barrier beach closed) conditions (Mortenson 1996; SCWA 2013 - 2021). Sonoma Water's pinniped monitoring program that began in 2009 has included observations from water level management activities (*i.e.*, artificial breaching and lagoon outlet channel implementation) and its effects on the Jenner haul-out. Seal counts and disturbances were recorded from 1 to 2 days prior to a breaching or channel implementation event, the day of an event, and the day after an event (SCWA 2011 - 2021). During most events the trend observed was that harbor seal numbers declined during a beach closure (occasionally, the numbers rose again and then declined again during a closure) and increased the day following an artificial breaching event.

Joe Mortenson began his ongoing monthly seal counts at the Jenner haul-out and Bodega Rock in January 1987, with nearby haul-outs added to the counts thereafter. Elinor Twohy began daily counts of seals and people at the Jenner haul-out, including photographing the haul-out, on November 1, 1989. Her daily counts were taken at different times on successive days to determine if there were diurnal patterns in use of the haul-out (Mortenson and Twohy 1994). She also photographed and noted whether the river mouth at the Jenner haul-out was open or closed each day. Mortenson and Twohy (1994) previously reported that the Jenner haul-out is atypical in terms of the time of year that the peak numbers of harbor seals are present, reporting haul-out peaks in the late winter (February and March). Recent data from baseline monitoring conducted by Sonoma Water and the Stewards of the Coast and Redwoods indicated that these winter peaks in abundance are no longer occurring and that the Jenner

haul-out is showing seasonal variation more similar to those reported elsewhere with a molting and pupping season peak (Figure 4) (SCWA 2012 - 2021).

