Sole Source Justification:

The lead PI (Dr. Troy Hall) has conducted research and projects for over 20 years on visitor use impacts to ecological systems. Dr. Hall has over 20 peer-reviewed and 30 other publications in these areas, with several key citations noted in her attached CV. And she is familiar with resources in GGNRA, specifically, as she completed a comprehensive State of the Parks Report on natural resource conditions and priorities for research here.

Dr. Hall has assembled a unique research team, many of whom are already familiar with GGNRA, to work in concert with GGNRA's project management and natural resource staff, to specifically address the development of a dog management monitoring plan with the most representative indicators of such impacts on both visitors and GGNRA natural resources:

- Dr. Ashley D'Antonio-A recreational ecologist, with over 8 years of professional experience and 7 publications almost exclusively in national parks, has completed studies on the impacts of visitor uses in national parks, and the application of resource assessment techniques in urban proximate environments.

- Dr. Lisa Ganio -An interdisciplinary statistician with 27 years of professional research experience with multi-scaled and spatial statistical analyses research on environmental impact topics,and 52 peer-reviewed publications on related topics(CV attached). She has provided consulting services for state and federal agencies and has been enlisted by the State of Oregon for her interdisciplinary statistical expertise in developing field-based sampling programs. She has also taught both graduate and undergraduate courses as well in experimental design, sampling, and statistical analyses for almost 20 years.

- Deonne VanderWoude –A nationally-known, human dimension program manager of public lands with a Masters in Environmental studies and a BA in Environmental Anthropology with over 10 years of professional experience in the research and development of the only science-based, dog management monitoring program in the nation. She has authored 5 publications on directly related programs(CV attached)which have included developing both indicators and field-tested protocols with standards for dog management in a park with similar trail mileage and open space.

- Jules Evens-a nationally-recognized, California shorebird expert with over 25 years of professional experience and over 15 related publications. Mr. Evens has completed bird studies and inventories in GGNRA and contributed to the analyses of recreational impacts of dogs on birds in GGNRA.(CV not available at this time since he is on vacation and out of area).

- Dr. Jeremy Wimpey-a recreational ecologist with a specialty in geospatial environmental analysis and 11 years of professional experience in this area, has published or co-authored 14 related research papers on trail monitoring of the recreational impacts on ecological systems with development of spatial observation zones for representative protocols (see CV).

Time is now of the essence as this is also a foundational element required for the implementation of the final dog management rule expected to be published early in 2017 per NPS commitments in the Final Environmental document with a required implementation date of September 2017 for the final monitoring program. This project requires field visits, consultation and coordination with NPS staff, (2) external peer reviews, and public meetings; so, 10 months is the minimum possible timeframe for completing the work with the monitoring program required as a condition of implementing the dog mgt final rule on 1 October, 2017.

Vital Signs Monitoring

Overwintering western snowy plover monitoring was conducted for the 23rd consecutive year on GOGA beaches in San Francisco, with this being the second year under an approved protocol. Snowy plovers and other shorebirds were counted, as well as various potential sources of disturbance, within each designated beach segment.

Public Interest Highlights

The maximum count and winter season average count of snowy plovers were both above long term averages, with a record count of 104 snowy plovers observed during a survey on Ocean Beach in January. Crissy Field holds a smaller population of overwintering snowy plovers, but also saw a record count of nine plovers on the beach. This trend is possibly associated with a strong breeding year and high overwinter survival due to mild winter conditions. The fencing and signage installed at Crissy Field in 2010 appear to be improving compliance with dog leash regulations and possibly a factor in reduced overall public use of the site, which has allowed dune vegetation to spread out on the beach.

Other Highlights

The San Francisco Chronicle published an article about the high number of plovers observed on Ocean Beach

Other Notes from 2016

- PORE and GOGA western snowy plovers: SFAN and park staff participated in winter and breeding season regional plover surveys for USFWS tracking; SFAN staff and GOGA used snowy plover monitoring data to inform sand movement projects at Ocean Beach in coordination with the City and County of San Francisco. GOGA hosted six public informational meetings on the Proposed Rule for Dog Management in the GGNRA between March 22-31, 2016. Over 600 people participated in these meetings in Marin, San Francisco, and San Mateo Counties.

Attachment B – Budget

Budget
Monitoring Impacts of Dogs in the Golden Gate National Recreation Area
Principal Investigator: Dr. Troy Hall
10/15/2016 – 12/31/2017

Category	Description	Rate	Units	Amount	Total
SALARIES		**monthly**	**months**		
	Lead PI - Troy Hall	$13,735	1.9	$25,991	
	CoPI - Ashley D'Antonio	$8,889	3.4	$29,898	
	Other Professional - Lisa Ganio	$9,300	2.1	$19,530	
	Graduate Student (MS)	$3,798	2.94	$11,166	
	Undergraduate Student Hourly	$25	0.65	$2,750	
Subtotal					**$89,335**
BENEFITS					
	Lead PI - Troy Hall	39%		$10,136	
	CoPI - Ashley D'Antonio	45%		$13,454	
	Other Professional - Lisa Ganio	43%		$8,398	
	Graduate Student (MS)	32%		$3,573	
	Undergraduate Student Hourly	8%		$220	
					$35,781
TRAVEL	**(see narrative for details)**	**per trip**	**# trips**		
	SF, CA Task 2	$2,110	4	$8,440	
	SF, CA Task 3	$1,821	3	$5,463	
	SF, CA Task 5b&c	$2,092	3	$6,276	
	SF, CA Task 6	$1,327	1	$1,327	
	Norfolk, VA George Wright Society	$8,112	1	$8,112	
Subtotal					**$29,618**
SUPPLIES					
	Books/Printed Material	$500	1	$500	
Subtotal					**$500**
OTHER FEES & SERVICES					
	Facilitator Fees (SF public meetings)	$1,500	3	$4,500	
	Consultant - Deonne VanderWoude	$75,815	1	$75,815	
	Consultant - Jules Evens	$11,796	1	$11,796	
	Consultant - Jeremy Wimpey	$10,800	1	$10,800	
	Contingency (see narrative)	$25,000	1	$25,000	
Subtotal					**$127,911**
TUITION	(exempt from indirects)				
	Grad tuition - 2 academic terms	4575	2	$9,150	
Subtotal					**$9,150**
DIRECT COSTS					**$292,295**
INDIRECT COSTS		MTDC	17.5%	$283,145	**$49,550**
TOTAL PROJECT COSTS					**$341,845**

Budget Narrative – Oregon State University

Salaries & Wages - $89,335

- Troy Hall (PI) will coordinate work among the project team, guide overall development of monitoring approaches, provide review of documents and deliverables, facilitate meetings with National Park Service staff, and participate as subject matter expert in public meetings.
- Ashley D'Antonio (co-PI) will be lead subject matter expert related to ecological impacts of dogs (e.g., impacts to birds, wildlife, and vegetation), including development of indicators and creation of monitoring protocols for those indicators. She will also be responsible for all geospatial analyses and products necessary for protocols. She will participate in all field visits, serve as subject matter expert during public meetings, and work with contractor on staff training.
- Lisa Ganio will be the project statistician, responsible for developing sampling plans and drafting the narrative justifications for sampling. She will participate in site visits and serve as subject matter expert during public meetings.
- A undergraduate student at $25/hour, 8% OPE, will be an hourly wage employee responsible for conducting a literature review on ecological impacts of dogs and developing potential indicators.
- Graduate Student (GRA) salary (for a MS student) is included for 6 months (summer and fall, 2017) to conduct data analysis and draft the example report.

Fringe Benefits - $35,781

Fringe benefits follow Oregon State University institutionally, are specifically identified to each employee and are charged individually as direct costs. Benefits include FICA, PERS, MEDICAL/DENTAL/LIFE INSURANCE, LIABILITY INSURANCE, UNEMPLOYMENT & LONG-TERM DISABILITY INSURANCE, STATE ACCIDENT INSURANCE FUND, EXECUTIVE DEPARTMENT PERSONNEL DIVISION AND EMPLOYEE RELATIONS BOARD ASSESSMENT.

Travel – Domestic – $29,618

NOTE- These funds are for OSU travel only. Consultant travel costs for VanderWoude, Wimpey and Evans are included in the consultant services budget below.

- Funds are requested for 2 OSU employees x 2 trips to travel to SF, CA for Task 2 (GGNRA field visits and meetings with park specialists). Costs per person per trip are calculated as follows: airfare $650 plus per diem $68/day x 6 days+ $200/night x 5 nights for 1 person = $2058; ground transportation $51.5; per person per trip total = $2110 x 2 people x 2 trips = $8440.

- Funds are requested for 3 OSU employees to travel to SF, CA for Task 3 to conduct a 3-day workshop with GGNRA leadership. Costs for the trip are calculated as follows: airfare $650 plus per diem $68/day x 5 days+ $200/night x 4 nights for 1 person = $1790; ground transportation $31; per person total = $1821 x 3 people = $5463.

- Funds are requested for 3 OSU employees to travel to SF, CA for Tasks 5b&c to facilitate public meetings. Costs for the trip are calculated as follows: airfare $650 plus per diem $68/day x 6 days+ $200/night x 5 nights for 1 person = $2058; ground transportation $34.33; per person total = $2092 x 3 people = $6276.
- Funds are requested for 1 OSU employee to travel to SF, CA for Task 6 to train field staff on adopted protocols. Costs for the trip are calculated as follows: airfare $650 plus per diem $68/day x 3 days+ $200/night x 2 nights for 1 person = $1254; ground transportation $73; per trip total = $1327.

- Funds are requested for 3 OSU employees to travel to Norfolk, VA George Wright Society to present results from the project. Costs for the trip are calculated as follows: airfare $1200 plus per diem $57/day x 7 days+ $110/night x 6 nights for 3 people = $6777; ground transportation $210; registration $1125; per trip total = $8112

Supplies – $500

Fund are requested for books/printed material ($500) to support Task 1 which involves a comprehensive literature review, which will require purchase of books and printing of documents. (The Supplementary Environmental Impact Statement, which is the foundation for this work, is 1200 pages.)

Other Fees & Services - $127,911

- $4500 is requested to contract a facilitator who will run 3 public meetings in San Francisco estimated at $1500 per meeting.

- Consultant Services (Contracts)
  - $75,815 - Deonne VanderWoude is a national leader in monitoring impacts of dogs. She will be the lead subject matter expert for all work related to describing and monitoring human impacts of dogs (visitor conflict, dog behavior, etc). She will be the lead author on all documents. She will participate in all field visits and work with D'Antonio on staff training.
  - $10,800 - Jeremy Wimpey is a national leader on geospatial techniques used in monitoring ecological impacts of recreation. He will provide review and consultation services.
  - $11,796 - Jules Evans is a specialist of endangered shorebirds. He will provide expertise regarding the location and identification of species of concern, input on relevant indicators, and review of protocols for monitoring impacts to birds.

- $25,000 is included for miscellaneous contingency expenses, which may include unexpected vehicle costs (rentals if additional staff accompany field trips), potential air fare increases, meeting room rental charges (meeting locations have not yet been identified), rental of AV equipment for public meetings, and printing of posters and other print material. An email from the sponsor (NPS) authorizing the inclusion of this category and amount is included with the proposal. Oregon State University Office of Sponsored Research Award and Administration office has reviewed and approved.

Tuition - $9,150

Graduate student tuition and fees for 2 academic terms are included in the budget. Per term cost is $4,575 and is exempt from indirect costs.

Total Direct Costs - $292,295

Indirect Costs - $49,550

The CESU rate of 17.5% is applied to a base of $283,145 using modified total direct costs (tuition is excluded).

Total Project Costs - $341,845

PACIFIC NORTHWEST COOPERATIVE ECOSYSTEM STUDIES UNIT
Task Agreement Number [FBMS will assign agreement number, Contracting will insert]
Under
Cooperative Agreement Number P16AC00003
Between the
United States Department of the Interior
National Park Service
and
Oregon State University, School of Forestry(Department of Forestry, Ecosystems and Society)
DUNS No: 053599908
140 Peavy Hall, 3100 SW Jefferson Way, Corvallis, OR 97333

CFDA: 15.945, Cooperative Research and Training Programs – Resources of the National Park System (CESU)
Project Title: Development of GGNRA Dog Management Monitoring Program and Protocols
Amount of Federal Funds Obligated: $341,845.
Total Amount of Task Agreement Award: $341,845.
Period of Performance: 11/28/2016-12/31/2017

This Task Agreement by and between the National Park Service (NPS) and Oregon State University, Department of Forestry, Ecosystems and Society(ORSU/FES) is issued against the Pacific Northwest Cooperative Ecosystem Studies Unit Cooperative and Joint Venture Agreement, P16AC00003, for the purpose of mutual assistance in conducting a project entitled "Development of GGNRA Dog Management Monitoring Program and Protocols. " Unless otherwise specified herein, the terms and conditions as stated in the Cooperative Agreement will apply to this Task Agreement.

