# Russian River Estuary Management Project

## *Pinniped Monitoring Plan*

January 2016 (Revised)

*Reference as:*
Sonoma County Water Agency and Stewards of the Coast and Redwoods. 2016. Russian River Estuary Management Project Pinniped Monitoring Plan. Revised January 2016.

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# Introduction

The Russian River 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 $km^2$ (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).

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 Jenner haul-out. There are also several known resting areas at logs and rock piles in the Russian River estuary. This monitoring plan has been prepared as part of the Sonoma County Water Agency's (Water Agency) application for incidental harassment authorization (IHA) under the Marine Mammal Protection Act (MMPA) for activities associated with the Russian River Estuary Management Project. This plan is a modification to the previous monitoring plan last updated in 2011 (SCWA and Stewards 2011). The activities associated with the Russian River Estuary Management Project 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
- maintenance of monitoring wells on the barrier beach south of the jetty.

The monitoring plan is a collaborative effort between the Water Agency and the Stewards of the Coast and Redwoods (Stewards).

## Background

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). Although closures may occur at any time of the year, the mouth usually closes during the spring, and fall (Heckel 1994; Merritt Smith Consulting 1997, 1998, 1999, 2000; Sonoma County Water Agency [SCWA] and Merritt Smith Consulting 2001, SCWA 2013, 2014, 2015). Closures result in ponding of the Russian River 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 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 (Water Agency). The Water Agency's artificial breaching activities are conducted in accordance with the Russian River Estuary Management Plan (ESA 2014).

## Biological Opinion and the Estuary

The Water Agency 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 the Water Agency's estuary management 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 historic artificial breaching practices have significant adverse effects on the Russian River's estuarine rearing habitat for steelhead. The historic method of artificial breaching, which is done in response to rising water levels behind the barrier beach, adversely affects the estuary's water quality and depth of freshwater. The California Department of Fish and Wildlife (CDFW) issued a consistency determination on November 9, 2009, finding that the Russian River Biological Opinion was consistent with the requirements of the California Endangered Species Act (CESA) and adopted the measures identified in the Russian River Biological Opinion.

The historic breaching practices create a tidal marine environment with shallow depths and high salinity. Salinity stratification contributes to low dissolved oxygen at the bottom in some areas. The 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 Biological Opinion's Reasonable and Prudent Alternative (RPA) 2 (NMFS 2008) requires the Water Agency to collaborate with NMFS and CDFG 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+) steelhead from May 15$^{th}$ to October 15$^{th}$ (lagoon management period). A program of potential, incremental steps are prescribed to accomplish this, including adaptive management of a lagoon outlet channel.

The Water Agency anticipates that lagoon outlet channel management activities would occur in accordance with the Russian River Biological Opinion between May 15 and October 15. Artificial breaching activities would occur in accordance with the Russian River Biological Opinion primarily from October 16 to May 14. However, if estuary water surface elevations rise above 7.0 feet (at the Jenner gauge) and threaten to flood low-lying properties during the lagoon management period, the Water Agency may consult with NMFS and CDFW regarding artificially breaching the barrier beach to alleviate potential flooding, as discussed in the Biological Opinion. The Biological Opinion incidental take statement estimates that the Water Agency may need to artificially breach the barrier beach "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).

## Previous Monitoring Efforts

The Jenner haul-out has been extensively monitored. The Stewards' Seal Watch Public Education Program began in 1985, when Dian Hardy and other local activists from Jenner discovered that the harbor seals at Goat Rock State Beach were in greater danger from beach visitors and unleashed dogs than from the pollution of a recent sewage spill into the Russian River. In response to these concerns, they organized and set up four-hour shifts on the beach at the river mouth where they asked visitors to abide by the Marine Mammal Protection Act and stay at least 50 yards from the harbor seals. Today, State Parks Volunteer Docents assist the public in safeguarding this local harbor seal haul-out, the largest on the Sonoma Coast. Docents are available at Goat Rock State Beach on weekends during the 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 marine mammals observed, and the number of boats and kayaks present.

