



**Sonoma
Water**



Russian River Estuary Management Project

Pinniped Monitoring Plan



August 2021 (Revised)

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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 km² (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 (Sonoma Water) request for Rule making and Letters of Authorization (LOA) 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 2016 (SCWA and Stewards 2016). 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.

The monitoring plan is a collaborative effort between Sonoma Water 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 and Merritt Smith Consulting 2001; SCWA 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020). 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 Sonoma Water. Sonoma Water's artificial breaching activities are conducted in accordance with the Russian River Estuary Adaptive Beach Management Plan (ESA 2021).



Figure 1. Pinniped haul-outs at the Russian River Estuary and surrounds.

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 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 Sonoma Water to collaborate with NMFS and CDFW 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 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.

Sonoma Water 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, Sonoma Water 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 Sonoma Water 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.

Since July 2009 Sonoma Water has been conducting baseline monitoring of the Jenner haul-out and several nearby coastal and estuary sites as described in the 2016 Pinniped Monitoring Plan (SCWA and Stewards 2016). 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. We have observed a strong seasonal pattern in most years where seals are most abundant during the spring and summer months (Figure 2). Seasonal variation in the abundance of harbor seals is commonly observed throughout their range (Allen et al. 1989, Stewart and Yochem 1994, Gemmer 2002). Seal abundance was shown to increase throughout the day, but only during the spring and winter months (Figure 3). Seal abundance was weakly affected by tide height with higher tides shown to reduce seal abundance (Figure 4), based on direct observations, this is likely due to waves washing over the haul-out during these high tides. Seal abundance was also greater when the river mouth was open to the ocean (Figure 5).

In addition to baseline monitoring, monitoring during water level management activities (breaching and lagoon outlet implementation) has been ongoing since July 2009. 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. The number of harbor seals 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, SCWA 2021). 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 - 2021).

