

MPA COMPLIANCE: DIGITAL SIGNAGE PILOT PROJECT



SONOMA AND MENDOCINO MPA COLLABORATIVES *MAY - AUGUST, 2022*



**COLLABORATIVE
NETWORK**



funding for this document was provided through the Sustaining
California's Ocean program of Resources Legacy Fund



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Mendocino and Sonoma MPA Collaborative Pilot Highway Sign Compliance Sign Evaluation Report Oct 2022

Background

Sonoma and Mendocino MPA Collaboratives (the Collaboratives) identified lack of awareness of Marine Protected Areas (MPAs) by visitors as the primary factor identified contributing to non-compliance in MPAs. Lack of awareness of regulations results in habitat impacts to tidepools and eelgrass beds, wildlife disturbance, illegal poaching, as well as an increase in coastal trash. The Collaboratives identified increased signage near areas of high impact as the primary strategy to improve compliance in coastal visitors. In 2022 the Collaboratives launched a digital message traffic signs pilot project to inform coastal visitors about local MPAs to improve regulatory compliance. To evaluate the effectiveness of the pilot effort the Collaboratives took a threefold approach:

- *Compliance Surveys* - utilizing docents/volunteers/staff to collect information directly from coastal visitors regarding their awareness of MPAs and whether additional signage would promote changes in awareness and compliance.
- *Analyzing MPA Watch Human Activities Data* – utilizing ongoing data collection at survey sites near the digital traffic signs to determine if significant changes could be detected.
- *Polling volunteers and staff for feedback on the pilot project* – lastly we gathered feedback and lessons learned from our local experts: our volunteers/staff/and local experts familiar with the area and project.

This pilot project provides insights into the status of MPA awareness, compliance, and effectiveness of digital highway sign deployment in two remote areas of the north coast of California. Findings from this pilot project include lessons learned, opportunities, and next steps.

Activities

Planning:

Sign Placement - Mendocino and Sonoma MPA Collaborative partners identified priority digital sign locations with high visitor attendance and concerns regarding impacts to the habitat (maps 1 and 2). Sign placement locations were limited to State Parks lands for the pilot project. Highway sign locations were approved by the Collaborative partners and by the California Department of Fish and Wildlife (DFW).

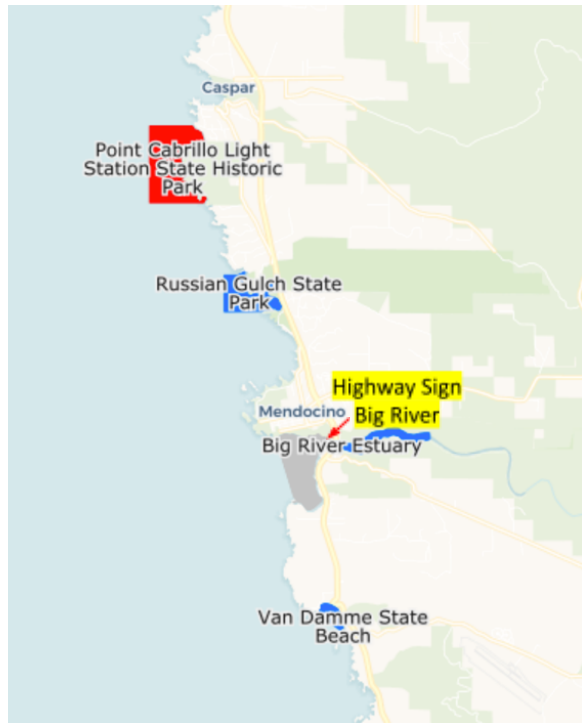
- Mendocino County - Big River was identified due to high visitation in the summertime, increased use by locals as a place to swim due to the pandemic, and prevalence of dogs off leash violations. (map 1).
- Sonoma County - Bodega Head and Goat Rock were chosen due to high human use and breeding harbor seals and seabirds (map 2).

Sign Messaging -The highway signs selected for this pilot project could be programmed with three messages that would cycle on a loop. The collaboratives identified MPA and

county-specific messages relevant to the location. Messages were limited by character restraints, and some creative abbreviations were necessary. Highway sign messages were approved by the Collaborative partners and by DFW.

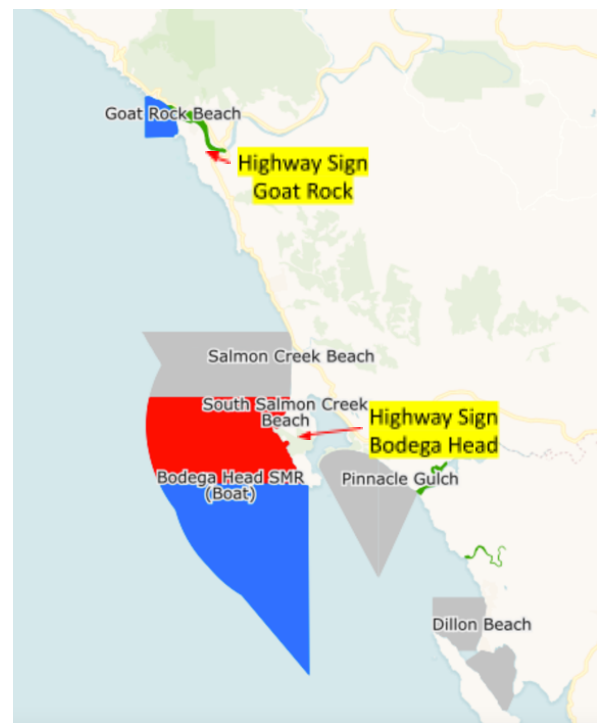
- Mendocino County - MARINE PROTECTD AREA, RESPECT WILDLIFE STAYBACK, WATCHFOR SWIMMERS LEASHDOG (Map 1)
- Sonoma County - MARINE PROTECTD AREA, RESPECT WILDLIFE STAYBACK, WILDLIFE .CA.GOV /MPAS (Map 2)