ARTICLE I – BACKGROUND AND OBJECTIVES

A. Background
Golden Gate National Recreation Area (GGNRA) is in need of assistance in developing a dog management monitoring program with protocols. This effort would include the generation of protocols for visitor use and biophysical impact-related indicators, and establish a field guide with protocols for the implementation of a dog management monitoring program. Additionally, this task order will facilitate dialogue with GOGA staff to identify the visitor experience and resource quality issues associated with managing 21 various park areas/named locations in the management unit for various types of dog walking use by private (public) and commercial dog walkers. Dog management issues in the SF Bay Area, and in GGNRA particularly, are incredibly contentious and have a long history of planning, and public engagement. The history of dog walking in some areas of GGNRA began prior to the establishment of the park, when dog walking, including off-leash dog walking, occurred informally at sites under various public jurisdictions in San Francisco and Marin counties. In the park's early years, those practices continued largely uninterrupted in spite of the existence of the NPS pet regulation(36 CFR 2.15) prohibiting off-leash dog walking within areas of the National Park System Park staff recognized and documented issues arising from these practices during this time period.

The park's enabling act established the GGNRA Citizens' Advisory Commission, which coordinated public involvement for the park. In 1978, responding to input from dog walkers, the Commission developed a pet policy with input from park staff which provided general guidance for dog walking and recommended locations for both on-leash dog walking and off-leash or "voice control" dog walking in certain park areas. In 1979, the Commission recommended the pet policy to the park Superintendent, which included a recommendation that the NPS promulgate a special regulation to allow off-leash dog

walking in GGNRA. Although the NPS never promulgated this special regulation, for more than 20 years the recommended 1979 Pet Policy was unofficial practice in contravention of Service-wide regulations that require pets to be restrained on a leash no longer than 6 feet or otherwise physically confined at all times. 36 CFR 2.15.

Since the 1990s, the San Francisco Bay Area population and overall use of GGNRA lands have increased, as have the number of private and commercial dog walkers in the park. At the same time, the number of conflicts between park users with and without dogs has risen, as has the fear of dogs and dog bites or attacks. During this time, park staff have also gained greater knowledge of park resources. These resources include several species with habitat in areas used by dog walkers that have been listed as threatened, endangered, or special-status species requiring special protection, as well as both plant and animal species native to the area requiring protection under the NPS's broader mission and mandate.

Because the San Francisco Bay Area is highly urbanized and some adjacent city, county, and state public lands have either few or limited large areas available for dogs, or have more restrictions within their nearby county and state park lands, use by urban dog owners has been pushed onto NPS lands historically. For residents of San Francisco and Marin counties, and increasingly for San Mateo residents, GGNRA lands are their "backyards," and residents have come to expect NPS lands to be made available for dog walking and other recreational activities despite its national park status and primary mandate to preserve and protect park resources and values. In addition, the coastal areas within GGNRA are very popular parts of the San Francisco Bay Area, a region whose population is currently over seven million and is expected to grow to eight million by 2020. GGNRA visitation itself has grown from 7-8 million visits in the 70's when the earlier recommendation was developed to over 17 million visits per year now.

Underscoring the increasing conflict over off-leash dog use, dog walking groups and individuals have filed two lawsuits against the NPS when park management actions threatened the status of off-leash areas. The first lawsuit, in 2000, responded to the closure of a portion of an off-leash area that the park instituted to provide resource protection, restoration, and public safety. In 2004, a second lawsuit responded to an attempt by the NPS to transition and bring GGNRA into compliance with the NPS pet regulation as it proceeded with dog management planning. In both instances, the federal district court found that, except in an emergency, the NPS did not have the authority to either close or impose significant, long-term restrictions of public use of areas that had allowed off-leash dog walking pursuant to the 1979 Pet Policy, without first completing an environmental and rulemaking public notice and comment process. United States v. Barley, 405 F. Supp. 2d 1121 (N.D. Cal., June 2, 2005).

In 2002, the NPS issued an Advance Notice of Proposed Rulemaking asking for public input as to whether the NPS should consider developing a new regulation for dog walking in GGNRA. Following review of public comments, the NPS initiated planning under the National Environmental Policy Act of 1969 (NEPA), together with a Negotiated Rulemaking process, in an effort to develop a proposed rule with stakeholder input. The Negotiated Rulemaking Committee did not reach consensus on a proposed rule, but contributed to the development of a range of alternatives for the draft Dog Management Plan/Environmental Impact Statement (draft Plan/EIS) that was released for public comment in 2011. The resulting significant public comment necessitated a Draft Dog Management Plan/Supplemental Environmental Impact Statement (draft Plan/SEIS) that was released for public comment on September 6, 2013. The public comment period for the draft Plan/SEIS closed on February 18, 2014. The draft Plan/SEIS is available online at http://parkplanning.nps.gov/goga by clicking the link entitled "GGNRA Dog Management Plan" and then clicking the link entitled "Document List." In all instances, the development of this monitoring program for purposes of ensuring compliance will need to be consistent with the SEIS's references on pages 63-68 in Chapter 2, and help ensure that the park does not allow any impacts identified therein to approach or result in either impairment or an "unacceptable impact" as

identified in NPS Management Policies (2006)1.4.7.1 (Unacceptable Impacts) and 8.2(Visitor Uses).It will also have to adhere to all NPS regulations regarding the highest scientific integrity and the peer-review process as well as include public meetings.

TABLE 1. GOLDEN GATE NATIONAL RECREATION AREA PARK AREAS CONSIDERED FOR DOG MANAGEMENT MONITORING

(WILL PROVIDE MAPS FOR VISUAL REFERENCES AND AREAS INCLUDED)

Marin County
Stinson Beach (parking lots/picnic areas only;northern access trail to upton beach)
Homestead Valley
Alta Trail / Orchard Trail
Oakwood Valley
Muir Beach
Rodeo Beach & Vicinity/Marin Headlands
Rodeo Valley/Marin Headlands
Fort Baker
San Francisco County
Fort Mason
Crissy Field (including Crissy Field Wildlife Protection Area (WPA))
Fort Point Promenade / Fort Point National Historic Site (NHS) Trails
Baker Beach and Bluffs to Golden Gate Bridge
Fort Miley
Lands End
Sutro Heights Park
Ocean Beach (including Ocean Beach Snowy Plover Protection Area (SPPA))
Fort Funston
San Mateo County
Mori Point
Milagra Ridge
Sweeney Ridge(including Baquiano trail)
Rancho Corral de Tierra

B. Objectives

Investigators from ORSU/FES and NPS staff will collaborate to accomplish the following specific objectives.

The objectives of this project include the development, and initiation, of the monitoring program to fulfill the commitment in both the SEIS and FEIS of the development of monitoring-based management strategies (MMS). The Monitoring Program developed herein will address each of the 21 park areas in Table 1 above by identifying corresponding indicators and a range of standards for each along with a sampling program based on NPS priorities. The latter will allow for NPS decision-making at each park area/named locations for direct or indirect management actions, or further study if necessary based on targeted sampling programs and data collection. This monitoring program will assist the NPS in gauging the effectiveness of the dog management final rule and associated management actions in minimizing violations of the dog walking special regulation and avoiding or minimizing adverse impacts/effects on park resources and the quality of the visitor's experience across those same 21 park areas/named locations. This iterative process requires GGNRA to undertake baseline monitoring and then cyclical monitoring of these sites with indicators that are scientifically defensible and grounded. Additionally, this effort will include facilitating the generation, and management vetting, of standards in which GGNRA would assess results on an ongoing bases at these sites, and determine the need for a follow-up ladder of prospective management actions from indirect to direct based on the level of threat to park resources and the safety and quality of the visitor's experience. The program developed herein with protocols will be subject to peer review, including presentation by the PI at the George Wright Society annual conference for purposes of such expeditious review.

Other objectives of this project are to ensure that NPS can deploy this program in a cost effective manner and monitor ongoing compliance by collecting the data in the field, and integrating and analyzing the data efficiently through software applications, in preparation of annual reports documenting monitoring data collected and any consequent need for outreach, enforcement, and/or other management actions. This program will document and track any further non-compliance with the final rule/special regulation for follow-up consideration of short-term or longer term management actions, including short-term or long-term closures with public notice subject to 36CFR1.7, additional permitting or permit restrictions, and/or other management actions necessary to avoid approaching any "unacceptable impacts." This project will also assist NPS in completing a preliminary monitoring report providing baseline data after the first phase of monitoring.

Below are examples of the existing and proposed federal regulations, along with the new final rule, that will need to be addressed and operationalized such that they can be monitored for compliance thru a phased program:

- Vegetation damage: 36 CFR 2.1 (a) (1) (ii)
- Wildlife disturbance: 36 CFR 2.2(a)(2)
- Disturbance to threatened and endangered species: 36 CFR 2.2 (a) (2), 50 CFR Part 17
- Violation of areas closed to dogs (threatened and endangered species and sensitive habitat): New proposed Part 7 Special Regulation or 36 CFR 2.15
- Violation of areas closed to all (threatened and endangered species and sensitive habitat): 36 CFR 1.5 (f) or 36 CFR 2.15
- Violation of areas closed to dogs (safety): 36 CFR 1.5 (f), New Part 7 Special Regulation or 36 CFR 2.15
- Hazardous condition (aggressive behavior, pet rescues): 36 CFR 2.34 (a)
- Non-compliance with Use Designation (eg. dogs in no dog zone; off-leash in on leash zone): New 36 CFR Part 7 Special Regulation or 36 CFR 2.15

- Government property damage: 36 CFR 2.31 (a) (3)
- Pet excrement: 36 CFR 2.15 (a) (5).
- Uninvited or unwanted physical contact by dog(New proposed Part 7 Special Regulation)
- Unattended dog(New proposed Part 7 Special Regulation)
- Uncontrolled dog(New proposed Part 7 Special Regulation)
- Voice and Sight control(New proposed Part 7 Special Regulation)
- Violation of Special Use permit(New proposed Part 7 Special Regulation)

C. Public Purpose

The Golden Gate National Recreation Area has been undergoing a planning and rulemaking effort, for the past 12 years, which would allow dogs to be off leash, under voice control, in popular locations, as well as other areas where dogs can be walked on leash. An Advanced Notice of Proposed Rulemaking was published in 2002, a Negotiated Rulemaking Committee for Dog Management in GGNRA was created in 2006 (members were appointed by the Secretary of the Interior), and a draft Plan/EIS was released in 2011. In response to the draft Plan/EIS, a total of 4,700 pieces of correspondence, with approximately 8,000 substantive comments, were received from 29 states. A draft Plan/Supplemental EIS was released in 2013 to respond to the substantive comments on the draft Plan/DEIS and added the newest area of the park, Rancho Corral de Tierra. A final decision on the Rulemaking for dog management is expected by the end of 2016, and a subsequent implementation of a Dog Management and Monitoring Program in 2017 is legally required.

Common to all the alternatives that were considered in the EIS, was the implementation of a monitoring based management strategy, to monitor and reinforce normative compliance with future dog walking regulations which provide visitors clarity of both rules and authorized uses in different park areas; this will also allow staff to monitor and record noncompliance as well as impacts to natural and cultural resources, and inform park management and law enforcement when, where, and how to prioritize responses to noncompliance. To prevent unacceptable, adverse impacts to both park resources and other visitors, the Park would regularly monitor all sites according to a sampling design established through this research. When the level of compliance is deemed to be 'approaching an unacceptable level' based on violations and/or impacts to resources and/or other visitors, primary and secondary management actions such as focused enforcement of regulations, expanded outreach and education, establishment of activity buffer zones, time and use restrictions, and/or SUP restrictions would be implemented. The research into, and assessment and development of, indicators, standards and protocols are needed to provide a scientifically-based, visitor use management system with public understanding for measuring and monitoring both site specific impacts on park resources and other visitor uses and managing compliance with revised normative park regulations, as well as provide management with necessary site information upon which to further base its' actions.