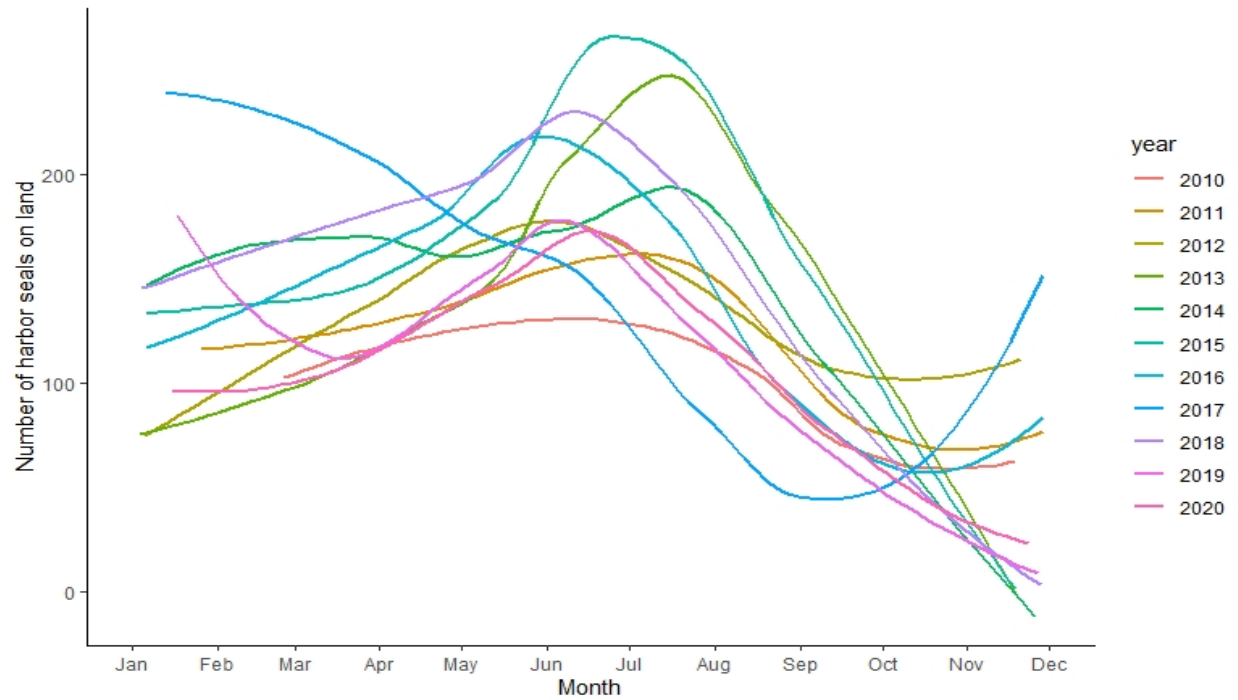


Figure 2. Seasonal trends in harbor seal abundance at the Jenner haul-out (Goat Rock State Beach) during baseline surveys for the years 2010 to 2020.

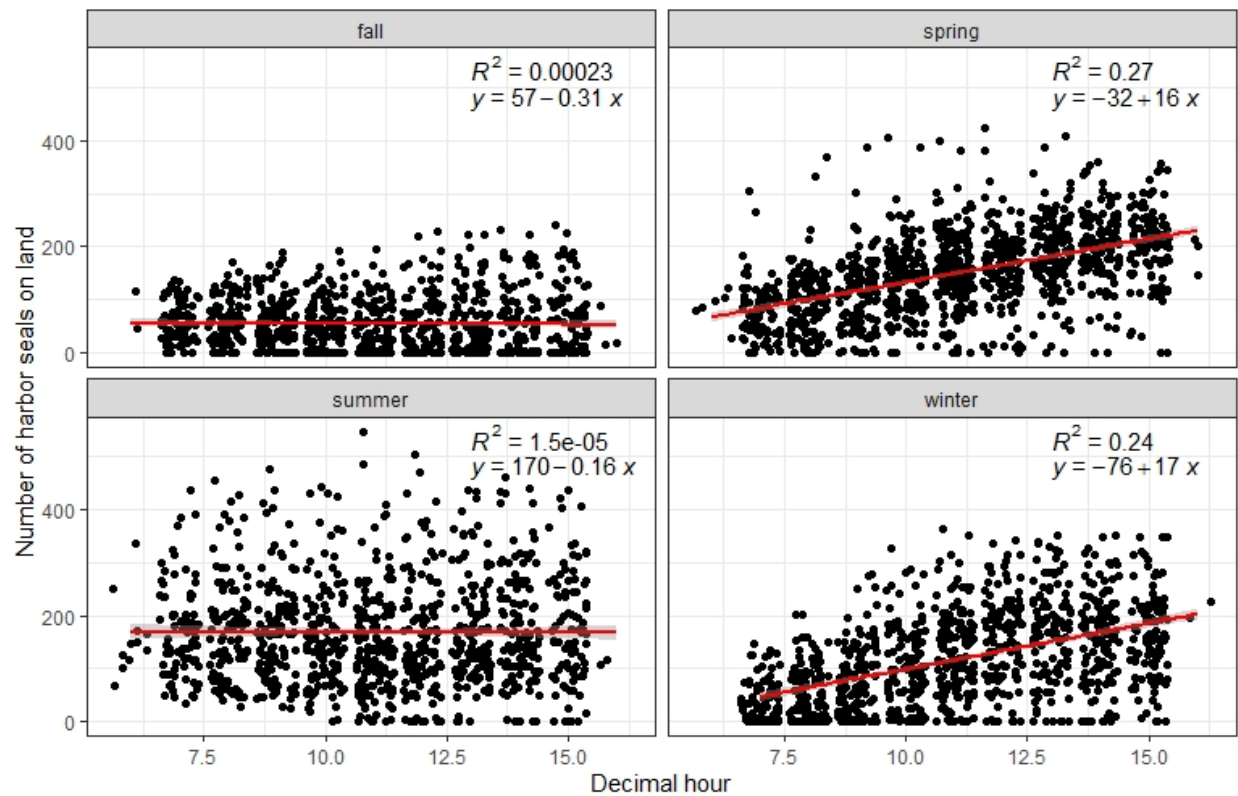


Figure 3. Number of harbor seals counted on the Jenner haul-out, by time of day in decimal hour (where 12.0 is noon) for each season, during baseline surveys between January 2010 and April 2021. Linear regression line ($y \sim x$) is plotted in red and the confidence interval is the shaded area.