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 mouth at the Jenner haul-out was opened or closed each day.

The Water Agency monitored biological and water quality conditions before, during, and after artificial breaching events from 1996 to 2000. Harbor seals regularly hauled out at the mouth of the Russian River, with the greatest numbers observed in late winter and mid-summer. California sea lions and elephant seals were occasionally observed at the river mouth. 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). Seals at the haul-out responded

most negatively to human disturbances on the beach (typically beach visitors approaching the haul-out). When approaching the breaching location, Water Agency crews walked ahead of the bulldozer to ensure that no pinnipeds were harmed during the activity. Most pinnipeds usually left the haul-out prior to the bulldozer reaching the breaching location due to disturbance from visitors prior to crews arriving onsite. The remaining pinnipeds flushed as the crew approached the breaching location ahead of the heavy equipment. Once breaching was completed, equipment and crews left the beach and pinnipeds returned to the haul-out within a day.

Since July 2009 the Water Agency has been conducting baseline monitoring of the Jenner haul-out and several nearby coastal and estuary sites as described in the 2011 Pinniped Monitoring Plan (SCWA and Stewards 2011). The purpose of baseline monitoring was to describe the conditions under which harbor seals haul out and how seals respond to implementation of the estuary management program. Baseline monitoring has provided information about temporal patterns in seal abundance and how changes in the physical environment influence their abundance on land. The abundance of seals at Jenner is influenced by time of day, tide state, month, and river mouth condition (Table 1). Seal abundance increases from morning until afternoon, with a peak around 14:00 (Figure 2). Seal abundance decreases at high tides (≥ 4.01 feet) (Figure 3). Seals are present at Jenner throughout the year but their abundance varies with month. While monthly abundance varies between years, seal abundance consistently peaks in July and decreases in September and October (Figure 4). More seals haul out during open mouth conditions, however this effect is not independent of month (Figure 5).

In addition to baseline monitoring, monitoring during water level management activities (breaching and lagoon outlet implementation) has continued. Recent observations of seals during breaching activities indicate that seals leave the Jenner haul-out as safety crews approach their haul-out ahead of equipment. Depending on the location of their haul-out seals have also remained on the beach during breaching activities. Seals that left the haul-out just prior to breaching have returned to the beach within hours of completion of activities and typically return prior to the next morning (SCWA 2013, 2014, 2015).

SPECIAL PROJECTS/RUSSIAN RIVER/7104-ESTUARY/EstuaryManage-PinnipedMonitoring.mxd December 9,2015

**Figure 1. Russian River estuary management pinniped monitoring locations.**

***Table 1**. Results of one way analysis of variance (ANOVA) on the abundance of harbor seals hauled out at Jenner during baseline surveys since 2009. Includes analysis of the influence of hour (07:00 – 15:00); tide (low, rising, high, falling); month (January – December) and mouth condition (open or closed) on the abundance of seals at the Jenner haul-out. Data from 2009 – 2014 are combined.*

| Effect | d.f. | Mean square | F ratio | P value |
|---|---|---|---|---|
| hour | 8 | 67621 | 9.188 | 0.000 |
| tide | 3 | 484113 | 73.211 | 0.000 |
| month | 11 | 417581 | 83.071 | 0.000 |
| mouth condition | 1 | 927380 | 131.2143 | 0.000 |