NPS cannot accomplish this on it's own, given the staffing constraints and required monitoring program expertise. This agreement affords NPS a joint research opportunity with Oregon State University to provide a team with unique expertise in both visitor use and ecological monitoring along with dog management expertise in monitoring and local staff knowledge of resources and visitor use issues in GGNRA. This Cooperative Agreement is, as the SOW above clarifies, for the public purpose of developing adequate, coordinated, cooperative research and a localized training program concerning impacts on the park resources and visitors of the National Park Service.

ARTICLE II – LEGAL AUTHORITY

Pursuant to 54 USC §101702(b), to facilitate the administration of the System, the Secretary, under such terms and conditions as the Secretary may consider advisable, may—(A) enter into cooperative agreements with public or private educational institutions, States, and political subdivisions of States to develop adequate, coordinated, cooperative research and training programs concerning the resources of the System; and (B) pursuant to an agreement, accept from and make available to the cooperator technical and support staff, financial assistance for mutually agreed upon research projects, supplies and equipment, facilities, and administrative services relating to cooperative research units that the Secretary considers appropriate. This subsection does not waive any requirements for research projects that are subject to Federal procurement regulations.

ARTICLE III – STATEMENT OF WORK

This work outlined in this task order is performed in and with GGNRA, with technical assistance provided by the National Park Service Social Science Branch (SSB) in the Washington Office (WASO) and Natural Resources Stewardship and Science Directorate together with Oregon State University/Forestry, Ecosystems and Society(ORSU/FES) department. In monitoring the recreational impacts of dog walking under the proposed rule that is adopted, a management monitoring program is required that will include the development of indicators as proxies for key impacts within a design, sampling and protocol program of monitoring that allows for management decision-making for a park location while incorporating local NPS ecological expertise (especially with knowledge and expertise on wildlife, including shorebird and small and mid-size mammals, as well as native and sensitive vegetation) to fulfill the tasks associated with this task order. The University is expected to assemble a complementary research and monitoring team with particular expertise related to assessing dog walking impacts and in the implementing a field monitoring program, along with NPS staff, that will include GGNRA meetings an joint field discussions with NPS staff, peer review, (3) public workshops and then training of NPS monitoring staff after finalization.

ORSU/FES will perform the following tasks:

Task 1:
Informed by the very substantial SEIS literature reviews already done, conduct a supplementary literature review on recent research from 2012 to present and develop an outlined matrix report on visitor use-specific impacts on ecological conditions (regionally specific or applicable, where feasible and available, and dog/pet/walker recreational impacts), starting with the SEIS research citations. Synthesize information down to critical elements for GGNRA application with the intent to develop a practical, science-based, program to monitor compliance with dog regulations and impacts to inform a Monitoring-based Management Strategies (MMS).

a. Broader dog/pet recreation and associated ecological impact literature relevant to this issue and specific to the GGNRA research and monitoring requires increased understanding of the issues associated with the key GGNRA resource conditions, specific (flora and fauna) species sensitive to dog walking and applicable to the 22 park areas/named locations, as referenced in the SEIS.
b. The University will consult with the NPS Technical Representative concerning the content and format of the literature review report for Task 1 and will provide draft deliverables to the NPS Technical Representative for review and comment before they are considered final.

Task 2:

Conduct two five-day field visits to GGNRA to review and advise on the 22 park areas/named locations with recreation, monitoring, and ecological specialists and managers at GGNRA. **Field visit one** will be used to outline, understand, and prioritize the issues and current state of knowledge surrounding dog management and development of a monitoring program along with GGNRA staff meetings. This includes primarily site visits to familiarize team members with most of the 22 park areas/named locations and begin to identify site-specific locations and procedures for visitor use monitoring. **Field visit two** will prioritize the indicators with GGNRA Leadership and will also include both remaining park areas/named locations not visited on the first field trip and follow-up on previously-visited, more complex park areas/named locations by the monitoring and protocol development team.

a. University will travel to GGNRA with various subject matter experts (representing dog monitoring, spatial dimension recreational and human dimensions experts provided by University) to focus on the natural resource concerns, visitor use, regulations and geographic context of each site.
b. University will use these field visits to conduct Task 3 & 4.
c. University will summarize the field visits with minutes. The University will consult with the NPS Technical Representative concerning the content and format of the minutes and will provide them first in draft to the NPS Technical Representative for review and comment before considered final.

Task 3a:
Prepare a visitor use and ecological monitoring matrix and assessment (report) that outlines the core visitor experience and resource impact issues which are being protected at each of the 22 park areas/named locations (from SEIS – note that the number of park areas/named locations may vary depending on how they are counted. That is, some maps have 2 park areas/named locations on one map because of proximity).

a. Develop a matrix of the key visitor experience components and sensitive natural resources that are being impacted at each site (from SEIS).
b. Utilize SEIS and GGNRA managed and external data sources that outline species location, visitor use data, and any additional data sources (like 36 CFR violations) that are available to establish the importance of resource issues and develop scientifically valid sampling strategies in relation to dog management and the monitoring program. The University will rely on GGNRA staff and NPS-provided, regional ecological expertise to assist in identifying the data resources to conduct this task.
c. For natural resources, the University will outline the sites where these impacted natural resources are located and the rationale as to what would make most sound & measureable indicators to monitor compliance per the SEIS within the dog monitoring program.
d. The University will consult with the NPS Technical Representative concerning the content and format of the assessment (report) for Task 3 and will provide draft deliverables to the NPS Technical Representative for review and comment before considered final.
e. The University will address peer review comments in their final matrix/assessment report.

3b. Conduct and facilitate a two-three day workshop with GGNRA Leadership to review and finalize indicators and to establish standards for the monitoring indicators within the dog monitoring program.

- The University will introduce the prioritized indicators that have been developed per the previous tasks. Based on this overview, in addition to additional relevant knowledge,
- The University will pair indicators with impacts for different park areas/named locations;

- The University will recommend a range of potential standards for relevant indicators tied to impacts levels to ensure NPS is avoiding approaching 'unacceptable impacts;' the Leadership team will be responsible for final selection of standards to be used in the draft and final report deliverables.
- Meeting minutes will be generated by the University and reviewed/approved by NPS project manager.The University will report the standards generated from the workshop via meeting minutes and incorporate them into the field monitoring guide (report) within each respective indicator section.

Task 4:
Generate protocols via a field monitoring guide (example attached of level of detail for this report) that targets prioritized indicators for GGNRA to implement, given its SEIS description of impacts and compliance under a Management Monitoring Strategy.

a. Develop a field monitoring guide that describes the procedures for sampling, collecting, and analyzing monitoring data. [Note:No data collection of monitoring indicators will be done by the University].
   - The University will consult with the NPS Technical Representative concerning the content and format of the final report for Task 4 and will provide draft deliverables to the NPS Technical Representative for review and comment before considered final.
   - Identify the data needed to establish baseline conditions for each indicator which will be needed for assessing change over time.
   - Establish a range of recommended sampling strategies for different park areas/named locations and corresponding indicators with frequencies for monitoring those indicators to ensure a defined range of statistical confidence in results to support management decision-making needs for park area/named location.
   - Include identification of stratified staffing needs for different sampling approaches for different highly-visited and sensitive habitats vs. more remote backcountry park areas/named locations, addressing seasonal visitation differences and the representativeness of results at each park area/named location.
   - Outline the types of quantitative analyses required to report on monitoring results with recommended software programs for field applications where web access may be difficult. Identify best available technology, software applications/programs and methodologies for data collection in front country and backcountry areas for most efficient and effective data summarization and integration of collected data.
   - Consider and discuss capabilities for summarizing results and the associated representativeness and limitations of such results.
   - Field monitoring guide reporting will be delivered to GGNRA and the SSB in draft and final hard copies (four copies) and in electronic formats (PDF and Word).
   - The draft report will be reviewed and commented on by GGNRA staff and select non-NPS subject matter experts (in conformance with the NPS Guidelines on peer review processes) before proceeding with the finalization of the report. The draft report after preliminary peer review will also be the basis for public workshops that are facilitated through this contract with team members acting as 'subject matter experts' in presenting recommendations and taking public input on such.
   - [HYPERLINK "http://www.nps.gov/policy/Interimpeerreview.htm).The"] University will address all peer review comments. Peer review and NPS review of the field monitoring guide will take place within the 45-day period outlined in the University's

workflow following receipt of the draft report. Peer review will comply with the NPS Interim Guidance (http://www.nps.gov/policy/Interimpeerreview.htm).

Task 5:
Facilitate three public meetings/open houses with team members and NPS staff to gather public input relevant to the monitoring program, especially the proposed indicators and standards.

a. The University will facilitate the public engagement process and public understanding in development of a draft and final proposed dog management monitoring program to meet NPS regulations.

- Author up to four briefing statements along with up to 12 posters and tools for public engagement summarizing the task order efforts with the audience being GGNRA stakeholders particular to dog management and monitoring interests. Serve as monitoring program 'experts' in (3) public fora on indicators and standards selected for principal, visitor use impacts from SEIS.
- Facilitate a public engagement process with key University team expertise and GGNRA staff to facilitate public involvement and understanding in development of these indicators and standards and get public input thru 3 meeting workshops with key stakeholder groups and the public in meetings at GGNRA prior to implementation.(Assumes 1 trip to GGNRA, up to 4 people with up to 5 days onsite for the (3) public fora with pre-meetings with NPS staff.).
- Address public concerns that arise about the indicators and standards recommended through a Frequently Asked Questions Fact sheet and key response summaries (following the public meetings) with citations, where available, of scientific literature supporting such indicators and standards, and where not available, with other supporting materials.
- The University will finalize workshop minutes and identify appropriate substantive comments to be addressed in the monitoring program and facilitate any revisions as such in the field guide and report..
- The University will highlight key points for full-scale implementation of the dog monitoring program and recommend phasing based on joint criteria developed between Contracting team and NPS.

Task 6: Train field staff on adopted protocols for monitoring program. Assumes 1 trip to GGNRA, up to 2 people with up to 4 days onsite for field training of NPS monitoring staff and pre-testing of monitoring protocols and observations of monitoring staff. Research, test and train staff on best software programs and applications for the data collection, integration and summarization.

- Provide field training to monitoring staff on both protocols and use of best software program and technology in collection of data on indicators related to full range of impact topics agreed upon in Tasks 3 and 4 above.
- Provide field data collection sheets in hard copy and software applications that allow for simple, efficient recording, integration and summarization.
- Pre-test field monitoring observations by staff with QA/QC report to ensure highest level of sampling representativeness and accuracy.
- Assumes NPS review of draft QA/QC report will be completed within a 15-day period.

Task 7. Perform analysis on data collected by NPS in phase 1 (summer of 2017) and integrate into a model technical monitoring report using software program applications developed for GGNRA sites and field work. Complete draft and final 3-5 page executive summary of technical management report.

- Provide draft report(s) for review and then final report(s) in response to NPS comments in (4) hardbound copies and an electronic Microsoft Word version that NPS can utilize or other software program agreed upon that NPS has access to for these purposes.
- Video conference with park staff in a 1 to 1.5-hour meeting teleconference, following provision of the draft report, to discuss analysis and collect NPS comments prior to providing final annual technical management report and 3-5 page executive summary reports on Phase 1 program.

NPS will perform the following tasks:

Task 1:
Assist in informing University and their staff on dog management plan and rule to be implemented, along with provision of bibliography used in SEIS and FEIS. Provide initial draft outline of matrix on potential natural resource indicators by site, where available, as starting point to consider along with table of adverse impacts in SEIS for understanding of impacts at each park area/named location.

a. Provide access to GGNRA natural resource and visitor use data to increase understanding of the issues associated with the key GGNRA resource conditions, specific (flora and fauna) species sensitive to dog walking and applicable to the 22 sites, as referenced in the SEIS.
b. The NPS Technical Representative will consult with the University concerning the content and format of the literature review report for Task 1 and review draft deliverables within 7 days providing comments within 7 work days.

Task 2:
Develop itineraries and agenda along with University for two five-day field visits to GGNRA to familiarize and to perform field reviews with University and staff of physical areas of impact as well as critical resource concerns. **Field visit one** will be used to outline, understand, and prioritize the issues and current state of knowledge surrounding dog management and development of a monitoring program along with GGNRA staff meetings. This includes primarily site visits to familiarize team members in the 21 park location and begin to identify a nexus for visitor use monitoring vantage points. **Field visit two** will prioritize the indicators with GGNRA Leadership and will also include some site visits for the monitoring and protocol development team.

a. NPS subject matter experts (representing natural resources and park planning) will participate in park area/named location field visits, providing field information as available.
b. The NPS Technical Representative will consult with University concerning the content and format of the minutes and will review these draft minutes within 7 working days(other than 2 weeks over the Xmas holidays) providing comment.