Mendocino County



Map 1: Mendocino MPA Watch Locations (State Parks) And Highway Sign placed at Big River Access Road.

Sonoma County



Map 2: Sonoma MPA Watch Survey sites used for analysis (Beach Watch, a project of the Greater Farallones Association and National Marine Sanctuary)

Compliance Surveys: Staff and volunteers from Mendocino State Parks, Greater Farrallones Association (GFA) and Greater Farallones National Marine Sanctuary’s Beach Watch project, and Stewards of the Coast and Redwoods visitor center conducted surveys with visitors to inform an evaluation of the digital signage effectiveness for increasing MPA compliance. The Collaborative partners and CA DFW approved compliance survey questions prior to launch.

Compliance Survey Questions:

1. Do you know what a Marine Protected Area is?
2. Do you know if you are in a Marine Protected Area?
3. Did you see a highway sign with Marine Protected Area Messaging?
4. Did the sign change your behavior?

Volunteer training was provided via a recorded presentation. Additional supplemental materials to inform volunteers about MPAs in general such as [MPA Docent Training Modules](#) training series. MPA brochures and stickers were provided to volunteers to distribute to people interested in more information about MPAs. Compliance surveys (Appendix 1) were conducted by staff or volunteers in visitor centers or on beaches at any time during digital highway sign deployment, April 1-July 31 2022. Survey data were entered and checked for entry accuracy by GFA staff. Compliance survey results were summarized by county, identifying the results of the four questions and reporting any additional notes taken.

MPA Watch Data Collection Activities: Ongoing MPA Watch data collection from Mendocino State Parks and GFA Beach Watch was leveraged to compare pre-sign deployment human activities (April-July of 2021) and during sign deployment (April-July 2022) to test if any change in activities could be detected between the two time periods.

Human activity grouping used for analysis: We used four human use category groupings for this analysis focusing on land based activities and dogs:

- Total Consumptive Land Based Activities – this includes any take activity from the shore including fishing, trapping, collecting intertidal animals, algae, etc.
- Total Non-Consumptive Land Based Activities – this includes any recreational activities including walking, running, lounging, wildlife watching.
- Total Animals off leash – Dogs off leash.
- Total Animals on Leash – Dogs on leash.

These activity category groupings can be inspected further to determine what specific categories drive a significant change if one is found.

Survey sites used for analysis: We used MPA Watch data from survey sites near digital sign installations. We include MPA and adjacent non MPA sites where available as attendance may have varied depending on this status. Survey counts or sample size of surveys varied from site and region. Only surveys with adequate survey sample size within the four-month time period in each year were included in statistical analyses (figure 1).

Figure 1. Sample sizes of surveys per site April 1-July31 (n)

Sonoma Survey Sites	2021	2022
Doran Beach	9	8
Goat Rock Beach*	9	9
Miwok Beach	9	8
North Jenner Beach*	7	5
Salmon Creek Beach	9	8
South Salmon Creek Beach*	9	9
Russian River Spit*	9	9
Mendocino Survey Sites	2021	2022
Big River – Estuary*	0	10
Big River - River Mouth*	0	17

Point Cabrillo*	0	3
Russian Gulch*	3	3
Van Damme*	0	0

Post Sign Deployment Feedback: Following the 4-month sign deployment we sought feedback from volunteers, staff, and knowledgeable locals. We asked the following questions:

1. Do you think the timing of highway sign deployment, April 1-July 31 was effective to protect resources in this area? (responses 1-5, not effective to affective, and open comment)
2. Do you think the placement of signs was effective in informing visitors in the area? (responses 1-5, not effective to affective, and open comment)
3. Do you think the sign messaging was effective to alert visitors to seek more information about MPA regulations in the area? (responses 1-5, not effective to affective, and open comment)
4. Do you have any ideas for new ways to inform the public about MPA regulations in the area? (open comment)

Summary and Recommendations: Lastly we provide a summary of the key findings and provide recommendations for future endeavors building from the lessons learned in this pilot project. Following the sign deployment, we invited feedback from more than 200 volunteers and staff who participated in either compliance surveys, MPA Watch surveys, and/or are local experts. This feedback poll asked targeted questions to gather additional perspectives and lessons learned from our highly experienced volunteer pool.