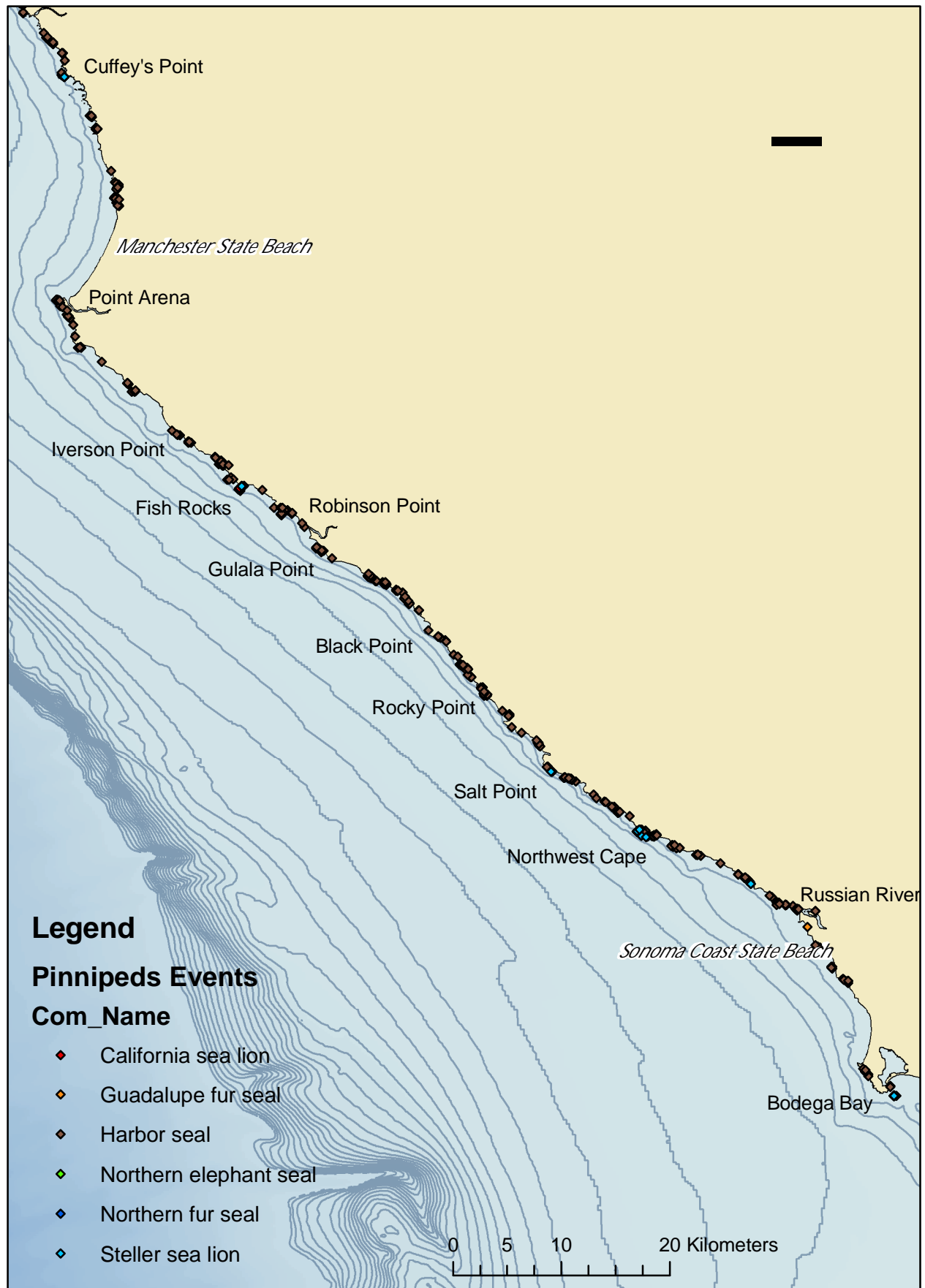


Figure 6. Pinniped Haulouts from Bodega Bay to Cuffey's Point, California Coast. Data includes haul-outs and rookeries surveyed using aerial or ground count methodologies and observations and monitoring results. Com_Name is the species common name. Source: California Pinniped Rookeries & Haul-out Sites. GIS public map. NOAA National Marine Fisheries Service Southwest Regional Office. <http://www.swr.noaa.gov/psd/rookeryhaulouts/index.htm>

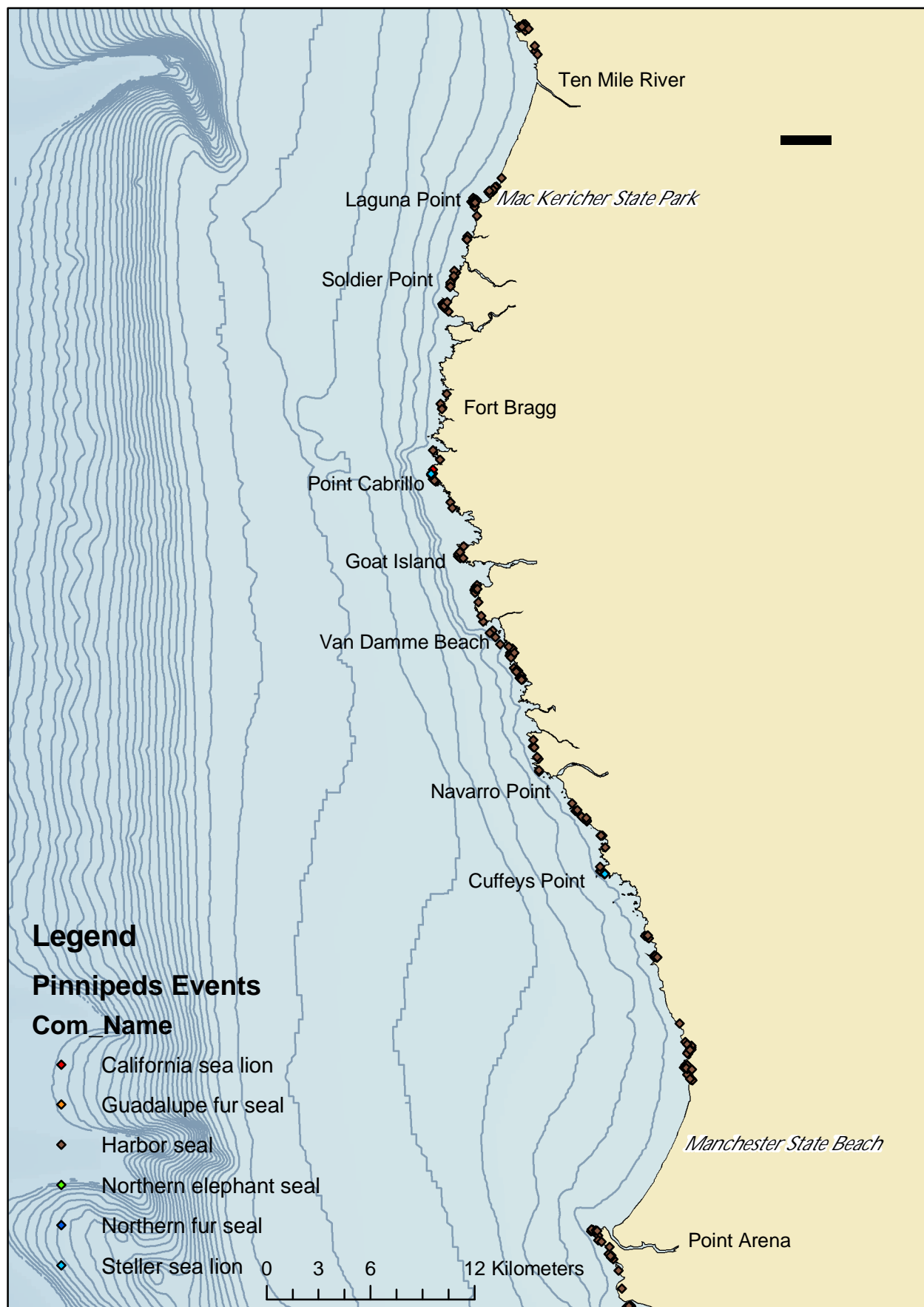


Figure 7. Pinniped Haulouts from Point Arena to Ten Mile River, California Coast. Data includes haul-outs and rookeries surveyed using aerial or ground count methodologies and observations and monitoring results. *Source:* California Pinniped Rookeries & Haul-out Sites. GIS public map. NOAA National Marine Fisheries Service Southwest Regional Office. <http://www.swr.noaa.gov/psd/rookeryhaulouts/index.htm>