Task 3:
Consult with University on the content and format of the visitor use and ecological monitoring matrix and assessment (report) that the University is developing as the framework of the core visitor experience and resource impact issues which are being protected at each of the 21 sites.

a. Discuss and refer University to key visitor experience and sensitive natural resources that are being impacted at each site(from SEIS).
b. Provide key SEIS and GGNRA managed data sources that outline species location, visitor use data, and any additional data sources (like 36 CFR violations) that are available. The University will rely on both working with GGNRA staff and an expert University who is

knowledgeable of the area from Avocet to assist in identifying the natural resource data resources to conduct this task.

c. For natural resources, the NPS Natural resource staff will assist University in identifying the sensitive sites within park areas/named locations where these impacted natural resources are located and discuss initial ideas about potential indicators that are most sound & measureable in monitoring compliance.
d. The NPS Technical Representative will consult with the University concerning the content and format of the assessment (report) for Task 3 and will review draft deliverables within 10 working days after receipt prior to a University finalizing a report.

Task 4:
Provide an electronic copy of a Monitoring Program and Protocol report as an example of level of detail for this report.

- NPS Technical Representative will consult with the University concerning the content and format of the final report for Task 4 and NPS will review draft deliverables within 15 working days providing integrated comments to University to address prior to considering a final.
- Discuss baseline conditions for each indicator in which to compare incremental monitoring results against over time.
- Review a range of recommended sampling strategies from the University for different sites with corresponding indicators and frequencies for monitoring those indicators to ensure a defined range of statistical confidence in results to support management decision-making needs for each site within 10 working days upon receipt. Consult with University on management objectives for each park area/named location.
- Review with University seasonal use variations, where known, at different sites and priorities for different sampling approaches for different highly-visited and sensitive habitat sites vs. more remote backcountry sites, addressing visitation differences and representativeness of results at each site
- Review the Draft Field monitoring guide report delivered to GGNRA and the SSB in draft hard and electronic copies, providing consolidated comments back to University within 15 working days.
- Coordinate select non-NPS subject matter expert review to conform to the NPS Guidelines on peer review processes before proceeding with the finalization of the report. Peer review and NPS review of the field monitoring guide will take place within the 45-day period outlined in the University's workflow following receipt of the draft report. Peer review will comply with the NPS Interim Guidance ([HYPERLINK "http://www.nps.gov/policy/Interimpeerreview.htm"]).

Task 5:
Coordinate appropriate NPS leadership team and a staff, along with logistics set up, of a two-three day workshop with GGNRA Leadership to review indictors and identify corresponding standards for those monitoring indicators within the dog monitoring program. Provide public notice of ,and arrange meeting logistics for, (3) public fora/meetings/open houses with team members and NPS staff to support public understanding, dialogue and input into monitoring program, especially the proposed indicators and standards.

b. The NPS will review draft meeting minutes from University within 5 working days and provide consolidated comments prior to finalizing them as part of admin record.
c. NPS will arrange for public meeting places and logistics for each of the (3) public meetings. NPS staff will be available as a resources at the meetings; and NPS will provide for an overall meeting facilitator/coordinator

- Review University-provided, draft briefing statements, posters and tools for public engagement within 5 working days with comments prior to University finalizing.
- Participate as an NPS planning or resource specialist, not as the monitoring program experts which University will serve as in (3) public fora

d. The NPS will review University-provided-public meeting records with University and discuss material generated from the workshop, via comments on draft meeting minutes, and discuss what changes are considered by University to the field monitoring guide (report) within each respective indicator section.
   - Reporting delivered by University to GGNRA and SSB in hard copy (four copies each respectively) and electronic formats (PDF and Word).
   - Review University provided key points for full-scale implementation and phasing of the dog monitoring program. Work with the University on developing joint criteria for phasing the monitoring program.
   - Review University-provided briefing statements along with up to 12 posters and tools for public engagement summarizing the task order efforts with the audience being GGNRA stakeholders particular to dog management and monitoring interests.
   - Provide key GGNRA staff as park planning and resource staff, not subject matter experts on monitoring program which Universitys serves as, for each public meeting. Meet with University to review meeting content and set up prior to public meetings, as well as after each.
   - Review with University public concerns that arise about the indicators and standards recommended by University thru Frequently Asked Questions Fact sheet and key response summaries (post public meetings).

Task 6: Provide facilities and staffing for training by University on both indicators and adopted protocols for monitoring program

- Purchase related equipment recommend by University and approved by NPS for NPS monitoring staff to ensure data collection efforts can be successful in both field and in analyses of data. Provide field data collection sheets that allows for simple recording and summarization
- Provide NPS monitoring staff to participate in training and field-testing.
- NPS review of draft QA/QC report will be completed within a 15-working day period.

Task 7: Provide data collected in phase 1monitoring program for ORSU/FES to integrate into a model monitoring report using software program applications developed by University for GGNRA park areas/named locations and field work.

- Review draft report within 10 working days(except over holidays)and provide comments prior to final report being completed by ORSU/FES in (4) hard copies and electronic Microsoft Word version that NPS can utilize or other software program agreed upon that NPS has access to for these purposes.
- Video conference with ORSU/FES University PI, co-PI and other staff in 1 -1 and 1/2hour meeting telcon, following provision of the draft report, regarding analysis and NPS comments prior to ORSU/FES providing final technical management report and 3-5 page Executive summary on Phase 1 program.

A. The ORSU/FES will:

1. Collaboratively undertake a visitor use monitoring research project titled "Development of GGNRA Dog Management Monitoring Program and Protocols" as described throughout this Task Agreement.
2. Appoint Troy Hall as Principal Investigator (PI).
3. OSU staff and subcontracted team experts will include:
   - Troy Hall (PI) coordinating work among the project team, will guide overall development of monitoring approaches, provide review of documents and deliverables, facilitate meetings with National Park Service staff, and participate as subject matter expert in public meetings.
   - Ashley D'Antonio (co-PI)as lead subject matter expert related to ecological impacts of recreation (e.g., impacts to birds, wildlife, and vegetation), including development of ecological indicators and creation of monitoring protocols for those indicators, will also be responsible for all geospatial analyses and products necessary for protocols. She will participate in all field visits, serve as subject matter expert during public meetings, and work with University on staff training.
   - Lisa Ganio will be the project's interdisciplinary statistician, responsible for developing sampling regimens, plans and drafting the narrative justifications for sampling. She will participate in site visits and serve as subject matter expert during public meetings.
   - Chad Kooistra will be an hourly wage employee responsible for conducting a literature review on ecological impacts of dogs as supplemental input for development of potential indicators.
   - Graduate Student (GRA-Masters student) is included for 6 months (summer and fall, 2017) to conduct data analysis and draft the example report.
   - Deonne VanderWoude, as a national leader in monitoring impacts of dogs, will be the lead subject matter expert for all work related to human dimensions of dog and dog-walking impacts, describing and monitoring human impacts of dogs (visitor conflict, dog behavior, etc). She will be the lead author on all documents, participate in all field visits and work with D'Antonio on staff training.
   - Jeremy Wimpey, as a national leader on geospatial techniques used in monitoring ecological impacts of recreation, will provide review and consultation services regarding those matters and best software application technologies for data collection.
   - Jules Evans as a reknowned specialist on shorebirds, and related ecological issues in the Bay area, will provide expertise regarding the location and identification of species of concern, input on relevant indicators, and identification of recommended protocols for monitoring ecological impacts.
4. See above.
5. Utilize the methods and processes as outlined in Attachment I: Methodology in conducting the project.
6. See Article III above.
7. Cooperate with the NPS Agreement Technical Representative (ATR) to ensure that the conduct of the project complies with "Quality Control of Scientific and Other Scholarly Products in the Pacific West Region."
8. Ensure that reports and other formal materials (including publications and presentations) resulting from this collaborative project acknowledge the NPS and that the project was conducted through

the Pacific Northwest Cooperative Ecosystem Studies Unit, and reference this Task Agreement number.

9. Upon request of the GGNRA, obtain digital photographs with captions of project activities and make these available to the NPS Pacific Northwest CESU Senior Science Advisor and others for use in presentations and reports.

B. The NPS will:

1. Collaboratively undertake a visitor use monitoring research project titled "Development of GGNRA Dog Management Monitoring Program and Protocols" as described throughout this Task Agreement.
2. Provide financial assistance to the ORSU/FES as provided in Article VI. The budget, included as Attachment B, is incorporated in this Task Agreement.
3. Assign Steve Ortega as the ATR.
   Other NPS Staff include:
   - Mike Savidge, as Project Manager for this project, as well as Social Scientist for GGNRA and lead on final dog management plan and rule.
   - Bill Merkle, as co-PM and lead wildlife biologist and liaison to the monitoring team for the Natural Resources (NR) division to coordinate all input and NPS NR staff expertise on this program.
   - Erin Heimbinder, as lead outreach coordinator on dog management rule implementation.
   - Nathan Hale Sargent as public affairs officer for GGNRA.
   - Visitor Use Program Manager (to be hired by NPS by January 31, 2017) as lead to assume responsibility for hiring NPS monitoring staff and implementing and managing the monitoring program.

4. See above in Article III.
5. Cooperate with the ORSU/FES PI to ensure that the conduct of the project complies with "Quality Control of Scientific and Other Scholarly Products in the Pacific West Region." The ATR (or designee) is the administrative reviewer for this project.
6. Ensure that reports and other formal materials (including publications and presentations) resulting from this collaborative project acknowledge the ORSU/FES and that the project was conducted through the Pacific Northwest Cooperative Ecosystem Studies Unit, and reference this Task Agreement number.

ARTICLE IV – TERM OF AGREEMENT

This Task Agreement is effective on November 15, 2016 through December 31, 2017.

ARTICLE V – KEY OFFICIALS

A. For the NPS:

1. ATR:
   Steve Ortega,
   Bldg. 201,GGNRA HQTRS
   Ft.Mason,

San Francisco, Ca. 94123
Phone: (415)561-4725
Fax: Fax: (415)561-4710
Email:steve_ortega@nps.gov

2. Awarding Officer:
Lilette J. Baltodano, Financial Agreements Officer
National Park Service, Pacific West Regional Office
333 Bush Street, Suite 500
San Francisco, CA 94104
Phone: 415-623-2251
Fax: 415-623-2384
Email: lilette_baltodano@nps.gov

3. Project Manager: Mike Savidge, Chief, Strategic Planning and Social Science, GGNRA
Bldg. 201,GGNRA HQTRS
Ft.Mason,
San Francisco, Ca. 94123
Phone: (415)561-4725
Fax: (415)561-4710
Email: michael_j_savidge@nps.gov

4. Project Co-Lead
Bill Merkle, Senior Wildlife biologist (& Monitoring Team NR liaison)
Bldg. 201,GGNRA HQTRS
Ft.Mason,
San Francisco, Ca. 94123
Phone: (415)289-1843
Fax:
Email: william_merkle@nps.gov

B. For ORSU/FES:

1. PI:
Troy Hall
Oregon State University, School of Forestry
Professor & Department Head
Forest Ecosystems & Society
321B Richardson Hall
Corvallis, OR 97331-5703
541.737.1306
Fax:
Email: [HYPERLINK "mailto:Troy.Hall@oregonstate.edu"]

2.Co-PI

Ashley D'Antonio
Oregon State University, School of Forestry
Associate Professor
Forest Ecosystems & Society
321B Richardson Hall

Corvallis, OR 97331-5703
541.737. ?
Fax:
Email: Ashley.D'Antonio@oregonstate.edu

C. Communications: ORSU/FES will address any communication regarding this Task Agreement to the Awarding Officer, with a copy also sent to the ATR. Communications that relate solely to technical matters may be sent only to the ATR.

D. Changes in Key Officials: Neither the NPS nor the ORSU/FES may make any permanent change in a key official without written notice to the other party reasonably in advance of the proposed change. The notice will include a justification with sufficient detail to permit evaluation of the impact of such a change on the scope of work specified within this Task Agreement. Any permanent change in key officials will be made only by modification to this Task Agreement.

ARTICLE VI – AWARD AND PAYMENT

A. NPS will provide financial assistance to the ORSU/FES in the amount of $330,000. for the work provided herein. The chargeable appropriation(s) and funding source(s) for this Task Agreement is as follows:

Fiscal Year:	Cost Structure:	Fund Source:	Amount:
2017	PPWGOGAB0 PFE00FEPR.YP0000 PX.PA207874A.00.1	Rec Fee	$ 341,845.