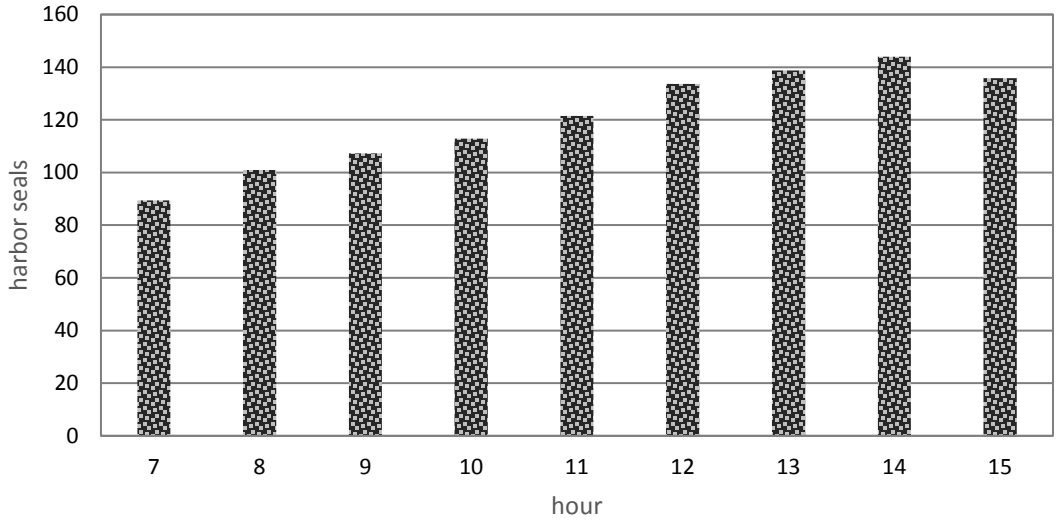


***Figure 2**. Average number of harbor seals hauled out at Jenner by hour of day. Observations included are during baseline surveys since 2009.*

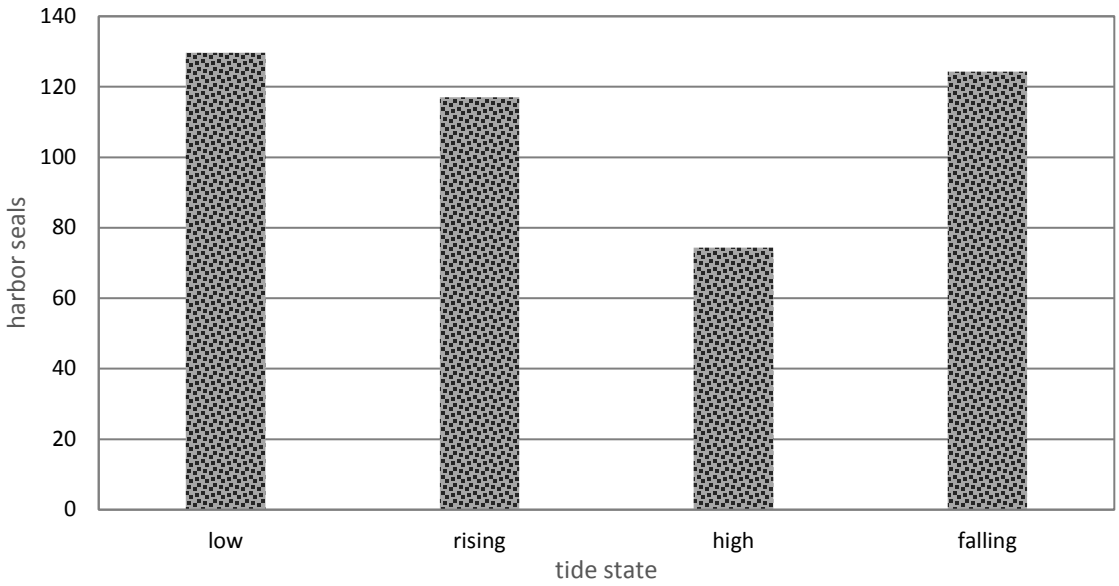


***Figure 3.*** *Average number of harbor seals hauled out at Jenner by tide state where low ≤ 2.01 feet, high ≥ 4.01 feet, rising is between 2.01 and 4.01 ft after a low tide and falling is between 2.01 and 4.01 ft after a high tide. Observations included are during baseline surveys since 2009.*