Figure 8. Pinniped Haulouts from Caspar Point to Humboldt Bay, California Coast. Data includes haul-outs and rookeries surveyed using aerial or ground count methodologies and observations and monitoring results. *Source:* California Pinniped Rookeries & Haul-out Sites. GIS public map. NOAA National Marine Fisheries Service Southwest Regional Office. <http://www.swr.noaa.gov/psd/rookeryhaulouts/index.htm>

4.2 California sea lions-U.S. stock

California sea lions (*Zalophus californianus*) range from southern Mexico to British Columbia, Canada. The entire U.S. population was estimated at 257,606 sea lions in 2014, from the annual pup count of 47,691 animals. Population estimates are based on a time series of pup counts from 1975-2014 and estimated survival rates using mark-recapture techniques (Carretta *et al.* 2021). Based on the lower 95% confidence interval of the population estimate the minimum population size is estimated to be 233,515 (Carretta *et al.* 2021). Using population size estimates from 1975-2014 and a logistical growth model the estimated net productivity rate is 7% per year (Carretta *et al.* 2021). 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 docks. 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 seasonal pattern of peak numbers occurring in the northwest during fall, but local areas show high annual and seasonal variability.

Sea lions feed on fish and cephalopods, including Pacific whiting, rockfish, anchovy, hake, flatfish, small sharks, squid, and octopus (California Department of Fish and Game 1990). Although solitary feeders, sea lions often hunt in groups, which can vary in size according to the abundance of prey (California Department of Fish and Game 1990).

California sea lions have been observed in and around the Russian River mouth and in the Russian River estuary (Merritt Smith Consulting 1999,2000; SCWA and Merritt Smith Consulting 2001; SCWA 2012, 2013, 2014). Juvenile sea lions were observed from August to October of 2009 at Patty’s Rock (Figure 1) by Sonoma Water staff and members of the public. Regular observation of juvenile California sea lions were reported along the Sonoma Coast and in the Russian River estuary and were generally considered to be a result of poor foraging conditions in the ocean in 2009. More recently individual juvenile sea lions were observed at the Jenner haul-out in 2016, 2017, 2018 and 2020. The individual observed in 2016 was noted to be in poor body condition. Adult male California sea lions are occasionally observed hauled out at or near the Russian River mouth during the fall and winter months. More often they are observed in the surf at the mouth of the river or swimming inside the estuary. These sightings in the

winter months are more typical of male sea lions traveling along the western coast of North America outside of their breeding beaches.

4.3 Northern elephant seals – California stock

Northern elephant seals (*Mirounga angustirostris*) 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°N (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. Pups are born in early winter from December to January. Breeding occurs from December to March, and gestation lasts around 11 months. Northern elephant seals are polygamous; males establish dominance over large groups of females during the breeding season.

Populations of northern elephant seals in the U.S. and Mexico were all originally derived from a few tens or a few hundreds of individuals surviving in Mexico after being nearly hunted to extinction (Stewart *et al.* 1994). Given the very recent derivation of most rookeries, no genetic differentiation would be expected. Although movement and genetic exchange continues between rookeries, most elephant seals return to their natal rookeries when they start breeding (Huber *et al.* 1991). The California breeding population is now demographically isolated from the Baja California population and is considered to be a separate stock. Based on the 2010 survey an estimated 40,684 pups were born in California, resulting in a population estimate of 179,000 northern elephant seals (Carretta *et al.* 2015). Based on trends in pup counts the population is estimated to be growing at an annual rate of 3.8% since 1988 (Lowry *et al.* 2014).

Northern elephant seals range along the entire California coast (California Department of Fish and Game 2009). Adult male elephant seals breed with harems of females from mid-December through March in dense rookeries on San Miguel Island, Santa Barbara Island, San Nicolas Island, San Simeon Island, Southeast Farallon Island, Año 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 feed at night in deep water, primarily on rays, sharks, pelagic squid, ratfish, and Pacific hake (California Department of Fish and Game 2009). Entanglement in marine debris, fishery interactions, and boat collisions are their main threats.

Censuses of pinnipeds at the mouth of the Russian River have been taken at least semimonthly since 1987. Elephant seals were noted from 1987 to 1991. 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). A single male northern elephant seal was present at the mouth of the Russian River harbor seal haul-out site, during the late winter and spring for several years. 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 was observed harassing harbor seals hauled out at the mouth of the Russian River. A northern elephant seal sub-adult, tagged R-1 by Dr. Sarah Allen in August 2003, was present at the Jenner haul-out from 2002 to 2007. He was generally present during molt and again from late December through March into the early pupping season. In recent years individual sub-adult elephant seals have been observed on a few occasions hauled out at the Russian River in the late summer and early fall.