Results

Compliance Survey Results

Compliance surveys were completed April 1-July 31 2022 by trained volunteers and staff on the beach or in nearby visitor centers. Members of the public were invited to participate in the survey which consisted of four questions and optional additional comments. Volunteers or staff provided brochures and answered questions about MPAs. Volunteers were not trained to or asked to enforce MPA or land manager regulations. Mendocino had one sign placed on the Big River access road and Sonoma had two signs placed at the Goat Rock access road and Bodega Head access road.

Mendocino County Compliance Survey Results (Appendix 1):

- 17 people were surveyed from April 1-July 31 2022 (58% in visitor centers and 41% on the beach);
- 67% of people surveyed knew what a Marine Protected Area was;
- 76% of people surveyed knew if they were in a Marine Protected Area;
- 12% of people saw the MPA Highway sign;
- 0% of people reported changing their behavior after seeing the Highway Sign.

Sonoma County Compliance Survey Results (Appendix 2):

- 71 people were surveyed from April 1-July 31 2022 (46% in visitor centers and 54% on the beach);
- 73% of people surveyed knew what a Marine Protected Area is;
- 66% of people knew if they were in a Marine Protected Area;
- 49% of people saw the MPA Highway sign;
- 16% of people reported changing their behavior.

Human Activity Analysis Results

We utilized ongoing MPA Watch human activity data collection in Mendocino and Sonoma to determine if a significant change in human activities was measurable prior to and during sign deployment April 1-July 31 2021 and April 1-July 31 2022. For each beach we compared annual rates (for the 4-month period) of occurrence for the following activity groupings: “total consumptive land-based activity”, “total non-consumptive land-based activity” and “animals on leash” and “animals off leash”. To determine if a significant change could be detected between the two years we conducted a one-way MANOVA (Multivariate Analysis of Variance) for the mean rate of encounter for each activity group at each site between 2021 time period and 2022 4-month period (April 1 - July 31). We used a T-test for sites that only have encounters for one data group (i.e. non-consumptive land use between 2021 and 2022). Two-sample t-tests, to test whether the means of two populations are different, were conducted for each beach site where only one dependent variable was observed. There were no significant differences found in either nonconsumptive land use or in off leash animals between years for any site.

Mendocino Results (Appendix 3)

The Mendocino survey sites did not have sufficient annual monitoring within the given time period to be able to compare annual mean differences. Only Russian Gulch had surveys in the 4-month time period both in 2021 and 2022. However, with only 3 surveys per group, this was not sufficient to analyze.

Sonoma Results (Appendix 4)

While most Sonoma Beaches had a sufficient number of surveys to perform an analysis, some sites did not have any or very few observations of either land use or animals during those surveys. Because of this, these instances could not be statistically analyzed. There were no significant differences, or change, found in the mean number of people observed in consumptive and non-consumptive land use between 2021 and 2022 for any site. There was also no significant difference in the mean number of animals on leash and off leash between 2021 and 2022 for any site. No change was found from pre-sign deployment (2021) to during sign deployment (2022).

Post Sign Deployment Polling Volunteers and Staff Results

Upon completion of the sign deployment period (April-July) we polled our volunteers, staff, and local experts for feedback on what they observed. 22 of 25 (88%) of respondents agreed that the sign deployment time period April-July was “somewhat effective” to “very effective” to protect resources in this area. 17 of 25 (68%) respondents agreed that the sign placement was

“somewhat effective” to “very effective” to inform visitors in the area. And 21 of 24 (84%) respondents felt that sign messaging was “somewhat effective” to “not effective”.

Summary of the spectrum of feedback on sign messaging:

- Driving by the sign does not give people enough time to grasp MPA messaging,
- Limited cell coverage may have prevented people from accessing more information about the local MPAs,
- Sign messages were incomplete and cryptic,
- Messages were only in English,
- Signs were an effective and complementary outreach tool during peak visitation season.

Summary of feedback on additional approaches to promote compliance and outreach:

- Highway signs were marvelous, suggested adding locations such as at the Jenner kayak boat launch,
- People suggested moving the Highway signs closer to access points (as some of them were a mile away or more),
- Concern over light pollution since the signs were on at night,
- People suggested that the more detailed permanently installed signs at access points were more effective,
- Docents on the beach providing handouts would be effective.

Summary and Recommendations:

88 compliance survey responses collected during this pilot project give us a new glimpse into MPA public knowledge and compliance in this region. 72% of respondents were familiar with MPAs, and most of these were able to identify if they were currently in one. 12% told us that they changed their behavior due to pilot project signage (all of these were in Sonoma County). 28% of people surveyed were not informed about MPAs at the time they responded to the survey questions, however, they had one-on-one contact with a volunteer who informed them about MPAs and directed them to additional information. Overall, MPA Collaborative members were impressed at the number of respondents who knew about MPA's, and who self-reported that they changed their behavior due to seeing the highway sign messaging. For the 28% who did not already know about MPA's, we were able to provide a one-on-one outreach opportunity.

We did not detect any significant change in human use activity between April 1-July 31 2021 and 2022 in either county. Based on the number of surveys conducted, we were able to test for large effects only so some small change from our pilot project may not have been detected due to limited power due to survey effort. For future attempts, the limitation to a four-month time period to match the sign deployment limited our survey sample size, most of the Sonoma sites had adequate sample size during the time period and across years, but not all. We had more limitations due to sample size in Mendocino. Second, this region is remote and the number of activities documented is relatively low, this was compounded by the sample size limitations.