B. Payment Procedures: Advances/Reimbursements through the Automated Standard Application for Payments (ASAP) System

1. Method of Payment. Payment will be made to the recipient by advance and/or reimbursement through the Department of Treasury's ASAP system.
2. Requesting Advances. Requests for advances must be made through the ASAP system. The recipient may submit requests as frequently as required to meet its needs to disburse funds for the Federal share of project costs. If feasible, the recipient should time each request so that payment is received on the same day that funds are dispersed for direct project costs and the proportionate share of any allowable indirect costs. If same-day transfers are not feasible, advance payments must be as close to actual disbursements as administratively feasible.
3. Requesting Reimbursement. Requests for reimbursements must be made through the ASAP system. Requests for reimbursement should coincide with the recipient's normal billing pattern. Each request must be limited to the amount of disbursements made for the Federal share of direct project costs and the proportionate share of allowable indirect costs incurred during that billing period.
4. Adjusting payment requests for available cash. The recipient must disburse any funds that are available from repayments to and interest earned on a revolving fund, program income, rebates, refunds, contract settlements, audit recoveries, credits, discounts, and interest earned on any of those funds before requesting additional cash payments from National Park Service.
5. Payments. All payments are made by electronic funds transfer to the bank account identified on the ASAP Bank Information Form that the recipient filed with the U.S. Department of Treasury.
6. Supporting Documents for Agency Approval of Payments. When a recipient is determined "high risk" or has had performance issues. If the Agency approval requirement is in effect for this

award, the ASAP system will indicate that Agency approval is required when the request for payment is submitted. The recipient must notify the Agreement Technical Representative (ATR) identified in this agreement that a payment request has been submitted. The payment authorizing official may request additional information from the recipient to support the payment requests prior to release of funds, as deemed necessary. The recipient is required to comply with these requests. Supporting documents include invoices, copies of contracts, vendor quotes, and other expenditure explanations that justify the reimbursement requests.

C. The result of work under each phase of this Task Agreement is considered to be independently useful. The data obtained from one phase, however, may be utilized for future phases, subject to satisfaction with the data, desirability for additional data, and available funding. Any future phase would be added through the issuance of a written modification to this agreement.

ARTICLE VII – PROJECT PRODUCTS

A. Financial Reports: The OSU/FES must submit Standard Form (SF) 425, "Federal Financial Report" (FFR), on a quarterly basis.

1. The FFRs may be submitted using one of the following methods:
   a. One original, mailed to: Contracting Division, National Park Service, Pacific West Regional Office, 333 Bush Street, Suite 500, San Francisco, CA 94104
   b. One scanned copy, emailed to: PWR_Agreements@nps.gov
   c. Electronic submission through FedConnect
2. The recipient will report program outlays and program income on a cash or accrual basis.
3. The first interim FFR will be due in accordance with the following table:

Award Performance Start Date	First Quarterly Interim Report End Date	First Quarterly Interim Report Due Date
January 1 – March 31	June 30	July 30
April 1 – June 30	September 30	October 30
July 1 – September 30	December 31	January 30
October 1 – December 31	March 31	April 30

4. Subsequent interim FFRs are due 30 calendar days after the end of each federal fiscal quarter which ends on December 31, March 31, June 30, and September 30.
5. The final FFR will be submitted 90 calendar days after the end of the term of agreement, or upon termination. Transactions which occurred after the award expired will also be included in the final reports. These expenses shall include wrap-up activities incurred during the project period and where the transaction occurred after the award expired. Transactions for the entire award period will be included in this final report and will reflect the transactions for the entire award amount.
6. All financial and programmatic records submitted by recipients, supporting documents, statistical records, and other grants-related records shall be maintained in accordance with 2 CFR § 200.333.

B. Performance Reports: The ORSU/FES must submit performance reports on a quarterly basis.
1. The performance reports may be submitted using one of the following methods:

a. One original, mailed to the ATR at the address shown in Article V, and to the following: Contracting Division, National Park Service, Pacific West Regional Office, 333 Bush Street, Suite 500, San Francisco, CA 94104
b. One copy, emailed to the ATR at the email address shown in Article V, and to the following: PWR_Agreements@nps.gov
c. Electronic submission through FedConnect

2. The performance reports must detail the following, in accordance with [HYPERLINK "http://www.ecfr.gov/cgi-bin/text-idx?SID=e87ebd32f85ebaf2d8809eebd2bd1f00&node=se2.1.200_1328&rgn=div8" \h]:
   a. A comparison of actual accomplishment to the objectives of the award established for the period;
   b. The reason why goals were not met, if appropriate; and
   c. Additional pertinent information including, when appropriate, analysis and explanation of cost overruns or high unit costs.
3. The first interim performance report will be due in accordance with the following table:

Award Performance Start Date	**First Quarterly Interim Report End Date**	**First Quarterly Interim Report Due Date**
January 1 – March 31	June 30	July 30
April 1 – June 30	September 30	October 30
July 1 – September 30	December 31	January 30
October 1 – December 31	March 31	April 30

4. Subsequent interim performance reports are due 30 calendar days after the end of each federal fiscal quarter which ends on December 31, March 31, June 30, and September 30.
5. The final performance report will be submitted no later than 90 calendar days following the end of the term of agreement, or upon termination.

C. Schedule/Milestones/Dates

Monitoring & Management Program and Protocols for Dog Management in the Golden Gate National Recreation Area: Summary of Timeline & Deliverables

Project Duration: November 28, 2016 to December 31, 2017

Task item/deliverable	Date	Notes
1. Literature review draft summary points	11/28/16	Survey of literature to inform first site visit
1. Literature review final report	1/15/17	Complete prior to 2nd site visit and indicators meeting with park staff
2. Field visit 1	11/28/16-12/2/16	"show me" trip and team visit with specialists in field
2. Submit draft meeting minutes from field trip 1	12/14/16	
2. Field visit 2	1/16/17-1/20/17	Visit selected sites; meet with NPS staff to discuss indicators
2. Submit draft meeting minutes from field trip 2	1/30/17	
3. Draft visitor use & ecological matrix	2/15/17	
3. NPS review and comment completed	3/3/17	

3. External peer review of matrix & proposed representative indicators with range of potential standards completed.	3/10/17	
3. Final visitor use & ecological matrix	3/17/17	
3. Selection of indicators & review of range of potential standards tied to approaching levels of adverse effects	3/20-3/23	2-3 day NPS staff workshop; Formerly part of Task 5; moved to task 3
4. Report on technology and software choices with recommendations as applications for capturing field data	3/20/17	Review & recommendations for technology applications and software program(s)
4. First draft of field guide and protocols	5/1/17	
4. NPS review and comment completed	5/17/17	
4. Revised Draft Final field guide and protocols	6/02/17	
4b. Peer review of final indicators and protocols completed	6/16/17	
4.Peer review comments addressed	6/20/17	
5. Public engagement workshops(3);(1) staff and team mtg	6/26/17-6/30/17	1 NPS pre-meeting & 3 public meetings within 1 week
5. Workshop Minutes/Notes Summary	7/7/17	
5. Finalize field guides and protocols	7/20/17	
6. Field training with QA/QC	8/1-5/17-	
7. Integrated data analyses, findings and recommendations into draft and final monitoring reports(s)	11/1/17	Integration and Summary of Phase 1 data into technical mgt & exec summary reports
7. 1-1.5 hour video conf with NPS staff on reports	11/27/17-12/1/17	Discuss analysis, report and report comments

D. Description of Project Products/Reports
(See above in SOW and Deliverables)

E. Delivery of Project Products

1. Financial and performance reports will be submitted in accordance with Article VII.A. and VII.B., respectively.
2. One electronic (pdf) and four hard copies of all products will be submitted to the NPS PM at the address shown in Article V, NPS Key Officials.
3. One electronic (pdf) copy of the final report will be submitted to the Chief, NPS Social Science office, Attn: Bret Meldrum; another to Pacific Northwest CESU Senior Science Advisor.
4. One electronic (pdf) copy of the final report will be submitted to: Carol Simpson, Technical Information Center, Denver Service Center, National Park Service, carol_simpson@nps.gov.

ARTICLE VIII – PRIOR APPROVAL

The recipient shall obtain prior approval for budget and program revisions, in accordance with 2 CFR § 200.308.

ARTICLE IX – CLOSEOUT PROCEDURES

A. This Task Agreement shall be closed out in accordance with the procedures stated in 2 CFR §§200.343-345.

B. The recipient shall submit, within 90 calendar days after the end date of the award, all financial, performance, property, and other reports as required by the terms and conditions of the award. NPS may approve extensions when requested by the recipient.

C. Unless NPS authorizes an extension, the recipient shall liquidate all obligations incurred under the award not later than 90 calendar days after the end date of the agreement.

D. The recipient shall promptly refund any balances of unobligated cash that NPS has advanced or paid and that are not authorized to be retained by the recipient for use in other projects.

E. The recipient shall account for any real and personal property acquired with Federal funds or received from NPS in accordance with 2 CFR §§200.310-316.

ARTICLE X – GENERAL AND SPECIAL PROVISIONS

A. Special Provisions:

1. Recipient Employee Whistleblower Rights and Requirement to Inform Employees of Whistleblower Rights.

    a. This award and employees working on this financial assistance agreement will be subject to the whistleblower rights and remedies in the pilot program on Award Recipient employee whistleblower protections established at 41 U.S.C. 4712 by section 828 of the National Defense Authorization Act for Fiscal Year 2013 (Pub. L. 112-239).
    b. The Award Recipient shall inform its employees in writing, in the predominant language of the workforce, of employee whistleblower rights and protections under 41 U.S.C. 4712.
    c. The Award Recipient shall insert the substance of this clause, including this paragraph (c), in all subawards or subcontracts over the simplified acquisition threshold, 42 CFR § 52.203-17 (as referenced in 42 CFR § 3.908-9).

2. Conflict of Interest.

    a. The Recipient must establish safeguards to prohibit its employees and Sub-recipients from using their positions for purposes that constitute or present the appearance of a personal or organizational conflict of interest. The Recipient is responsible for notifying the Awarding Officer in writing of any actual or potential conflicts of interest that may arise during the life of this award. Conflicts of interest include any relationship or matter which might place the Recipient or its employees in a position of conflict, real or apparent, between their responsibilities under the agreement and any other outside interests. Conflicts of interest may also include, but are not limited to, direct or indirect financial interests, close personal relationships, positions of trust in outside organizations, consideration of future employment arrangements with a different organization, or decision-making affecting the award that

would cause a reasonable person with knowledge of the relevant facts to question the impartiality of the Recipient and/or Recipient's employees and Sub-recipients in the matter.

b. The Awarding Officer and the servicing Ethics Counselor will determine if a conflict of interest exists. If a conflict of interest exists, the Awarding Officer will determine whether a mitigation plan is feasible. Mitigation plans must be approved by the Awarding Officer in writing.

c. Failure to resolve conflicts of interest in a manner that satisfies the government may be cause for termination of the award. Failure to make required disclosures may result in any of the remedies described in 2 CFR § 200.338, Remedies/or Noncompliance, including suspension or debarment (see also 2 CFR Part 180).