5. TYPE OF INCIDENTAL TAKE AUTHORIZATION

This is a request for rulemaking and letters of authorization for Level B incidental harassment of Pacific harbor seals, northern elephant seals and California sea lions at the Russian River, in Sonoma County, California. The type of take expected is incidental harassment of pinnipeds from the activities associated with estuary management and biological and physical monitoring throughout the estuary as required from the Biological Opinion (NMFS 2008). Estuary management activities will include people, vehicles, and heavy equipment on the beach near the haul-out. Activities may include: excavation and maintenance of the lagoon outlet channel, construction of a pilot channel during artificial breaching events, posting and removal of warning signs on the beach, monitoring the lagoon outlet channel, topographic surveys of the sandbar at the mouth of the estuary. Activities in the Russian River estuary near river haul-out locations will include boat operation associated with flow circulation and water quality monitoring, and beach-seining and boat operation associated with biological monitoring near haul-out locations.

6. DESCRIPTION AND ESTIMATION OF TAKE

The estimates of the number of Pacific harbor seals that may be harassed by the proposed water level management activities is based upon the number of potential take events associated with Lagoon Outlet Channel and artificial breaching activities (Table 3) and the average number of harbor seals that are present at the Jenner haul-out during bar-closed conditions (Table 5). The numbers of take events associated with lagoon outlet channel management are split into two categories: 1) initial channel excavation, which would likely occur between May and September, and 2) maintenance and monitoring of the outlet channel, which would continue until October 15th. Recent observations indicate that seals continue to use the Jenner haul-out during bar closed conditions, while the average number of seals hauled out is reduced (SCWA 2021). Based on Sonoma Water pinniped monitoring from 2010 to 2020, the average number of harbor seals hauled out during barrier beach-closed conditions (Table 5) can be used to estimate the number of individuals that may be harassed by both lagoon outlet channel and artificial breaching activities. Both activities would likely be implemented soon after a beach closure (within 14 days), so the data presented in Table 5 would be reasonable for the take estimates. Because the lagoon outlet channel implementation dates cannot be determined yet (they are dependent on when the barrier beach naturally closes after May 15th), the highest average number of harbor seals during the Lagoon Management Period presented in Table 5 was used to estimate the number of seals that may be taken during implementation of the lagoon outlet channel. For maintenance and monitoring activities associated with the

lagoon outlet channel, the monthly average of harbor seals during bar closed conditions was used (Table 5). Table 6 provides detailed take estimates.

The majority of the biological and physical monitoring of the estuary occurs away from the main harbor seal haul-out; however boats are driven past small (peripheral) resting areas on logs, rocks and sand bars in the estuary. The estimate for seal disturbance for these activities is based on the assumption that one seal would be encountered during each of these sampling events (Table 3). For the river mouth haul-out, the estimate for harbor seal disturbance is based on the monthly average reported from 2010 to 2020 in Table 5. The estimated potential total number of individual animals that may be taken equates to the average number of seals of each species anticipated to be encountered per event multiplied by the estimated number of events annually. The potential total number of individual animals that may be taken is likely an overestimate because the same seals would presumably be taken multiple times throughout the year (Table 6).

California sea lions and northern elephant seals are occasional visitors to the estuary. Based on the small amount of observations available for these species, the estimate is that there is a potential to encounter one adult or sub-adult animal (per species) per month throughout the year (Table 6).

Based on the estimate of activities to occur annually and the average number of pinnipeds expected to occur we are requesting take authorization for incidental (level B) harassment of 5,163 Pacific harbor seals, 34 California sea lions and 34 northern elephant seals for each year of the requested Letter of Authorization or a total of 25,815 take events for Pacific harbor seals and 170 take events each for California sea lions and northern elephant seals for the duration of the Letter of Authorization. Since harbor seals are not distinguished by age class throughout the year we are unable to divide our take estimate by age and we estimate that the majority of animals encountered are greater than one year old. For California sea lions and northern elephant seals we have not previously observed mature females of these species at the Russian River so we expect the individuals likely to be encountered would be adult or sub-adult males and juveniles of either sex.

Table 4. Average number of harbor seals observed at the Jenner haul-out (Goat Rock State Beach) by month and mouth condition during Sonoma Water baseline and pre-water level management activities at the Jenner haul-out from 2010 to 2020.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
closed	57	88	133	99	118	113	105	44	24	25	26	54
open	121	148	138	165	151	197	260	107	56	59	88	90
Overall	106	143	138	159	149	178	227	100	49	38	62	79

Russian River Estuary Management Project at Goat Rock State Beach and the Russian River Estuary

Table 5. Estimated number of pinnipeds that may be affected (Level B harassment) by Russian River estuary management activities annually.