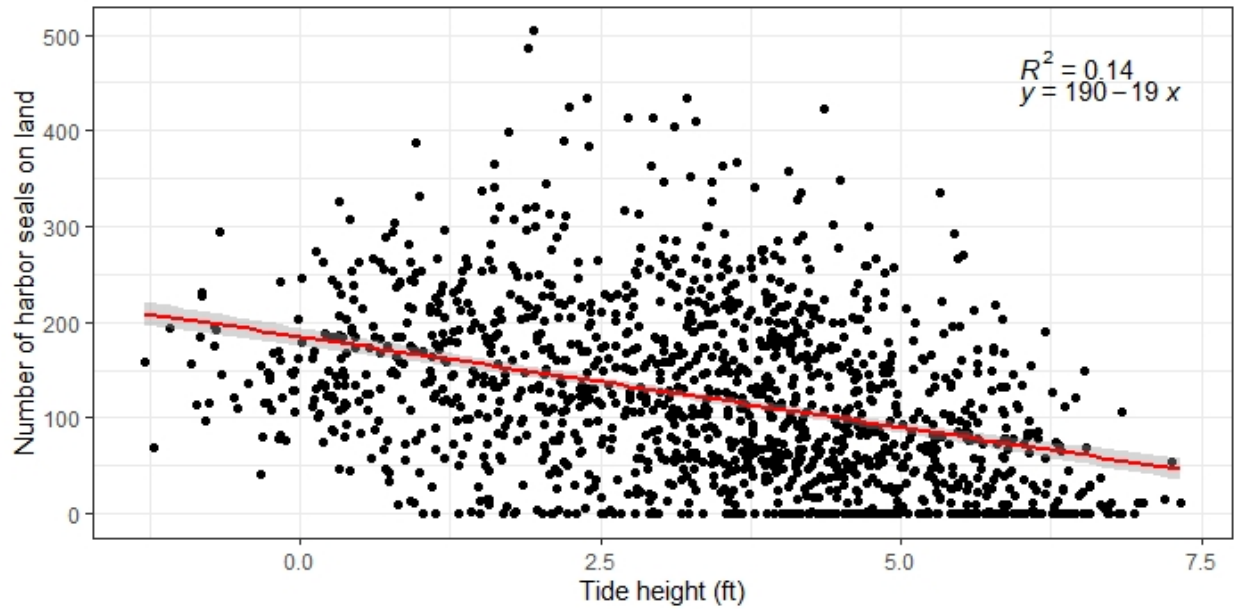


Figure 4. Number of harbor seals counted on the Jenner haul-out by tide height (feet) for baseline surveys between January 2010 and December 2020. Linear regression line ($y \sim x$) is plotted in red and the confidence interval is the shaded area.