3. Reporting Subawards and Executive Compensation.

a. Reporting of first-tier subawards.
   1. Applicability. Unless you are exempt as provided in paragraph D. of this award term, you must report each action that obligates $25,000 or more in Federal funds that does not include Recovery Act funds (as defined in section 1512(a)(2) of the American Recovery and Reinvestment Act of 2009, Pub. L. 111–5) for a subaward to an entity (see definitions in paragraph E. of this award term).
   2. Where and when to report.
      i. You must report each obligating action described in paragraph A.1. of this award term to [HYPERLINK "http://www.fsrs.gov" \h].
      ii. For subaward information, report no later than the end of the month following the month in which the obligation was made. (For example, if the obligation was made on November 7, 2010, the obligation must be reported by no later than December 31, 2010.)
   3. What to report. You must report the information about each obligating action that the submission instructions posted at [HYPERLINK "http://www.fsrs.gov" \h] specify.

b. Reporting Total Compensation of Recipient Executives.
   1. Applicability and what to report. You must report total compensation for each of your five most highly compensated executives for the preceding completed fiscal year, if—
      i. The total Federal funding authorized to date under this award is $25,000 or more;
      ii. In the preceding fiscal year, you received—
         a. 80 percent or more of your annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
         b. $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
      iii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at [HYPERLINK "http://www.sec.gov/answers/execomp.htm" \h].)
   2. Where and when to report. You must report executive total compensation described in paragraph A.1. of this award term:
      i. As part of your registration profile at [HYPERLINK "https://www.sam.gov" \h].

ii. By the end of the month following the month in which this award is made, and annually thereafter.

c. Reporting of Total Compensation of Subrecipient Executives.
   1. Applicability and what to report. Unless you are exempt as provided in paragraph D. of this award term, for each first-tier subrecipient under this award, you shall report the names and total compensation of each of the subrecipient's five most highly compensated executives for the subrecipient's preceding completed fiscal year, if—
      i. In the subrecipient's preceding fiscal year, the subrecipient received—
         a. 80 percent or more of its annual gross revenues from Federal procurement contracts (and subcontracts) and Federal financial assistance subject to the Transparency Act, as defined at 2 CFR 170.320 (and subawards); and
         b. $25,000,000 or more in annual gross revenues from Federal procurement contracts (and subcontracts), and Federal financial assistance subject to the Transparency Act (and subawards); and
      ii. The public does not have access to information about the compensation of the executives through periodic reports filed under section 13(a) or 15(d) of the Securities Exchange Act of 1934 (15 U.S.C. 78m(a), 78o(d)) or section 6104 of the Internal Revenue Code of 1986. (To determine if the public has access to the compensation information, see the U.S. Security and Exchange Commission total compensation filings at [HYPERLINK "http://www.sec.gov/answers/execomp.htm" \h].)
   2. Where and when to report. You must report subrecipient executive total compensation described in paragraph c.1. of this award term:
      i. To the recipient.
      ii. By the end of the month following the month during which you make the subaward. For example, if a subaward is obligated on any date during the month of October of a given year (i.e., between October 1 and 31), you must report any required compensation information of the subrecipient by November 30 of that year.

d. Exemptions.
   1. If, in the previous tax year, you had gross income, from all sources, under $300,000, you are exempt from the requirements to report:
      i. Subawards, and
      ii. The total compensation of the five most highly compensated executives of any subrecipient.

e. Definitions. For purposes of this award term:
   1. Entity means all of the following, as defined in 2 CFR part 25:
      i. A Governmental organization, which is a State, local government, or Indian tribe;
      ii. A foreign public entity;
      iii. A domestic or foreign nonprofit organization;
      iv. A domestic or foreign for-profit organization;
      v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.
   2. Executive means officers, managing partners, or any other employees in management positions.
   3. Subaward:
      i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.

ii. The term includes your procurement of property and services needed to carry out the project or program. The term does not include procurement of incidental property and services needed to carry out the award project or program.
iii. A subaward may be provided through any legal agreement, including an agreement that you or a subrecipient considers a contract.

4. Subrecipient means an entity that:
   i. Receives a subaward from you (the recipient) under this award; and
   ii. Is accountable to you for the use of the Federal funds provided by the subaward.
5. Total compensation means the cash and noncash dollar value earned by the executive during the recipient's or subrecipient's preceding fiscal year and includes the following (for more information see 17 CFR 229.402(c)(2)):
   i. Salary and bonus.
   ii. Awards of stock, stock options, and stock appreciation rights. Use the dollar amount recognized for financial statement reporting purposes with respect to the fiscal year in accordance with the Statement of Financial Accounting Standards No. 123 (Revised 2004) (FAS 123R), Shared Based Payments.
   iii. Earnings for services under non-equity incentive plans. This does not include group life, health, hospitalization or medical reimbursement plans that do not discriminate in favor of executives, and are available generally to all salaried employees.
   iv. Change in pension value. This is the change in present value of defined benefit and actuarial pension plans.
   v. Above-market earnings on deferred compensation which is not tax-qualified.
   vi. Other compensation, if the aggregate value of all such other compensation (e.g. severance, termination payments, value of life insurance paid on behalf of the employee, perquisites or property) for the executive exceeds $10,000.

4. System for Award Management and Universal Identifier Requirements.

a. Requirement for System for Award Management

Unless you are exempted from this requirement under 2 CFR 25.110, you as the recipient must maintain the currency of your information in the SAM until you submit the final financial report required under this award or receive the final payment, whichever is later. This requires that you review and update the information at least annually after the initial registration, and more frequently if required by changes in your information or another award term.

b. Requirement for unique entity identifier

If you are authorized to make subawards under this award, you:
1. Must notify potential subrecipients that no entity (see definition in paragraph C of this award term) may receive a subaward from you unless the entity has provided its unique entity identifier to you.
2. May not make a subaward to an entity unless the entity has provided its unique entity identifier to you.

c. Definitions

For purposes of this award term:

1. System for Award Management (SAM) means the Federal repository into which an entity must provide information required for the conduct of business as a recipient. Additional information about registration procedures may be found at the SAM Internet site (currently at http://www.sam.gov).
2. Unique entity identifier means the identifier required for SAM registration to uniquely identify business entities.
3. Entity, as it is used in this award term, means all of the following, as defined at 2 CFR part 25, subpart C:
   i. A Governmental organization, which is a State, local government, or Indian Tribe;
   ii. A foreign public entity;
   iii. A domestic or foreign nonprofit organization;
   iv. A domestic or foreign for-profit organization; and
   v. A Federal agency, but only as a subrecipient under an award or subaward to a non-Federal entity.
4. Subaward:
   i. This term means a legal instrument to provide support for the performance of any portion of the substantive project or program for which you received this award and that you as the recipient award to an eligible subrecipient.
   ii. The term does not include your procurement of property and services needed to carry out the project or program (for further explanation, see 2 CFR 200.330).
   iii. A subaward may be provided through any legal agreement, including an agreement that you consider a contract.
5. Subrecipient means an entity that:
   i. Receives a subaward from you under this award; and
   ii. Is accountable to you for the use of the Federal funds provided by the subaward.

ARTICLE XI – ATTACHMENTS

The following attachments are hereby incorporated into this Task Agreement. In the event of any apparent conflict between the terms of the Task Agreement and the attachments, the terms of the Task Agreement, including its designations and modifications, will prevail.

A. Description of Methodology or Proposal
B. Budget
C. Standard Form 424, Application for Federal Assistance (incorporated by reference)
D. Standard Form 424A, Budget Information (incorporated by reference)
E. Standard Form 424B, Assurances – Non-Construction Programs (incorporated by reference)
F. Standard Form 425, Federal Financial Report (incorporated by reference)

Grants.gov lobbying form required at $100,000:
G. Certification Regarding Lobbying from Grants.gov (incorporated by reference)

SF-LLL required at $100,000 if the recipient participates in lobbying activities:
H. Standard Form LLL, Disclosure of Lobbying Activities (incorporated by reference)

ARTICLE XII – SIGNATURES

IN WITNESS WHEREOF, the parties hereto have executed this Task Agreement on the date(s) set forth below.

FOR THE RECIPIENT

_____ _____

Name Date
Title

FOR THE NATIONAL PARK SERVICE

_____ _____

Name Date
Title

Attachment A – Description of Methodology or Proposal

See Article III above.

Attachment B - Budget

Enter data in Yellow Boxes
Only round to nearest $

College of Forestry - Oregon State University

FORM EB3 -autofill
Revised 4/19/2016

Begin Inflation Year 1? (yes/no): no (starting values are FY2017)

Sponsor: NPS
Principal Investigator: Troy Hall
Proposal Title: Development of Golden Gate National Recreation Area's Dog Management Monitoring Program and Protocols
Start Date: 11/15/2016
End Date: 12/31/2017

EB3

Annual Escal	salary	OPE
Faculty	3%	1%
Research Ass	3%	1%
GRA	2%	2%
< 0.5FTE	2%	2%
PDS	4%	

Graduate Student FTE to Months Conversion

		FTE	Months
Full Year	12 months at 0.49 FTE	0.49	5.88
Academic	9 months at 0.49 FTE	0.3675	4.41
2 Terms	6 months at 0.49 FTE	0.245	2.94
1 Term	3 months at 0.49 FTE	0.1225	1.47

Totals	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTALS	
NSF Senior/Key Pers	55,889	-	-	-	-	55,889	OK
NSF Other Personnel	33,446	-	-	-	-	33,446	
Grants.gov Senior/Key Pers	79,479	-	-	-	-	79,479	OK
Grants.gov Other Personnel	45,637	-	-	-	-	45,637	OK

Data Tables - don't modify or delete

	2017 wages	OPE	sal esc
GRA-MS	45575	32%	2%
GRA-PhD	45958	30%	
PDS	42840	331	
Student		8.31%	
Tuition acte	4575	4.50%	
Tuition sum	4575		
Temp, < 0.5FTE		83%	

Tuition	Annual
2017	18300
2018	19124
2019	19985
2020	20884
2021	21824

2017	Annual sal But less th	OPE
	$0	$2,499	94%
	$2,500	$2,999	91%
	$3,000	$3,499	72%
	$3,500	$3,999	66%
	$4,000	$4,499	61%
	$4,500	$4,999	58%
	$5,000	$5,999	56%
	$6,000	$6,999	50%
	$7,000	$7,999	47%
	$8,000	$8,999	45%
	$9,000	$10,999	43%

BUDGET CATEGORIES		YEAR 1			YEAR 2			YEAR 3			TOTALS			checks
ACADEMIC WAGES	Base Salary (monthly)	FTE	Months	Cost	FTE	Months	Cost	FTE	Months	Cost	FTE	Months	Cost	
Lead PI - Hall	$13,735	0.16	1.9	25991			-			-	0.16	1.85	25,991	
PI - D'Antonio	$8,889	0.28	3.4	29898	-		-	-		-	0.28	3.36	29,898	
PI		-		-	-		-	-		-	-	-	-	
Other Professional - Garvo	$9,000	0.18	2.1	19530	-		-	-		-	0.18	2.10	19,530	
		-		-	-		-	-		-	-	-	-	
Grad Res Assistant - MS	$3,798	0.25	2.5	11166	-	-	-	-	-	-	0.25	2.94	11,166	
student hourly wage	$25	0.06	0.7	2750	-		-	-		-	0.06	0.65	2,750	
student hourly wage		-		-	-		-	-		-	-	-	-	
grad student summer wage		-	-	-	-	-	-	-	-	-	-	-	-	
TOTAL SAL & WAGES		0.91	10.65	89,335	-	-	-	-	-	-	0.91	10.65	89,335	OK
OTHER PAYROLL EXPENSES		Rate			Rate			Rate						
Lead PI - Hall		39%		10136	-		-	-		-			10,136	
PI - D'Antonio		45%		13454	-		-	-		-			13,454	
PI		-		-	-		-	-		-			-	
Other Professional - Garvo		43%		8398	-		-	-		-			8,398	
		-		-	-		-	-		-			-	
Grad Res Assistant - MS		32%		3573	-		-	-		-			3,573	
student hourly wage		8.00%		220	-		-	-		-			220	
student hourly wage		-		-	-		-	-		-			-	
grad student summer wage		-		-	-		-	-		-			-	
TOTAL OPE				35,781			-			-			35,781	OK
TOTAL PERSONNEL COSTS				125,116			-			-			125,116	OK
TRAVEL														
Travel / Domestic														
Travel / Domestic				29,618									29,618	
Travel / Foreign				-			-			-			-	
TOTAL TRAVEL				29,618			-			-			29,618	OK
SERVICE & SUPPLIES														
Materials & Supplies				500									500	
Publication Costs				-									-	
Consultant Services				-									-	
Computer Services				-									-	
Other Fees and Services/Facilitator				4,500									4,500	
Other - Contractor VanderWoude				75,815									75,815	
Other - Contractor Evans				11,796									11,796	
Other - Wimpey				10,800									10,800	
Other - Contingency				25,000									25,000	
TOTAL SVC & SUPPLIES				128,411			-			-			128,411	OK
TUITION ** (assumes GRAs appointed at 0.49FTE)														
GRA 1 - MS				9,150			-			-			9,150	
GRA 2 = PhD				-			-			-			-	
TOTAL TUITION				9,150			-			-			9,150	Ok
SUBCONTRACTS +		modified	excluded		modified	excluded		modified	excluded		modified	excluded		
Institution 1		-		-	-		-	-		-	-		-	
Institution 2				-			-			-			-	
Institution 3				-			-			-			-	
TOTAL SUBCONTRACTS		-		-	-		-	-		-	-		-	OK
TOTAL DIRECT COSTS				292,295			-			-			292,295	Ok
INDIRECTS MTDC Method														
MTDC BASE		283,145			-			-			283,145			OK
Total Exemptions		9,150			-			-			9,150			OK
INDIRECT COSTS		17.5%		49,550			-			-			49,550	Ok
TOTAL COSTS				341,845			-			-			341,845	OK