Species	No. Animals Expected to Occur ^a	No. Take Events ^b	Potential Total Number of Individual Animals that may be Taken ^{c, d}
Lagoon Outlet Channel Management on the Sandbar (May 15 to October 15)			
Pacific harbor seal ^e	Implementation: 118 Maintenance & Monitoring: May-118; June-113; July-105; Aug-44; Sept-24; Oct-25	Implementation (May-Sept): 3 Maintenance May -1; June-Sept-4 per month; Oct-1 Monitoring (June-Sept-2 per month; Oct-1	Implementation: 354 Maintenance: 1,287 Monitoring: 597 TOTAL: 2,238
California sea lion (potential to encounter once per month May-Oct)	1	6	6
Northern elephant seal (potential to encounter once per month May-Oct)	1	6	6
Artificial Breaching on the Sandbar (October 16 to May 14)			
Pacific harbor seal ^e	Oct: 25 Nov: 26 Dec: 54 Jan: 57 Feb: 88 Mar: 133 Apr: 99 May: 118	Oct: 2 ^f Nov: 2 Dec: 1 Jan: 1 Feb: 1 Mar: 1 Apr: 1 May: 1 10 events maximum	Oct: 50 Nov: 52 Dec: 54 Jan: 57 Feb: 88 Mar: 133 Apr: 99 May: 118 TOTAL: 651
California sea lion (potential to encounter once per month Oct-May)	1	8	8
Northern elephant seal (potential to encounter once per month Oct-May)	1	8	8
Topographic Survey of the Barrier Beach			
Pacific harbor seal ^g	Jan: 106 Feb: 143 Mar: 138 Apr: 159 May: 149 June: 178 July: 227 Aug: 100 Sept: 49 Oct: 38 Nov: 62 Dec: 79	Jan: 1 Feb: 1 Mar: 1 Apr: 1 May: 2 June: 2 July: 2 Aug: 2 Sept: 2 Oct: 2 Nov: 2 Dec: 2	Jan: 106 Feb: 143 Mar: 138 Apr: 16 ^h May: 298 June: 356 July: 454 Aug: 200 Sept: 98 Oct: 76 Nov: 124 Dec: 158 TOTAL: 2,167

Species	No. Animals Expected to Occur ^a	No. Take Events ^b	Potential Total Number of Individual Animals that may be Taken ^{c, d}
California sea lion (potential to encounter once per month)	1	12	12
Northern elephant seal (potential to encounter once per month)	1	12	12
Biological and Physical Habitat Monitoring in the Estuary (excluding topographic surveys, see above)			
Pacific harbor seal ⁱ	1	107	107
California sea lion (potential to encounter once per month May-Dec)	1	8	8
Northern elephant seal (potential to encounter once per month May-Dec)	1	8	8

^a Number of animals expected to occur during bar closed conditions differ from previous permit applications due to the addition of observations from 2016-2020, see Table 5. This has changed the total take estimates since the previous permit application.

^b For implementation of the lagoon outlet channel, an event is defined as a single, 2-day episode. It is assumed that the same individual seals would be hauled out during a single event. For the remaining activities, an event is defined as a single day on which an activity occurs. Some events may include multiple activities listed in Table 3.

^c The estimated potential total number of individual animals that may be taken equates to the maximum number of seals of each species anticipated to be encountered per event multiplied by the estimated number of events during the term of the IHA.

^d The potential total number of individual animals that may be taken is likely an overestimate because the same seal would likely be taken multiple times throughout the season.

^e Number of seals expected to occur based on monthly averages of seals during bar closed conditions as presented in Table 5.

^f The number of events is the monthly average number of bar closure events from 2000 to 2020 (Table 1). The average number of breaching events from 2000 to 2020 is 5 events/year, and the most that occurred in a single year was 15 (Table 1).

^g Number of seals expected to occur based on 2010-2020 monthly averages in Table 5.

^h The potential number of individual animals that may be taken was calculated at 10% of the population expected to be present at the river mouth for a given month during the period where neonates are likely present. This figure was chosen based on the fact that if neonates are on the beach the survey crew will retreat away from the haul-out at the first sign that seals are alert to their presence. Outside of this time, it is assumed that the entire haul out will be disturbed in order to completely map the barrier beach.

ⁱ Number of harbor seals expected to occur is one per event, events listed in Table 3.

7. ANTICIPATED IMPACT OF THE ACTIVITY

The anticipated impacts of the estuary management activities are temporary disturbances caused by the presence of staff and equipment, and associated noise, on the beach near the Jenner haul-out, and operation of boats and deployment of beach seines near river haul-outs. Sonoma Water counted seals hauled out and monitored disturbances before, during, and after breaching events from 1996 to 2000 (Merritt-Smith Consulting 1997, 1998, 1999, and 2000; SCWA and Merritt Smith Consulting 2001) and since 2009 (SCWA 2011 - 2021). Seals at the Jenner haul-out responded most negatively to human disturbances on the beach (typically beach visitors approaching the haul-out and the presence of Sonoma Water crews and equipment near the haul-out). During breaching events harbor seals alerted to the sound of equipment on the beach and left the haul-out as the crew and equipment approached closer on

the beach. When breaching activities were conducted south of the haul-out location seals often remained on the beach during all or some of the breaching activity. This indicates that seals are less disturbed by activities when equipment and crew do not pass directly past their haul-out (SCWA 2011 - 2021).