Given the unique characteristics in the region we recommend 18 surveys per treatment period to improve statistical power for future comparisons.

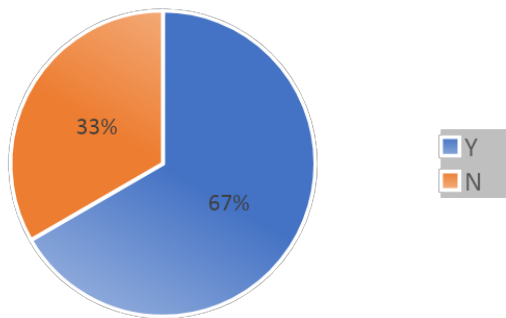
This pilot project allowed Mendocino and Sonoma Collaboratives to deploy highway signs with MPA Messaging to increase compliance at local MPAs by adding another outreach tool during a peak season. Timing of sign deployment was broadly supported by those knowledgeable in the area to support outreach at peak visitation season and coincide with harbor sea and seabird breeding. Some found the signs to be an effective supplemental approach by alerting people entering the area that MPAs were in the area, then seeing more detailed MPA signs at parking lots and access points. Through the pilot project and feedback, we have identified some opportunities for improvement. Regarding the sign itself, we identified limitations in effective messaging due to character restrictions on signs, need for improved sign location by moving closer to access points which may involve permitting with land managers. Monitoring for effectiveness is always challenging and rewarding. Our threefold survey approach provided valuable insight into public awareness of MPAs, current human uses, compliance, and avenues to increase compliance. An increased frequency of human use surveys would be useful to identify changes due to a public outreach campaign. Overall, there is probably no single approach that will ensure MPA compliance and promote best practices in our coast and communities. A multi-faceted approach including various sign types, outreach docents who are trained in best practices for diversity, equity, and inclusion, bilingual signs, and brochures are likely all players in long-term best practices.

Appendices

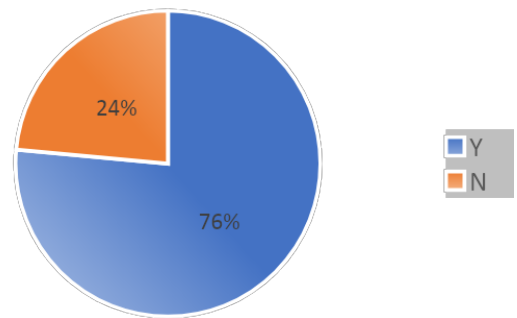
Appendix 1 - Mendocino County Compliance Survey Results

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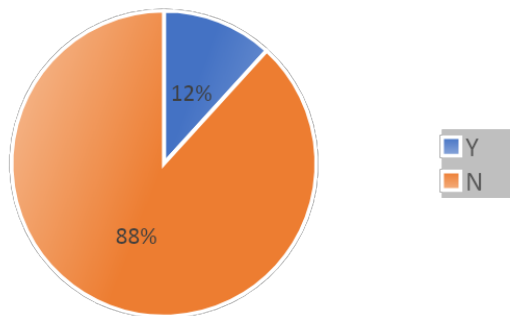
Do you know what an Marine Protected Area is? (n=17)



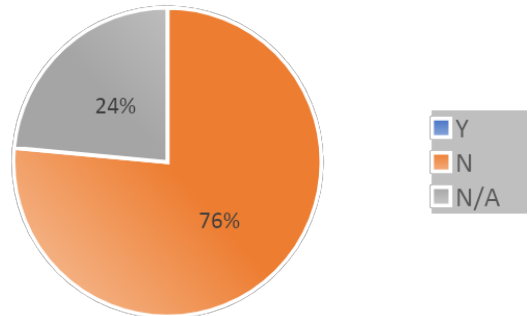
Do you know if you are in a Marine Protected Area? (n=17)



Did you see a highway sign with MPA Messaging? (n=17)

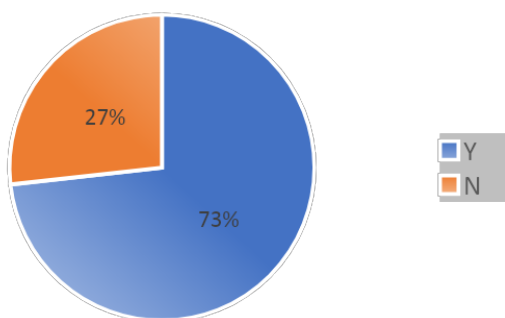


Did the sign change your behavior? (n=17)