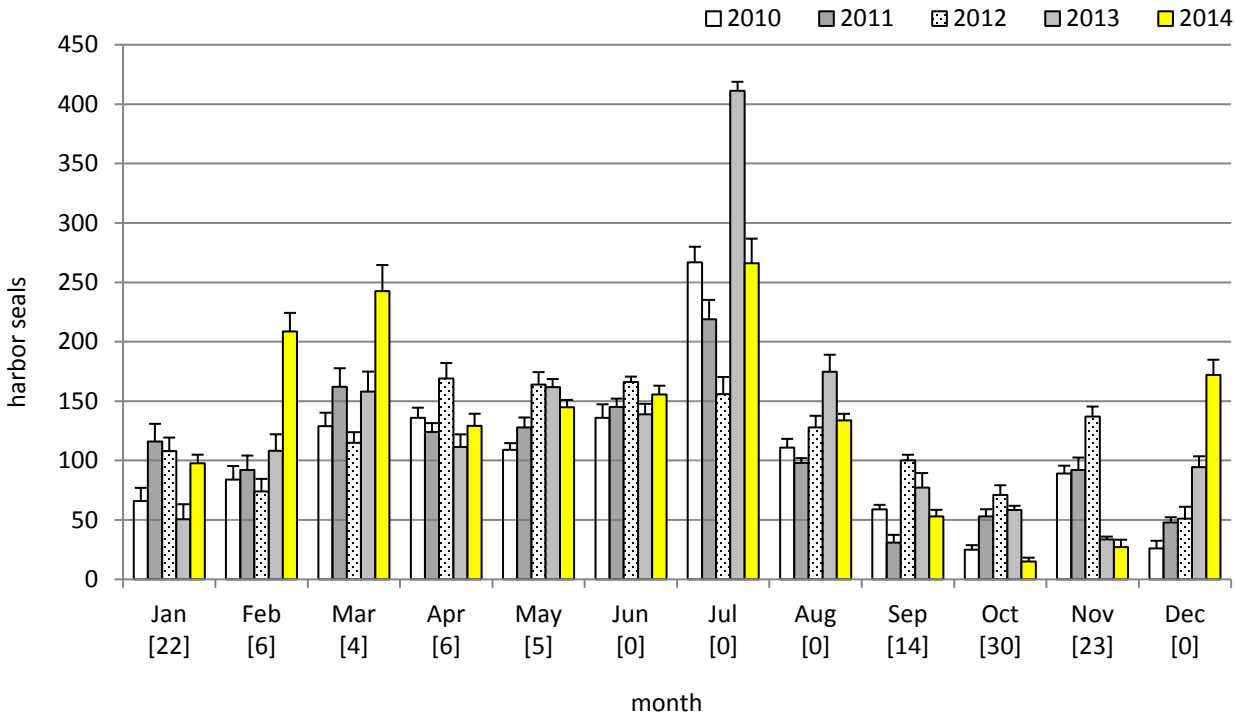


***Figure 4.*** *Average number of harbor seals hauled out at Jenner by month, grouped by year. Observations included are during baseline surveys since 2010. Numbers in brackets below month indicate the total number of days the river mouth was closed during 2014.*