Stampeding or dead pups have not been observed during monitoring of Sonoma Water's artificial breaching activities. Implementation of the lagoon outlet channel, as required by NMFS' Russian River Biological Opinion, has occurred on five occasions, and the potential direct effects on harbor seals and their pups was similar to artificial breaching activities as construction methods are similar. To date none of the lagoon outlet channels remained in place long enough for maintenance and monitoring activities to occur.

More specific data on the behavior of harbor seals during artificial breaching activities, specifically their responses to disturbance, are available in Merritt Smith Consulting (1997, 1998, 1999 and 2001) and SCWA and Merritt Smith Consulting (2001), and the annual data reports for NMFS IHA (SCWA 2011 - 2021). Mortenson (1996) also discusses harbor seal behavior during the time pups are present. To date water level management activities have occurred outside the harbor seal pupping season so the annual NMFS IHA data reports do not describe pup behavioral responses to Sonoma Water activities. In April of 2015 a scheduled breaching activity was canceled due to the presence of neonatal harbor seals on the beach.

The opportunity for mother-pup bonding at the Jenner haul-out is not expected to be impacted by implementation of the lagoon outlet channel or artificial breaching activities. The majority of pups are born by mid-May in most years (SCWA 2012-2021), and implementation of the lagoon outlet channel would begin around May 15th (as required by the Russian River Biological Opinion). By this time, it is expected that bonding between mothers and pups would have likely occurred. The number of artificial breaching activities during the months of March, April and May has been relatively low in the past (Table 1), and the breaching activities occur in a single day over several hours. Artificial breaching activities are not expected to impact mother-pup bonding.

Excavation of the lagoon outlet channel may require the presence of Sonoma Water crews and equipment on the beach for up to 2 consecutive days. There have been several breaching events that required up to 2 days of work with a bulldozer or excavator without any apparent long-term impacts to the presence of seals at the haul-out. Seals at the Jenner haul-out experience regular disturbance by beach visitors and continual noise from the adjacent Highway 1 and would likely only be temporarily disturbed by the presence of Sonoma Water crews over a 2-day period. However, it is difficult to predict the response to the presence of up to 2 pieces of heavy equipment on the beach during the initial construction of the outlet channel. Monitoring of the pinniped response to this disturbance is detailed in section 13.

During both summer lagoon outlet channel management and artificial breaching activities, Sonoma Water crews would approach the haul-out ahead of the heavy equipment to minimize the potential for flushes to result in a stampede, a particular concern during pupping season.

Sonoma Water staff would avoid walking or driving equipment through the haul-out. Crews on foot would take caution to approach the haul-out slowly and to make an effort to be seen from a distance, if possible, rather than appearing suddenly at the top of the beach. Seals are usually alerted to the presence of the heavy equipment on the barrier beach well before it approaches the haul-out due to the equipment's noise. 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. During Sonoma Water's monitoring since 2009 harbor seals typically leave the haul-out prior to the excavator reaching the breaching location due to the presence of crews arriving on foot. Once breaching was completed, equipment and crews left the beach and pinnipeds returned to the haul-out soon after.

8. ANTICIPATION IMPACTS ON SUBSISTENCE USES

Marine mammals are not used for subsistence in and around the Russian River estuary. No impacts to the availability of marine mammals for subsistence are expected as a result of the proposed project.

9. ANTICIPATED IMPACT ON MARINE MAMMAL HABITAT

The purposes of the lagoon outlet channel management and artificial breaching activities are to manage the barrier beach at Goat Rock State Beach to improve summer rearing habitat for juvenile salmonids in the Russian River estuary and to minimize potential flood risk to low-lying properties on the estuary, respectively. These activities would result in physical alterations of the Jenner haul-out. When the barrier beach closes, water surface elevations in the estuary rise resulting in the haul-out increasing in elevation on the beach and flooding of haul-outs in the Russian River. For the summer lagoon outlet channel, elevations would range between 4 and 9 feet NGVD with a target of 7 feet. For artificial breaching activities, the sandbar would be breached when water surface elevations ranged from 4.5 and 7 feet NGVD.

The lagoon outlet channel would alter the beach by creating a shallow outlet channel that would convey river flow to pass over the sandbar and minimize or eliminate tidal exchange from May 15th to October 15th.³ The gentle slope of the outlet channel would allow seals to travel through the channel, although the shallow depths (0.5 to 2 feet) would likely not allow for swimming through the channel. Depending on the barrier beach height and the location of the river's thalweg when the beach closes, part of the outlet channel may be constructed in areas where seals typically haul out on the estuary side. The outlet channel would be maintained from May 15th to October 15th. After October 15th, the closed barrier beach would be artificially breached when water surface elevations in the estuary approach 7.0 feet NGVD as read at the Jenner visitor's center. Artificial breaching activities alter the habitat by creating a pilot channel through the closed sandbar. The location of the pilot channel is dependent on the height and width of the sandbar and the location of the river's thalweg. The pilot channel could

³ The lagoon management period is May 15th to October 15th, as described in the Russian River Biological Opinion (NMFS 2008).

be constructed in areas where seals typically haul out. Construction of the lagoon outlet channel and artificial breaching pilot channels requires excavated sand to be side cast on the beach. Any sand excavated would be side cast on the adjacent beach in such a way as to minimize changes to beach topography. During implementation and maintenance of the lagoon outlet channel, side cast sand would be graded on the adjacent beach and/or placed within the wave run-up zone on the beach so it is redistributed on the beach. During artificial breaching, the excavated sand is side cast adjacent to the pilot channel because it will be scoured as the mouth opens with flows leaving the estuary.