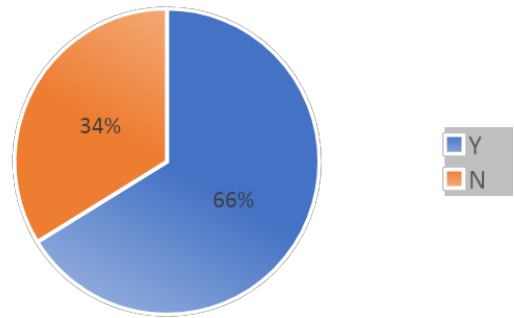


Appendix 2 - Sonoma County Compliance Survey Results

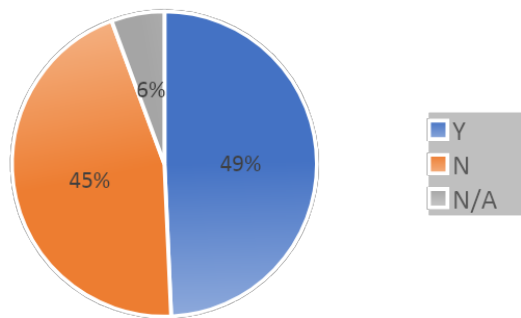
Do you know what a Marine Protected Area Is? (n=71)



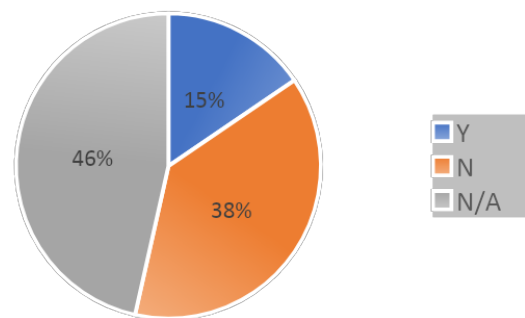
Do you know if you are in a Marine Protected Area? (n=71)



Did you See a Highway Sign with MPA Messaging? (n=71)

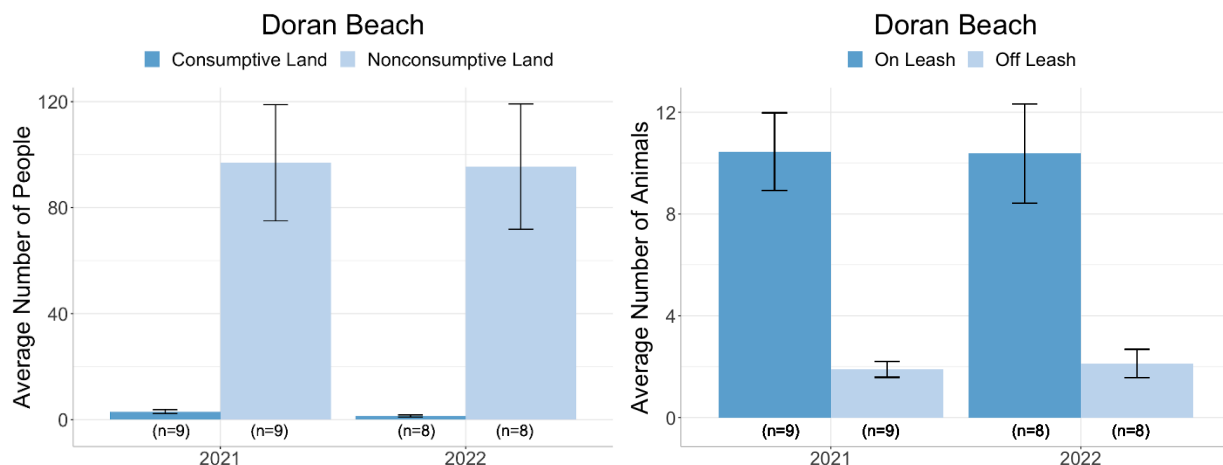


Did the sign change your behavior? (n=71)