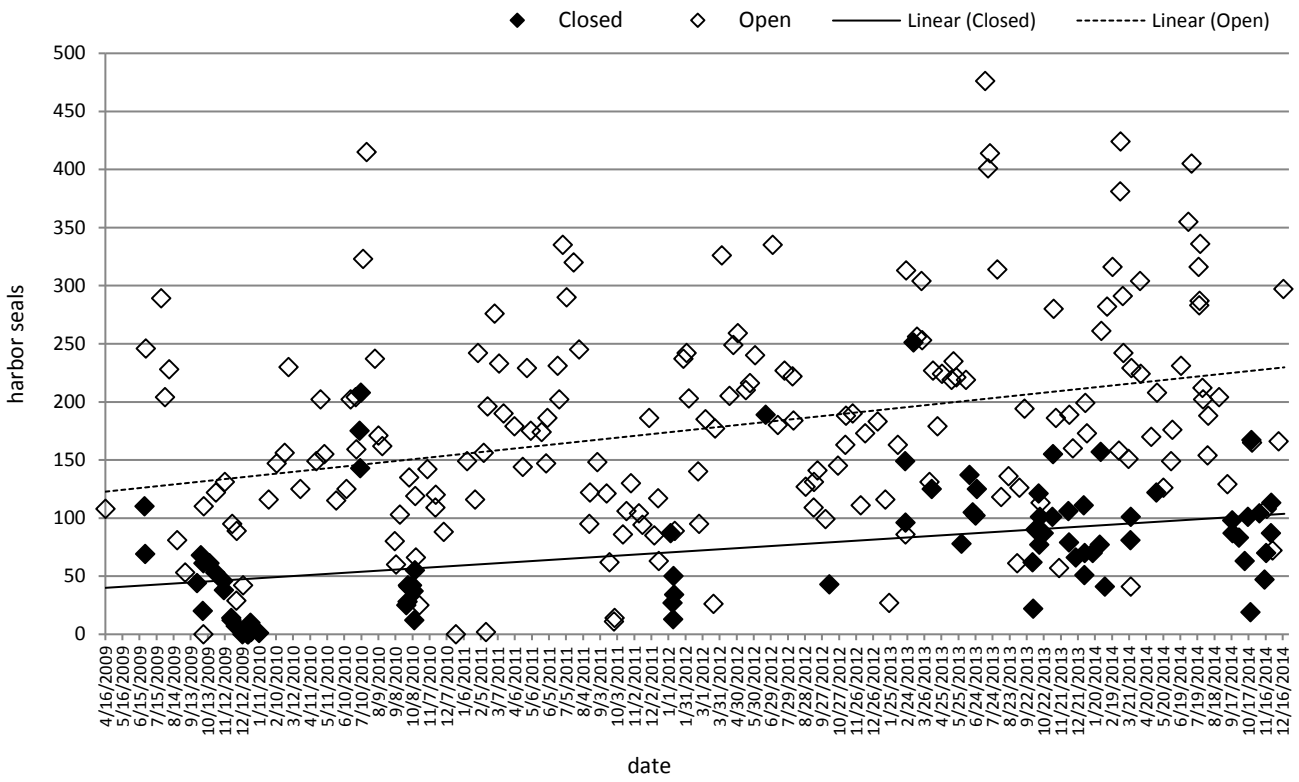


***Figure 5.*** *Maximum number of harbor seals hauled out during all pinniped surveys conducted at the Jenner haul-out since 2009. Dashed line represents the linear trend of harbor seal counts for river mouth open conditions and solid line represents linear trend for river mouth closed conditions.*

# Goals and Objectives

The purpose of this monitoring plan is to detect the response of pinnipeds to estuary management activities at the Russian River estuary. Specifically, the following questions are of interest:

- Under what conditions do pinnipeds haul out at the Russian River estuary mouth at Jenner?
- How do seals at the Jenner haul-out respond to activities associated with the construction and maintenance of the lagoon outlet channel and artificial breaching activities?
- Does the number of seals at the Jenner haul-out significantly differ from historic averages with formation of a summer (May 15$^{th}$ to October 15$^{th}$) lagoon in the Russian River estuary?
- Are seals at the Jenner haul-out displaced to nearby river and coastal haul-outs when the mouth remains closed in the summer?

# Monitoring Components

Pinnipeds will be monitored to meet the plan's goals and objectives. The results would provide information on the effects of estuary management activities on the pinnipeds, primarily Pacific harbor seals that haul out at the mouth of the Russian River estuary. Methods may be revised as data are collected and evaluated in the field. Any significant changes in methodology would be documented and included in the annual report (see below).

## Schedule

The term of the monitoring plan would correspond with the MMPA IHA issued by NMFS. Baseline data on conditions associated with seal presence at the Jenner haul-out would be collected for the term of the IHA. Generally, monitoring associated with implementation and maintenance of the lagoon outlet channel would occur between May 15 and October 15. Monitoring of artificial breaching activities would occur with each event, generally from October 16 to May 14. Should the mouth remain open during the lagoon management period, weekly monitoring of the Jenner haul-out would continue as described below.