During Sonoma Water's pinniped monitoring associated with artificial breaching activities from 1996 to 2000, the number of harbor seals hauled out at Goat Rock State Beach declined when the barrier beach closed (although the initial decline was often observed to be followed by a brief increase in the number of seals at the haul-out) and then increased the day following an artificial breaching event (Merritt-Smith Consulting 1997, 1998, 1999, and 2000; SCWA and Merritt Smith Consulting 2001, SCWA 2011). Our recent observations of seal haul-out abundance during barrier beach closed conditions and associated with artificial breaching activities follow the previously described trends (SCWA 2014-2021). While the barrier beach is more often formed in the later part of the year, we have gained information regarding the number of pinnipeds that use the haul-out during extended sandbar closure in the lagoon management period (May 15th to October 15th). In 2015 and 2017 the barrier beach was closed for a total of 49 and 65 days during the lagoon management period, respectively (SCWA 2016, 2018). Generally, fewer seals were hauled out during closure events compared to bar open conditions (SCWA 2021). Results are similar for barrier beach closures during the lagoon management period in 2013 and 2014 (SCWA 2014, 2015). While there were fewer seals hauled out during closed conditions, the monthly average of seal abundance during September and October did not vary significantly from previous years combined (SCWA 2015, 2016). Collection of baseline information during the lagoon management period would be included in the monitoring described under question 13 below. The number of seals at the haul-out declines from August to October, so management of the lagoon outlet channel would have little effect on haul-out use (SCWA 2021). The late spring and early summer (May, June, and July), may be the most sensitive time period for pinniped disturbance since it coincides with pupping and the likely initiation of lagoon management (following a closure in this time period). In 2013 prolonged closures occurred in late spring and early summer (8 to 25 days). The average number of pinnipeds at the haul-out ranged from 50 to 96 harbor seals over the course of the barrier beach closures (SCWA 2014). This indicates that seals present at the haul-out during the pupping season are unlikely to completely abandon the haul-out from May to July in the event a seasonal lagoon is maintained. During closure event seals are routinely observed travelling across the barrier beach between the estuary and the ocean. Based on these monitoring results, the numbers of seals hauled out from May through July would be expected to fluctuate, but it is likely that the haul-out would continue to be used by harbor seals. In April 2015 and May 2020 the barrier beach was closed for 8 and 17 days respectively, during the peak pupping period and the number of pups observed was similar to previous years when the mouth remained open at this time (SCWA 2016, 2021).

10. ANTICIPATED LOSS OR MODIFICATION TO HABITAT

The modifications of habitat described previously in Section 9 would be temporary. The Russian River estuary management activities are anticipated to have minimal effects on the overall habitat of California stocks of Pacific harbor seal and northern elephant seal, and the U.S. stock of California sea lion. Habitat modification effects would be limited to the Jenner haul-out at the mouth of the Russian River.

Changes in haul-out elevation regularly occur with the tides at this site and any habitat that would be impacted by side cast sand would be temporary. Seals would still have access to the estuary lagoon waters and could still flush into the water during high water surface elevation periods. Modification of habitat resulting from construction of the lagoon outlet channel or artificial breaching pilot channel would also be temporary in nature. Harbor seals are regularly observed crossing overland from the Pacific Ocean to haul out on the estuary side of the beach, even in bar-open conditions, so it is anticipated that seals would continue to use the haul-out in bar-closed, lagoon conditions.

11. MITIGATION MEASURES

During both summer lagoon outlet channel management and artificial breaching activities, Sonoma Water crews would approach the haul-out ahead of the heavy equipment to minimize the potential for flushes to result in a stampede. Sonoma Water staff would avoid walking or driving equipment through the haul-out. Crews on foot would take caution to approach the haul-out slowly and to make an effort to be seen from a distance, if possible, rather than appearing suddenly at the top of the sandbar. Seals are usually alerted to the presence of the heavy equipment on the sandbar well before it approaches the haul-out due to the equipment's noise. 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 to reduce disturbance of seals from loud noises following a relatively quiet period. All work, including monitoring, would be completed as efficiently as possible, with the fewest number of heavy equipment possible, to minimize disturbance of seals at the haul-out. Boats operating near river haul-outs would be kept within posted speed limits and driven as far from the haul-outs as safely possible to minimize flushing seals.