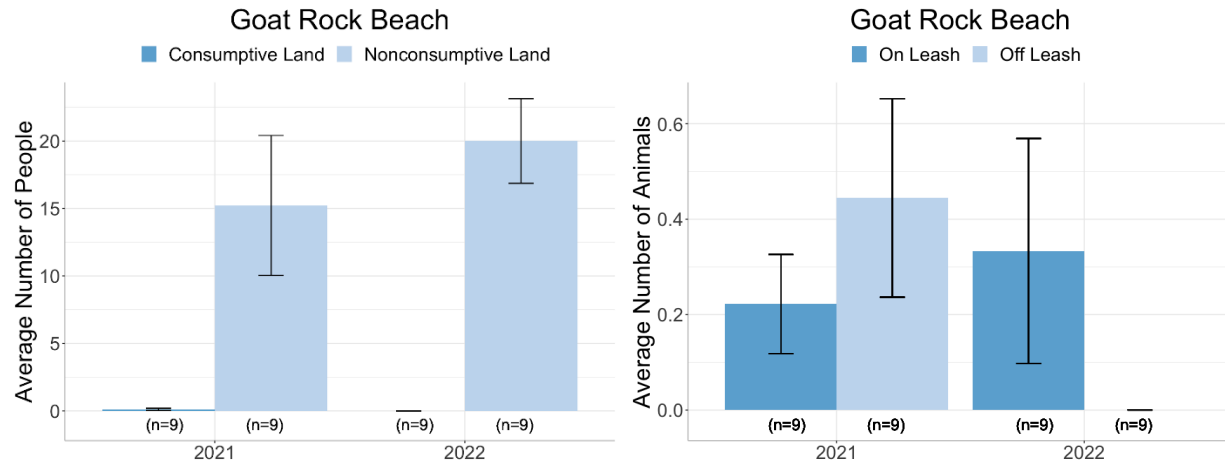


Appendix 3 - Sonoma County Human Use Comparison Between 2021 and 2022

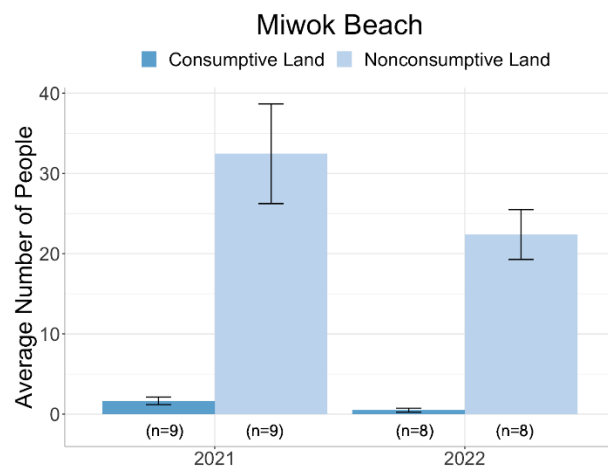
Doran Beach (Non-MPA) – Non-consumptive or recreational activities were the dominant use in both 2021 and 2022, with consumptive or take activities remaining a rare occurrence in both years. Dogs on and off leash were also consistent between 2021 and 2022. Park regulations require dogs to be leashed at all times, dogs off leash are a violation at this site.



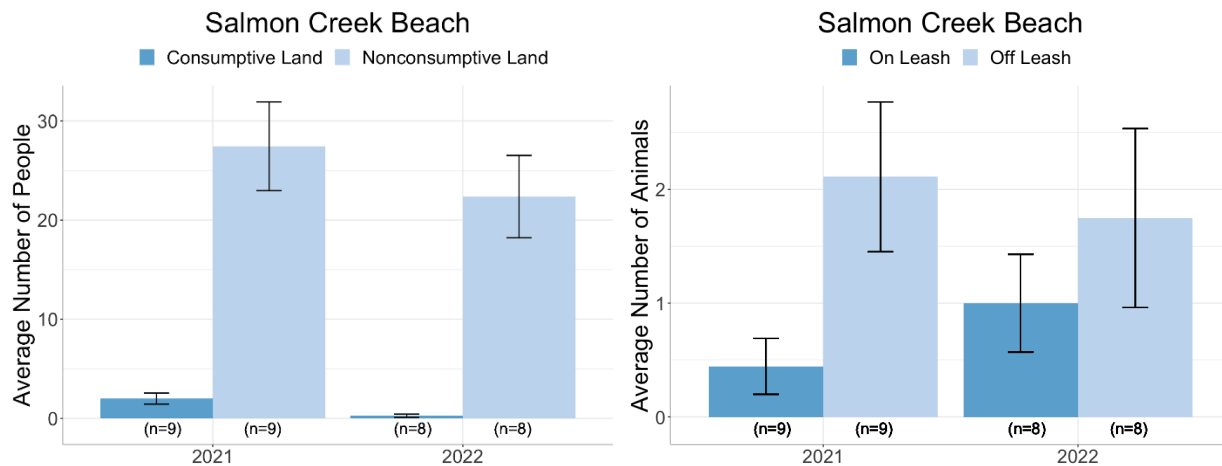
Goat Rock Beach (MPA) – Non-Consumptive or recreational activities are the dominant use at Goat Rock beach, with almost no consumptive or take activities observed in 2021 or 2022. We observed a non-significant yet notable increase in leashed dogs at Goat Rock and a change in off leash dogs from 2021 to none in 2022.



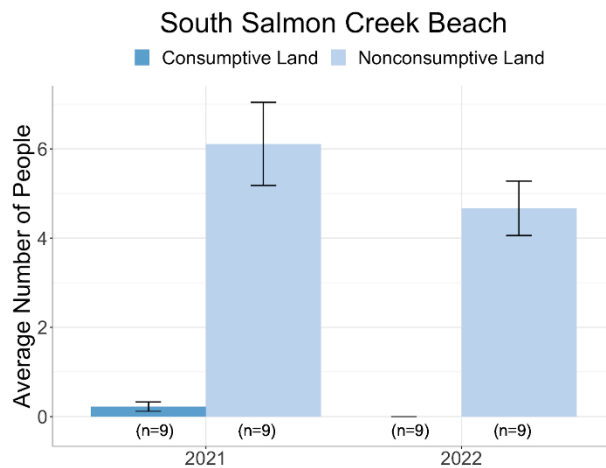
Miwok Beach (non-MPA) – Non-consumptive or recreational activities were the dominant use in both 2021 and 2022. A non-significant decrease in these recreational activities was observed in 2022. Dogs on and off leash were extremely rare at Miwok Beach during these time periods. Only 4 animals were observed and all were on leashes (2 in 2021 and 2 in 2022).