## Methodology

<u>Baseline (Jenner Haul-out Use)</u>

The Jenner haul-out would be monitored for four hours every week, with no more than four baseline surveys each month for the term of the IHA. Two monitoring events each month would occur in the morning (7:30 – 11:30) and two would occur in the afternoon (11:30 – 15:30) with an effort to schedule a morning survey at low

and high tide each month and an afternoon survey at low and high tide each month. All seals hauled out on the beach will be counted every thirty minutes from the overlook on the bluff along Highway 1 adjacent to the haul-out using a high powered spotting scope. Monitoring may conclude for the day if weather conditions affect visibility (e.g. heavy fog in the afternoon). Depending on how the sandbar is formed, seals may haul out in multiple groups at the mouth. At each thirty minute count, the observer indicates where groups of seals are hauled out on the sandbar and provides a total count for each group. When possible, adults and pups will be counted separately. The observer will provide a sketch of where the seals are hauled out on the back of the data sheet.

In addition to the count data, disturbances of the haul-out will be recorded. The methods for recording disturbances are similar to those in Mortenson (1996). Disturbances would be recorded on a three-point scale that represents an increasing seal response to the disturbance (Table 2). The time, source, and duration of the disturbance, as well as an estimated distance between the source and haul-out, would be recorded.

***Table 2**. Seal response to disturbance.*

| Level | Type of response | Definition |
|---|---|---|
| 1 | Alert | Seal head orientation or brief movement in response to disturbance, which may include turning head towards the disturbance, craning head and neck while holding the body rigid in a u-shaped position, changing from a lying to a sitting position, or brief movement of less than twice the animal's body length. |
| 2 | Movement | Movements in response to the source of disturbance, ranging from short withdrawals at least twice the animal's body length to longer retreats over the beach, or if already moving a change of direction of greater than 90 degrees. |
| 3 | Flush | All retreats (flushes) to the water. |

Weather conditions will also be recorded at the beginning of each survey. A Kestrel® 2500 Pocket Weather® Meter will be used to record the wind speed and ambient temperature. The Beaufort scale will be used to estimate the sea conditions and a description of precipitation will be recorded as either clear, fog or rain. Tide levels from the NOAA Pt. Reyes Station and estuary water surface as recorded from the Jenner Visitor's Center gauge will be correlated to the survey information in the office and will be reported annually.

Lagoon Outlet Channel Monitoring

Should the mouth close during the lagoon management period, the Water Agency would construct a lagoon outlet channel as required by the Russian River Biological Opinion and described in the MMPA IHA. Activities associated with the initial construction of the outlet channel, as well as the maintenance of the channel that may be required, would be monitored for disturbances to the seals at the Jenner haul-out.

A one-day pre-outlet channel survey would be made within 1 to 3 days prior to constructing the outlet channel. The haul-out would be monitored on the day the outlet channel is constructed and daily for up to 2 days during channel excavation activities. Monitoring would also occur on each day that the outlet channel is maintained using heavy equipment for the duration of the lagoon management period. Monitoring of outlet channel maintenance would correspond with the monitoring described under the "Jenner Haul-out Use" section above. Methods would follow the count and disturbance monitoring protocols described in the "Jenner Haul-out Use" section.

*Displacement*. In an attempt to understand if seals from the Jenner haul-out are displaced to coastal haul-outs nearby when the mouth remains closed in the summer, several other haul-outs on the coast would be monitored (Figure 1). These haul-outs include North Jenner and Odin Cove to the north, Pocked Rock, Kabemali, and Rock Point to the south. Each of these coastal haul-outs would be monitored concurrent with baseline monitoring at Jenner in the event that a lagoon outlet channel is implemented and maintained for a prolonged period (over 21 days). This would provide an opportunity to qualitatively assess if these haul-outs are being used by seals displaced from the Jenner haul-out. This monitoring would not provide definitive results that individuals from the Jenner haul-out are displaced to the coastal haul-outs as individual seals would not be marked; however, it would useful to track general trends in haul-out use during a prolonged period of river mouth closure.