** Excluded in MTDC indirect calculation

Salary+OPE	YEAR 1	YEAR 2	YEAR 3	YEAR 4	YEAR 5	TOTALS
Lead PI - Hall	36,127	-	-	-	-	36,127
PI - D'Antonio	43,352	-	-	-	-	43,352
PI	-	-	-	-	-	-
Other Professional - Garvo	27,928	-	-	-	-	27,928
0	-	-	-	-	-	-
Grad Res Assistant - MS	14,739	-	-	-	-	14,739
student hourly wage	2,970	-	-	-	-	2,970
student hourly wage	-	-	-	-	-	-
grad student summer wage	-	-	-	-	-	-

Domestic	29,618	-	-	-	-	29,618
Foreign	-	-	-	-	-	-

G. Other Direct Costs fastlane						
1. Materials & Supplies	500	-	-	-	-	500
2. Publication Costs	-	-	-	-	-	-
3. Consultant Services	-	-	-	-	-	-
4. Computer Services	-	-	-	-	-	-
5. Subawards	-	-	-	-	-	-
6. Other	127,061	-	-	-	-	137,061
Other Fees and Services /Facilitator	4,500	-	-	-	-	4,500
Other - Contractor VanderWoude	75,815	-	-	-	-	75,815
Other - Contractor Evans	11,796	-	-	-	-	11,796
Other - Wimpey	10,800	-	-	-	-	10,800
Other - Contingency	25,000	-	-	-	-	25,000

F. Other Direct Costs Grants.gov RR Budget						
1. Materials & Supplies	500	-	-	-	-	500
2. Publication Costs	-	-	-	-	-	-
3. Consultant Services	-	-	-	-	-	-
4. ADP/Computer Services	-	-	-	-	-	-
5. Subawards	-	-	-	-	-	-
6. Equipment or Facility Rental/User Fees						
7. Alterations and Renovations						
8. Tuition	9,150	-	-	-	-	9,150
9. Other Fees and Services	4,500	-	-	-	-	4,500
10. Other	123,411	-	-	-	-	123,411
Total	137,561	-	-	-	-	137,561

Restore Endangered San Francisco Lessingia at Fort Funston, GGNRA

Project Total Cost: $198,515
Funding Source: NRPP Servicewide

Park Unit: Golden Gate National Recreation Area
NPS Contact Person: Alison Forrestel (415) 289-1837
Michael Chassé (415) 561-2857

ABSTRACT

San Francisco Lessingia (*Lessingia germanorum*) is a federally endangered annual herb found in dune habitats on the San Francisco peninsula. This species has been reduced to only two extant locations: the Presidio of San Francisco and near Hillside Park in Daly City, just south of San Francisco. The latter population, which is considered to represent a unique genotype, occurs primarily on private land that is slated for eventual development. **We propose establishing a third population of San Francisco Lessingia by reintroducing this species to Fort Funston, a unit of the Golden Gate National Recreation Area (GGNRA) which is located in the southern portion of the San Francisco peninsula.** Once established, the Fort Funston population of San Francisco Lessingia would support substantially more individuals than the current Daly City population and would also have long term protection from development. **Establishing an additional San Francisco Lessingia population with long term protection is critical to ensuring the recovery of this endangered plant and is one of the key actions identified in the Recovery Plan for this species** (U.S. Fish & Wildlife Service 2003). This project will advance the NPS Climate Change Response Strategy by enhancing ecological resilience and will execute the "In my Back Yard" and "Parks for People" Call to Action items through engagement with neighbors and park users.

BACKGROUND/JUSTIFICATION

The San Francisco Bay Area is recognized as a biodiversity hotspot which supports many rare plant and animal species in a matrix of high density urban and suburban development (Kraft *et al.* 2010; Thorn *et al.* 2009). Many of the rare, threatened and endangered species that occur in the San Francisco Bay Area are protected within the Golden Gate National Recreation Area. One of these species is the federally endangered San Francisco Lessingia (*Lessingia germanorum*).

Figure 1. San Francisco Lessingia

San Francisco Lessingia (Figure 1) is an annual forb in the sunflower family (Asteraceae) that requires open dune habitat to persist. This species is known historically from old coastal sand deposits on the San Francisco peninsula, from Daly City (which is just south of San Francisco) northward to the Presidio of San Francisco. It is currently restricted to only two locations: the Presidio of San Francisco, where it exists in several subpopulations in remnant dune scrub habitats, and near Hillside Park, on the western edge of San Bruno Mountain, in Daly City. The primary reasons the current populations are so restricted are habitat loss due to development and the loss of natural dune processes (U.S. Fish & Wildlife Service 2003). Current population sizes vary dramatically from year to year but are in the range of hundreds to tens-of-thousands of individuals in the Presidio and hundreds to thousands of individuals in the Daly City population (NPS 2015, U.S. Fish & Wildlife Service 2003).

The recovery plan for San Francisco Lessingia identifies two key strategies: 1. Protecting and expanding (where possible) the two extant populations in the Presidio and Daly City, and 2. The establishment of a new population at Fort Funston. Management of the various Presidio sub-populations has been a joint effort between the National Park Service and the Presidio Trust and has been very successful to date. Because the Daly City population is mostly on private land owned by a developer (Figure 2), the long term conservation of this population is uncertain. The Endangered Species Act unfortunately provides very weak protection for listed plants on private land. U.S. Fish & Wildlife Service staffs are very aware of this issue but without a federal nexus they have no direct involvement in conservation of the Daly City location (Elizabeth Warne, USFWS, email communication, 7 December 2011). **Given the progress to date in protecting the Presidio population of San Francisco Lessingia and the challenges in protecting the Daly City population, the key next step in the recovery of this species is the establishment of a new population at Fort Funston.**

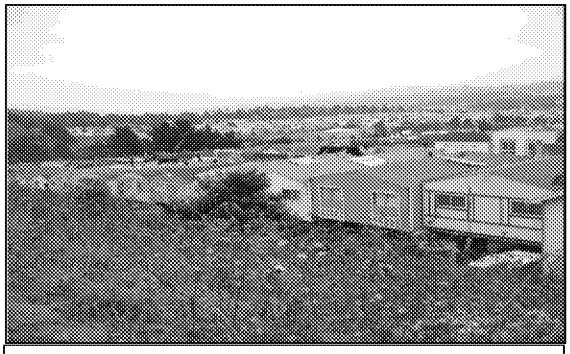


Figure 2. Daly City location of San Francisco Lessingia

Fort Funston is an approximately 200 acre unit of the GGNRA located at the southwestern corner of San Francisco. The vegetation is a mix of native dune and dune scrub, iceplant (*Carpobrotus edulis*) and other invasive plants. This is a popular recreation area which is heavily used by dog walkers. GGNRA recently released a Proposed Rule for Dog Management in the GGNRA, based on the Preferred Alternative described in the Draft Dog Management Plan/Supplemental Environmental Impact Statement (SEIS), which aims to clearly define dog walking rules and establish a habitat protection zone in the northern portion of the unit. The Proposed Rule is expected to be in place before the FY19 funding horizon for this proposal.

The Fort Funston dunes represent the only other large remnant dune habitat that occurs directly within the southern portion of the historic range for San Francisco Lessingia. At least 30 acres of remnant and restorable habitat, suitable for colonization by San Francisco Lessingia, exist at Fort Funston. This makes Fort Funston the last, best area with the potential to support a major population. This project would fund habitat restoration and reintroduction of San Francisco Lessingia at Fort Funston. Establishing a population of San Francisco Lessingia at Fort Funston is critical to ensuring the long term recovery of this species. The GGNRA Natural Resource program has nearly twenty years of experience in managing San Francisco Lessingia habitat in the Presidio of San Francisco. Lessons learned in the management and monitoring of this species at the Presidio's dune habitats will be applied to restoration approaches at Fort Funston.

This project helps meet the directives of the park's enabling legislation which mandates the preservation of the "outstanding natural historic, scenic and recreational values" and "natural character of the area." With three years of funding, and supplemental volunteer support, we expect to restore at least 10 acres of open dune habitat and establish a self-sustaining population of San Francisco Lessingia at Fort Funston.

OBJECTIVES

1. Implement the Recovery Plan for San Francisco Lessingia by establishing a large self-sustaining population of this species at Fort Funston, GGNRA.
2. Restore diverse, native dune habitat on 10 acres currently infested with invasive species.
3. Engage park users at a popular recreation site to educate them about the ecological values of the site.

METHODS

The overall strategy for this project will be a phased approach as recommended in the recovery plan (USFWS 2003). First, small "founder" sub-populations of San Francisco Lessingia will be established in existing bare areas at Fort Funston. After the first year of the project, when these sub-populations are established and spreading spontaneously, surrounding areas of ice plant and other invasive plants will be removed to allow for expansion of San Francisco Lessingia. In addition to seeding/planting and invasive plant removal, we will also actively revegetate with native dune plants that are commonly found growing in areas with San Francisco Lessingia.

Founder Sub-Population Establishment

We will first collect seeds from the Daly City population, which is genetically distinct from the Presidio population. Collecting from this population will allow for the preservation of the southern genotype of this species. The City of Daly City and San Mateo County Parks have expressed their support in working with GGNRA Natural Resources Management staff to facilitate access for seed collection at the Daly City population. We expect seed collection to be complete well before the start of the project. In year one of the project, a portion of the collected seeds will be cultivated through the Golden Gate National Parks Conservancy (GGNPC) Nursery Program. These plants will be transplanted to at least five locations at Fort Funston during rainy weeks in winter. In addition to transplants, we will also sow seed directly into our planting areas. All transplant/direct seed locations will contain bare soil and at least 0.1 acre of intact habitat. We will plant 200 transplants and direct-sow several thousand seeds per site. This approach has been effective at a variety of locations in the Presidio.

Invasive Plant Removal

Once the founder sub-populations are established and expanding spontaneously, during year 2 of the project, we will begin removal of surrounding iceplant and other invasive plants. Iceplant removal will be primarily by hand, which is effective for that species (Brossard *et al.* 2000). Other primary invasive plant species found at the site include wattles (*Acacia* sp.) and Australian tea tree (*Leptospermum laevigatum*). These small trees will be removed with chainsaws and treated with a cut-stump herbicide application. Approximately 10 acres of invasive plants will be removed through this project. Initial removal will be done with contractors and follow-up removal of invasive plants will be done by volunteers.

Revegetation

Native dune species known to coexist with San Francisco Lessingia will be direct-seeded or planted in the invasive plant removal areas. All plants will be collected and grown by the GGNPC nursery program using local seed sources. All seeding and planting will take place in year three of this project, after invasive plant removal has been completed.

In addition to the endangered San Francisco Lessingia, the following dune annual plant species will be established in restoration areas at Fort Funston. These include dune gilia (*Gilia capitata* subsp. *chamissonis*), San Francisco spineflower (*Chorizanthe cuspidata* var. *cuspidata*), coastal cryptantha (*Cryptantha leiocarpa*), strigose lotus (*Acmispon strigosus*), seaside fiddleneck (*Amsinckia spectabilis*), contorted primrose (*Camissonia strigulosa*), small primrose (*Camissoniopsis micrantha*), wild carrot (*Daucus pusillus*), blue toadflax (*Nuttallanthus texanus*), California plantain (*Plantago erecta*), and silver puffs (*Uropappus lindleyi*). Dune gilia and San Francisco spineflower are listed as rare by the California Native Plant Society.

Interpretive Component

This project provides a unique opportunity for public outreach and education and to directly engage park users and neighbors in stewardship and restoration in the park. Fort Funston is heavily used for recreation, but its biological value is not well understood by the public. Our primary means of education and outreach about this project will be through direct engagement of recreational users in habitat restoration work including invasive plant follow-up removal and planting native species. We already have an active volunteer program at this site which is a joint effort between the GGNPC and GGNRA staff, so it will be a seamless transition to recruit additional volunteers to work on this project. This existing volunteer program currently hosts a very popular monthly drop in program and is also a popular site for corporate and school volunteer days because of its close proximity to San Francisco ([HYPERLINK "http://www.parksconservancy.org/get-involved/volunteer/drop-in-programs/park-stewardship-san-francisco.html"]). During the course of this project, we will increase the number of drop in programs at Fort Funston in order to directly engage volunteers in restoration of this endangered plant. We will also host corporate and school groups at the project site. Fort Funston also hosts the San Francisco Unified School District (SFUSD) Environmental Science Center. We will coordinate with the SFUSD Science Technology Engineering and Math (STEM) Team to incorporate this project into the STEM program for local public school children.