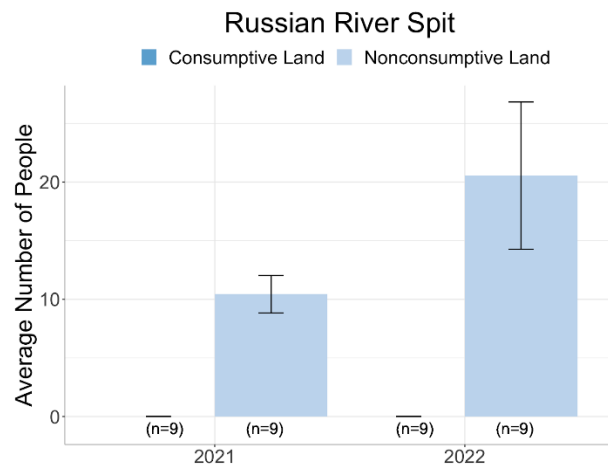
Salmon Creek Beach (non-MPA) - Non-consumptive or recreational activities were the dominant use in both 2021 and 2022. Dogs on and off leash were a regular occurrence in both 2021 and 2022, a slight non-significant shift towards more dogs being leashed was observed.



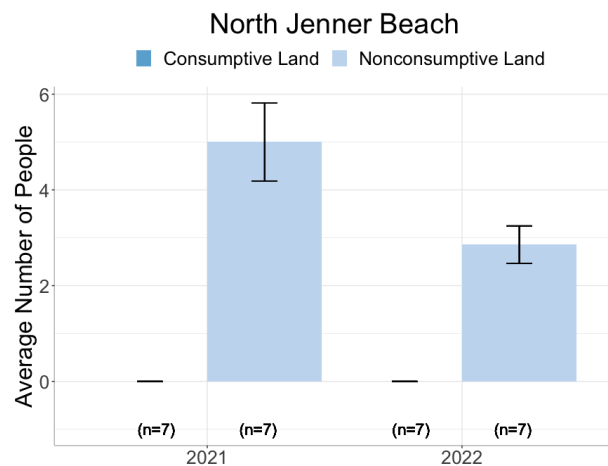
South Salmon Creek Beach (MPA) - Non-consumptive or recreational activities were the dominant use in both 2021 and 2022. No observations of animals on leash were made at this site. Animals off leash were analyzed using a T test and there was no significant change between years.



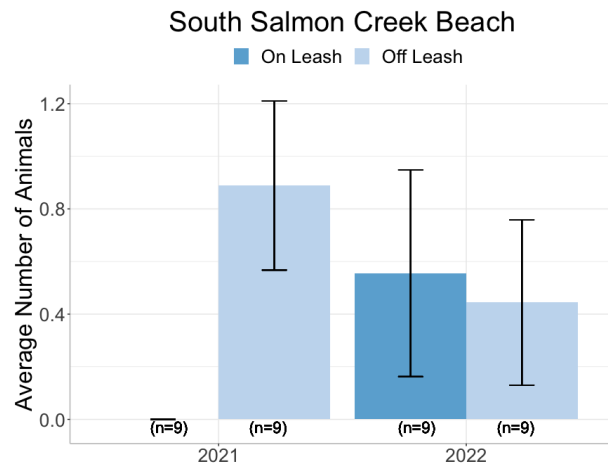
Russian River Spit (MPA) – Recreational use was the only use at this site with no significant change from 2021 to 2022. No observations of consumptive land use were made at this site. Only one observation of an animal was made (on leash in 2022).



North Jenner Beach (MPA) - Recreational use was the only use at this site with no significant change from 2021 to 2022. No observations of consumptive land use or animals were made at this site.



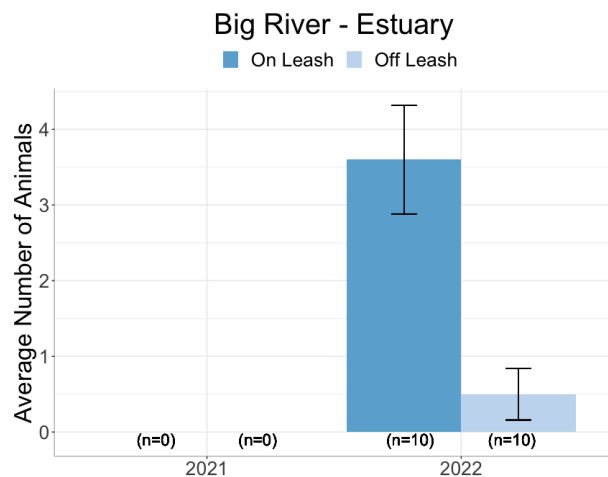
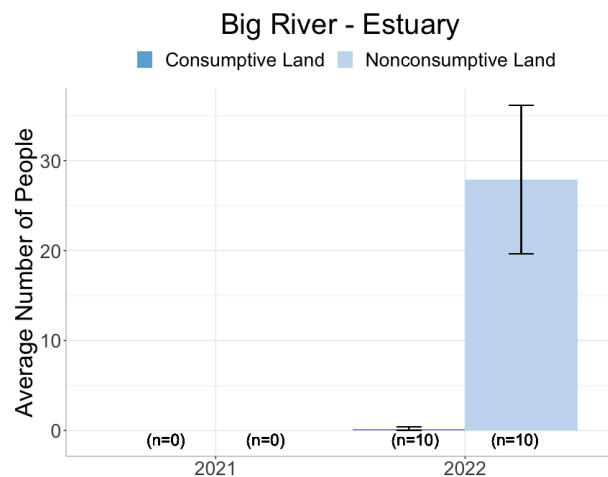
South Salmon Creek Beach (MPA) - Recreational use was the only use at this site with no significant change from 2021 to 2022. No observations of animals on leash were made at this site. No significant difference was found in off leash animals between 2021 and 2022