As volunteers would be required to monitor these coastal haul-outs (please see "Staffing" below), haul-out locations may need to be prioritized if there are not enough volunteers available. In that case, priority would be assigned to the North Jenner and Odin Cove haul-outs, followed by the Pocked Rock, Kabemali, and Rock Point haul-outs.

Artificial Breaching Events

Pinniped responses to the Water Agency's artificial breaching activities were extensively monitored from 1996 to 2000 (Merritt-Smith Consulting 1997, 1998, 1999, 2000; Sonoma County Water Agency and Merritt-Smith Consulting 2001) and since 2009 (SCWA 2011, 2013, 2014, 2015). In accordance with the Russian River Biological Opinion (NMFS 2008), the Water Agency would artificially breach the barrier beach outside of the summer lagoon management period (from October 16 to May 14), unless estuary water surface elevations from May 15 to October 15 rise above 7 feet at the Jenner gauge. In that case, NMFS and California Department of Fish and Wildlife (CDFW) could be consulted regarding potentially scheduling an artificial breaching event to open the barrier beach and reduce flooding risk.

Pinniped response to artificial breaching would be monitored at each such event during the term of the MMPA IHA. Methods would follow the count and disturbance monitoring protocols described in the "Jenner Haul-out Use" section. Half-hour counts of all seals hauled out on the beach would begin at least one hour before artificial breaching is scheduled to begin and conclude at least 2 hours after crews and equipment have left the beach, with a minimum of 6 hours of monitoring. If breaching is scheduled in the morning, monitoring could be begin as early as local dawn. For breaching events scheduled in the afternoon, monitoring would conclude at least 2 hours after crews and equipment have left the beach or at dusk.

## Monitoring During Pupping Season

The pupping season is March 15 to June 30. Baseline, lagoon outlet channel, and artificial breaching monitoring during the pupping season will include recording observations of neonates (pups less than 1 week old). Characteristics of a neonate pup include: body weight is less than 15 kg; thin for their body length; an umbilicus or natal pelage present; wrinkled skin; and awkward or "jerky" movements on land. The Water Agency shall coordinate with the Stewards SealWatch monitoring program to determine if pups less than one week old are on the beach (e.g., a pup was sighted being born) prior to a water level management event.

If, during monitoring, observers sight any pup which may be abandoned, the Water Agency would contact the NMFS stranding response network [Marine Mammal Center, 415-289-7350] and the West Coast Regional Stranding Coordinator [Justin Viezbicke, 562-980-3230] immediately and also report the incident to NMFS' Office of Protected Resources [Benjamin Laws, 301-427-8425] within 48 hours. Observers are not to approach or move the pup. Potential indications that a pup may be abandoned include: no observed contacts with adult seals, no movement of the pup, pup's attempts to nurse are rebuffed.

## Staffing

Monitoring would be conducted by qualified individuals with prior approval by NMFS. Generally, these individuals would include professional biologists employed by the Water Agency or volunteers trained by the Stewards. All volunteer monitors would be required to attend a classroom-style training and field site visits to the haul-outs. Training would cover the MMPA and any conditions of a MMPA permit issued by NMFS, this Pinniped Monitoring Program, pinniped species identification, age class identification (including a specific discussion regarding neonates), recording of count and disturbance observations (including completion of datasheets), and use of equipment. Pinniped identification would include harbor seal, California sea lion, and northern elephant seal, as well as other pinniped species with potential to occur in the area (i.e. northern fur seals, Guadalupe fur seals, Steller sea lions).

Generally, Water Agency staff and volunteers would collect baseline data on Jenner haul-out use during the weekly monitoring events. A schedule for this monitoring would be established with Stewards of the Coasts and Redwoods once volunteers are available for the monitoring effort. Water Agency staff would monitor lagoon outlet channel excavation and maintenance activities and artificial breaching events at the Jenner haul-out.

## Reporting

An annual report would be prepared and distributed to NMFS, California State Parks, and Stewards of the Coasts and Redwoods. The report would also be available to the public on the Water 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.

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