The proposed project would include the following additional mitigation measures to limit access to the beach during the pupping season (March 15 to June 30) as follows:

- 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 suitable fish rearing habitat. Pups less than one week old should be characterized by being up to 15 kg, thin for their body length, or an umbilicus or natal pelage is present. Sonoma Water and Stewards will conduct weekly surveys of the haul-out in April and May and coordinate with the locally established seal monitoring

program (SealWatch) to determine if pups less than one week old are on the beach prior to a breaching event;

- A water level management event may not occur for more than two consecutive days unless flooding threats cannot be controlled;
- Sonoma Water will 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; and
- Physical and biological monitoring, as described in Table 2, will not be conducted if a pup less than one week old is present at the monitoring site or on a path to the site.

12. ARCTIC PLAN OF CONSIDERATION

The proposed project will not occur in or near any traditional Arctic hunting areas and therefore will not have an impact on Arctic subsistence uses.

13. MONITORING AND REPORTING

The Russian River Estuary Management Project Pinniped Monitoring Plan (SCWA and Stewards 2021) describes in detail the methods for ongoing baseline (general) and Estuary Management Project (mitigation) monitoring protocols. The goal of the monitoring plan is to detect the response of pinnipeds to estuary management activities at the Russian River estuary. To achieve this goal we will continue to collect data on annual abundance of harbor seals at the Jenner haul-out to monitor trends in population size and annual pup production. Observations of seal behavior will be recorded and reported to monitor any impacts resulting from estuary management and monitoring activities.

Harbor seals are found at the mouth of the Russian River (Jenner haul-out) throughout the year. They are observed on the beach throughout the tidal cycle and at any time of day. Our baseline pinniped monitoring concluded that tidal state and time of day influenced harbor seal abundance at the Jenner haul-out, with seals less abundant in the early morning and at high tide (SCWA 2012, 2021). Harbor seals were most abundant on the Jenner haul-out in July during their annual molt (SCWA 2012), with these same trends being observed in most subsequent years (SCWA 2013 - 2021). Seasonal variation in the abundance of harbor seals at their haul-out locations is commonly observed throughout their range (Allen et al. 1989, Stewart and Yochem 1994, Gemmer 2002). The variation in their abundance can mostly be explained by changes in their biological and physiological requirements throughout the year. Peak seal abundance occurring in July during their molting season is likely a result of seals spending more time on land in order to help facilitate the molting process. This annual peak is typically followed by a decline in seal abundance which is likely a result of individual seals decreasing the amount of time on the haul-out post-molt to spend more time foraging and also coincides with the time that young seals may temporarily disperse from their natal haul-out (Stewart and Yochem, 1994, Thompson et al. 1994, Small et al. 2005).

The Jenner haul-out is a harbor seal rookery and we have attempted to standardize a measure of pup counts so that comparisons can be made across years. However, our ability to accurately measure natality (i.e., proportion of births to the number of mature females) is limited by the fact that harbor seals are not sexually dimorphic so the number of adult females on the beach cannot be easily determined. Harbor seal pups are very precocial and are able to swim just after birth, so counts of pups on the beach does not accurately reflect the total number of births.

Harbor seals will use the beach when there is an open channel or when a barrier beach has formed, however, the number of seals at Jenner was influenced by river mouth condition. Daily average seal abundance was lower during closed conditions compared to open conditions. This effect is also closely related to time of year, since most closures occur during the fall and winter, when seal abundance is low. However, when seal counts were grouped by season, the influence of mouth condition was observed for winter, spring, summer and fall (SCWA 2016, 2021).

The response of harbor seals at the Jenner haul-out to water level management activities has been similar across all years of monitoring (Merritt Smith Consulting 1997, 1998, 1999, 2000; Sonoma County Water Agency and Merritt Smith Consulting 2001; SCWA 2011 - 2021). Harbor seals alerted to the sound of equipment on the beach and left the haul-out as the crew and equipment approached closer on the beach. When breaching activities were conducted south of the haul-out, or when seals were hauled out on the ocean side of the beach, seals often remained on the beach during all or some of the breaching activity. This indicates that seals are less disturbed by activities when equipment and crew do not pass directly past their haul-out.

Since the beginning of the modified estuary water level management procedures as a result of the Russian River Biological Opinion in 2009 through 2020 a lagoon outlet channel has been implemented five times. While Sonoma Water has not had the opportunity to sustain an outlet channel, observations when a barrier beach has formed during the lagoon management period provide information as to how harbor seals respond when aquatic access between the estuary and the ocean is limited. While seal abundance was lower during closed conditions, our results indicate that closed conditions do not inhibited seals from using the Jenner haul-out during any period of the year. We conclude that the effect of barrier beach condition on seal abundance represents only a short term response, and is not an indication that seals are less likely to occupy the Jenner haul-out.

14. SUGGESTED MEANS OF COORDINATION

All pinniped data collected during the Russian River estuary management activities at the Russian River would be made available to NMFS, California Department of Parks and Recreation, the Stewards of the Coast and Redwoods, and to the general public.

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