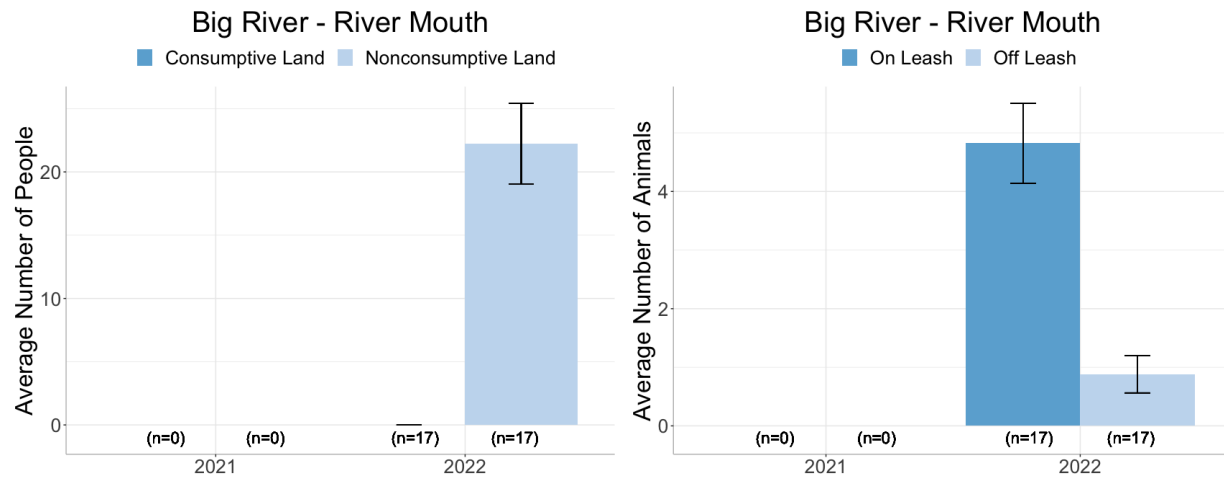
Appendix 4 - Mendocino County Human Use Comparison Between 2021 and 2022

Due to limited survey sample size the Mendocino survey sites did not have sufficient annual monitoring within the given time period sufficient to analyze. The following figures show the average occurrences of each variable for the available data.

Big River - Estuary

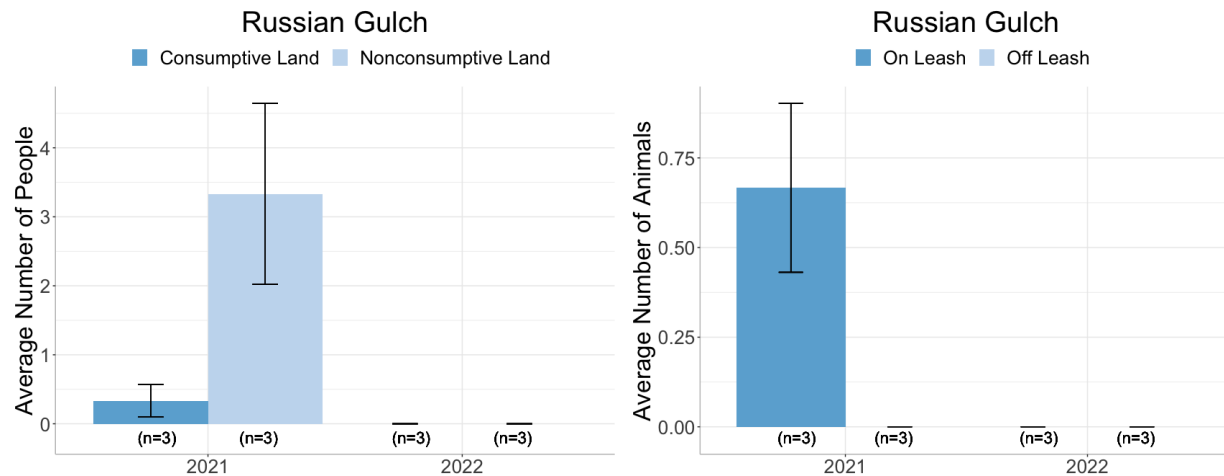


Big River - River Mouth



Point Cabrillo - Three surveys took place in 2022 within the specified four-month time period. No observations were made of consumptive land use, non-consumptive land use, animals on leash, or animals off leash.

Russian Gulch



Van Damme - No surveys were conducted in either 2021 or 2022 within the 4-month time period.

Power Analysis Results

There were no statistically significant differences found in any of the above analyses and we therefore we found no relationship between pre-sign deployment 2021 and during sign deployment 2022 in land use or animals.