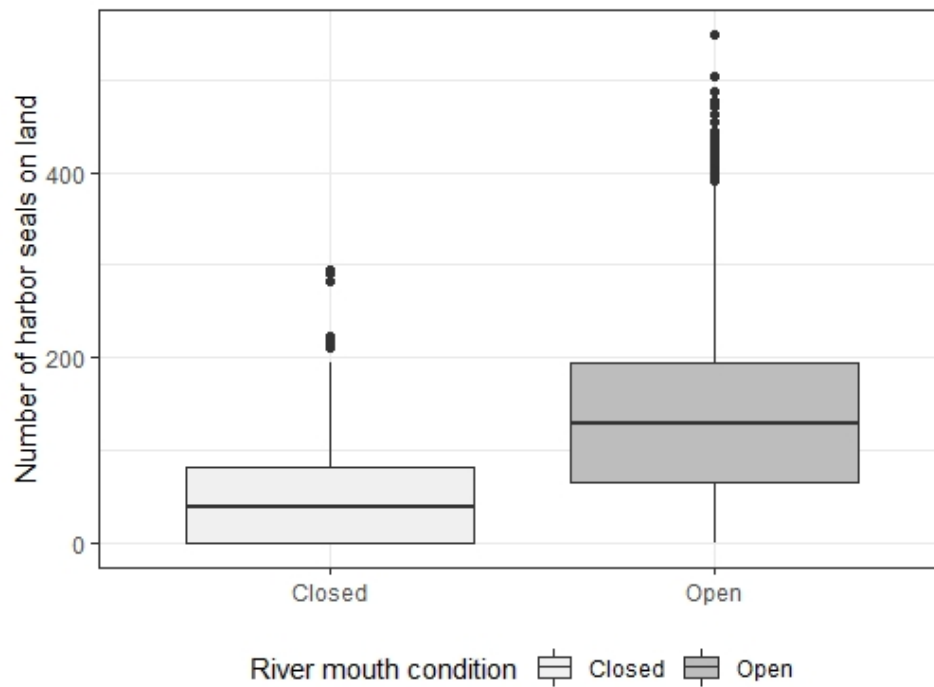


Figure 5. Number of harbor seals counted at the Jenner haul-out by mouth condition (open or closed) for baseline surveys between January 2010 and December 2020. Boxplot shows the median (horizontal line), inter quartile range (area), 95% confidence interval (whisker) and outlying values (point).

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. 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.

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 LOA issued by NMFS. Baseline data on conditions associated with seal presence at the Jenner haul-out would be collected each year from March 15 through October 15. 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, monitoring of the Jenner haul-out would continue as described below.

Methodology

Baseline (Jenner Haul-out Use)

Baseline monitoring will occur at the Jenner overlook from March 15 to October 15. This schedule would capture the pupping and molting seasons, and extend to the end of the beach management period, when management activities are more likely to occur. Surveys would be conducted twice monthly, except for the pupping season (April-May) when surveys would be conducted weekly in order to record the presence of neonate harbor seals. The haul-out will be monitored for 4 hours, scheduled for any consecutive block between the hours of 0800 and 1600. An effort will be made to avoid periods of high tide when scheduling baseline surveys.

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 would follow a three-point scale adopted by NMFS that represents an increasing seal response to the disturbance (Table 1). For each disturbance event the disturbance source and seal response will be recorded and tallied.

Table 1. Levels of pinniped response to disturbance used for Russian River Estuary Management Project pinniped monitoring. For permitting purposes a “take” or Level B harassment would include only moving or flight responses.

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, Sonoma Water would construct a lagoon outlet channel as required by the Russian River Biological Opinion and described in the MMPA LOA. 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.

Artificial Breaching Events

Pinniped responses to Sonoma Water'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, 2016, 2017, 2018, 2019). In accordance with the Russian River Biological Opinion (NMFS 2008), Sonoma Water 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 LOA. Methods for recording seal abundance would follow the count 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 one hour after crews and equipment have left the beach. 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 one hour after crews and equipment have left the beach or at dusk.

Disturbances during management activities

During any estuary management activity, or biological or physical monitoring activity, additional information will be recorded when a disturbance of seals on the haul-out is observed. In addition to the source of the disturbance and the seals’ response to the disturbance, staff will record the time and duration of the disturbance, the number of seals disturbed by species and age class during each event, and the approximate distance of the seals to the disturbance source. These detailed observations are necessary to report the number of pinnipeds disturbed (harassed) as described in the LOA.

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. Sonoma Water shall coordinate with the Stewards’ Seal Watch 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, Sonoma Water 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. Generally, these individuals would include professional biologists employed by Sonoma Water or volunteers trained by the Stewards and Sonoma Water. All volunteer monitors would be required to attend a classroom-style training and on site mentoring by an experienced observer. 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, volunteers would collect baseline data on Jenner haul-out use during the bi-weekly monitoring events. A schedule for this monitoring would be established with Stewards once volunteers

are available for the monitoring effort. Sonoma Water staff would monitor lagoon outlet channel excavation, maintenance activities, artificial breaching events, and biological or physical monitoring activities 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 Sonoma Water'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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