In addition to education and outreach through direct volunteer experience, we will also reach out to park users through on site signage, on site public information coordinators (PIC's), social media and the park website. GGNRA has a robust PIC program which consists of staff trained in talking with the public about natural resources issues and projects. During some phases of project implementation, especially phases involving contractor tree removal, we will have PIC's on site to discuss the project with the public. We have found that this is a very effective method of engaging the public and ensuring buy-in on park projects. We will also use park social media and website channels to highlight the project and educate park users. Lastly, we will also use more traditional approaches such as developing a resource bulletin about the San Francisco Lessingia that can be printed as a flier and adapted into an informative temporary sign. Fliers will be distributed through existing outreach pathways and 1-2 signs (using existing windmasters or real estate sign posts) will be installed along the trails where work is most visible to the public.

Product Description: Direct public engagement through volunteer and school programs; direct public engagement with on-site Public Information Coordinators (PIC's), on site signage, web content, social media content.

Purpose: The purpose for the direct public engagement through volunteer and school programs is to provide opportunities for deep and meaningful education about the project, connection to the project site and education about natural resources and biodiversity. The purpose for public engagement with PIC's and on site signage is to inform park visitors already at the site about project activities that are in process, to increase buy-in for the project and to provide broad information about natural resources and biodiversity. The purpose for web and social media content is to inform a broader audience about the project and provide broad information about natural resources and biodiversity.

Human Dimensions of the Issue: The broad issue that will be the focus of our interpretative outreach efforts is the importance of biodiversity and the role of restoration in protecting and maintaining biodiversity. Humans play a critical role both in the threat to biodiversity (e.g. habitat loss due to urbanization) and in the protection of biodiversity. Because of our heavy emphasis on volunteer engagement with this project, we will focus on the role of humans in protecting and restoring biodiversity. At Fort Funston in particular, there is a conflict between recreational use by dog walkers and natural resources protection. We will cover this issue in our volunteer programs and PIC contacts, but not in our written outreach materials.

Target Audience: We aim to reach a variety of audiences with our interpretation and outreach efforts. Through our volunteer programs we will reach park users who have an above average level of interest and commitment to the GGNRA. Through our work with the San Francisco Unified School District, we will reach 6th through 12th graders who are members of the local community and may or may not be current park users. Through the PIC's and on-site signage, we will target current users of Fort Funston which includes large numbers of dog walkers as well as members of the local community. Through web and social media contact, we will reach a broad group of users who have expressed some interest in the GGNRA, but not necessarily interest in Fort Funston or natural resources management in particular.

Message: The primary message we will communicate is the importance of biodiversity and role of restoration in protecting and maintaining biodiversity. We will focus on particular on what individuals can do to support biodiversity and participate in restoration.

Media and Method: See details in our introductory paragraphs.

Budget: See budget section below.

Partners: We will work with the following individuals on our interpretative component:

- Nancy Caplan, GGNRA Education Lead
- Nathan Hale Sargent, GGNRA Public Affairs Officer
- Jen Greene, GGNPC Public Outreach Coordinator
- Yakuta Poonwalla, GGNPC Community Programs Manager for San Francisco

Project Timeline

Year 1 (FY19)

- Create web content, signage and fliers to explain project and goals (Fall)
- Cultivate 1000 San Francisco Lessingia plants for transplanting to the project site (Fall/early Winter)
- Transplant 1000 San Francisco Lessingia plants and apply seed directly to planting locations (Winter)
- Collect seeds from local native dune plants and deliver to partner nursery for storage and propagation. (Late spring/summer)

Year 2 (FY20)

- Remove 10 acres of iceplant and acacia from areas surrounding founder sub-populations (Fall through Spring

Year 3 (FY21)

- Follow-up invasive plant removal with volunteers (Fall through Spring)
- Plant native dune species in restoration site (Late fall/early winter)

Post-project stewardship:

Staff, interns, and volunteers continue weeding the project area through our existing volunteer programs. Depending on cover after first year following planting, staff and volunteers can infill small numbers of native plants to ensure the establishment of native plants in the project area. In addition, GGNRA staff will conduct annual monitoring of the San Francisco Lessingia population and, as needed, control of invasive species.

STAFFING

This project will be overseen by the GGNRA's Vegetation Ecologist for San Francisco, Michael Chassé. Michael is listed on the Park's section 10(a)(1)(A) permit for San Francisco Lessingia and has years of experience and success managing for and monitoring this species in the Presidio. Michael also has extensive experience with dune habitat restoration in the Presidio and at Muir Beach in Marin County. He will be planning the implementation of the project, coordinating the contracting, and providing the on-the-ground oversight to ensure that project objectives are met.

Michael will be working with GGNRA's Supervisory Vegetation Ecologist, Alison Forrestel, who will help develop and refine implementation and monitoring plans and provide overall management guidance throughout the project, including its planning stages. GGNRA ecologists have the support of the GGNPC's Park Stewardship and Native Plant Nursery programs. Alisa Shor, the Director of the GGNPC's nursery program, has offered guidance by providing information about costs and revegetation methodology. Naomi LeBeau, Restoration Specialist for the GGNPC's Park Stewardship program, is available to guide of volunteer stewardship activities at Fort Funston. Yakuta Poonawalla, Community Programs Manager for the GGNPC, will lead volunteer stewardship events.

BUDGET

	Item/Description	Year 1	Year 2	Year 3	Total
Personnel Costs	**GS-11/5 Vegetation Ecologist** (Permanent Career Seasonal), 160 hours @ $52.71/hr (includes benefits) **– Project oversight**	8433	8433	8433	25299
	GS-5 Biotech (Seasonal) 1040 hours $25.27/hr (includes benefits) – **Implementation and field oversight**	26280	26280	26280	78840
	Public Information Coodinator during contractor invasives removal (80 hours at $17/hr + benefits)		1836		1836
Contractor and Cooperator Costs	**Iceplant removal** (5 person crew @ $50/hr/person for 7.5 days)		15000		15000
	Acacia removal (5 person crew @ $50/hr/person for 10 days)		20000		20000
	Follow-up weeding (5 person crew @ $1102/day* for 8.5 days) *Cost per day for this crew is cheaper than above crew because a different skill set is required for follow-up weeding			9375	9375
	San Francisco Lessingia propagation (1000 plants @ $4.75/plant)	4750			4750
	San Francisco Lessingia planting (500* plants @ $3.75/plant) *Half of planting will be done by volunteers		1875		1875
	Native dune species propagation (5000 plants @ $4.75/plant)		23750		23750
	Native dune species planting (2500* plants @ $3.75/plant) *Half of planting will be done by volunteers			9375	9375
	Outreach Development	4376			4376
	Printing/Posting Costs	1039			1039
Supplies	**Field supplies**	1000	1000	1000	3000
Total		**$45,878**	**$98,174**	**$54,463**	**$198,515**

In-kind Support

During Project Implementation

During the funding period for this project, at least 20 group volunteer days will be held, providing at least 250 hours of volunteer labor (field and nursery). The estimated value of this volunteer support is $6045 (Independent Sector 2011). This project will receive in-kind support in the form of guidance and advising from the GGNRA Vegetation and Restoration Ecologist, the GGNRA Supervisory Vegetation Ecologist, and the GGNPC's Restoration Specialist. GGNRA will also cover GSA vehicle costs as in-kind support ($1800).

Additionally, we will receive guidance from our partner's Nursery Manager totaling approximately $2000 of in-kind services. Lastly, we expect to support this project through small grants obtained through our non-profit partner, the GGNPC. We typically receive approximately $2000 per year in grant funds from this source to support miscellaneous project needs. We also anticipate applying for USFWS Extinction Prevention Funds to support this work.

PRODUCTS AND RESULTS

1. Establish a self-sustaining population of San Francisco Lessingia at Fort Funston, using seed from the Daly City population. This new Fort Funston population should reach at least 10,000 plants after 5 years.
2. Over a three-year period, conduct dune restoration and vegetation management on 10 acres that are currently infested by iceplant and other species. Maintain iceplant cover at 5% or less by the end of the funding period.
3. Increase volunteer capacity at Fort Funston by 25% over the project period to leverage staff and contractor funding and to promote the long-term sustainability of San Francisco Lessingia habitat.

RANKING CRITERIA

1. Significance of Resource.
The Golden Gate National Recreation Area has more threatened and endangered species than any other National Park in the continental US. The federally endangered San Francisco Lessingia is one of these listed species and is a top natural resource management priority for the park. This plant is known to occur in only two locations, one of which is on private land that has been proposed for development. Protecting unique, rare, threatened and endangered species, such as the San Francisco Lessingia, is a fundamental part of the GGNRA's mandates, as described in our enabling legislation (1972) which mandates the preservation of the "outstanding natural historic, scenic and recreational values" and "natural character of the area."

2. Severity of Resource Threat
The current global population of San Francisco Lessingia is limited to scattered sub-populations within the Presidio of San Francisco and a single population near Hillside Park in Daly City. Further expansion of San Francisco Lessingia within the Presidio is limited by land use boundaries established by the Presidio Trust and NPS in their 2001 Vegetation Management Plan and Environmental Assessment. The Daly City population occurs primarily on private land that is slated for eventual development. The Endangered Species Act unfortunately provides very weak protection for listed plants on private land. Therefore, establishing an additional San Francisco Lessingia population on lands with long term conservation protection using source material from the Daly City genotype is critical to ensuring the recovery of this endangered plant and is one of the key actions identified in the Recovery Plan for this species (U.S. Fish & Wildlife Service 2003).

Fort Funston represents the greatest potential for restoration of San Francisco habitat within its historic range. However, much of the remnant dune ecosystem is currently dominated by invasive plants such as iceplant (*Carpobrotus edulis*). If this project is delayed, we risk missing the current opportunity for reintroducing San Francisco Lessingia to Fort Funston while the Daly City population is still available as a seed source. This is crucial because the Daly City population is genetically distinct from Presidio populations, is unprotected, and is the most appropriate seed source for Fort Funston (U.S. Fish & Wildlife Service, 2003).

3. Problem Resolution

This project would achieve a key action towards reaching the USFWS recovery goals for San Francisco Lessingia. By establishing a third population of this species on federally protected lands, we will be taking direct steps to increase the resilience of this species, a critical goal in the context of climate change. GGNRA personnel have many years of experience with the restoration techniques proposed as part of this project. Specifically, staff members have been involved with San Francisco Lessingia restoration in the Presidio and have proven success in managing existing populations and restoring habitat for reintroduction. Our vegetation team is also experienced with invasive plant removal techniques that would be employed to prepare habitat for establishing San Francisco Lessingia at Fort Funston. Our vegetation ecologists also have extensive experience with restoring dune habitat and ecosystem function and have successfully restored dune habitat at other park locations such as Baker Beach in the Presidio and Muir Beach in Marin County. Additionally, Fort Funston already has a volunteer-based stewardship program, so we are very confident that we will have capacity to maintain restoration areas over the long term.

4. Cost Effectiveness

This project will take a critical step towards ensuring the long term viability and recovery of the federally endangered San Francisco Lessingia at a relatively low cost. We will achieve this in part by leveraging the already robust volunteer program at Fort Funston. Volunteer hours will assist in project implementation and provide the majority of labor for long term follow up. We will also leverage staff support and in-house expertise for project planning and implementation. Cost estimates are based on extensive experience doing similar work in other parts of the park. This project will provide information to other national parks and land managers trying to conserve highly endangered plants and manage invasive plants including iceplant. We will facilitate information transfer to other land managers by sharing project results at one or more national conferences (George Wright Society, California Native Plant Society, California Invasive Plant Council, Society of Conservation Biology, and/or Ecological Society of America) and via the SF Bay Area Network Parks Science and Learning website ([HYPERLINK "http://www.sfnps.org/"]).

REFERENCES

Brossard, C.C, J.M. Randall and M.C. Hoshovsky. 2000. Invasive Plants of California's Wildlands. University of California Press, Berkeley, CA. 360 pp.

Enabling Legislation of the GGNRA. 1972. [http://www.nps.gov/goga/learn/management/upload/ggnra_legislation.pdf]

Independent Sector. 2011. http://independentsector.org/volunteer_time?s=volunteer

Kraft, N.J.B., B.G. Baldwin, and D.D. Ackerly. 2010. Range size, taxon age and hotspots of neoendemism in the California flora. *Diversity and Distributions* 16: 403-413.

National Park Service. 2015. 2014 Annual Report on Federally Listed Species within areas managed by the Golden Gate National Recreation Area. 38 pp.

Thorne, J.H., J.H. Viers, J. Price, and D.M. Stoms. 2009. Spatial patterns of endemic plants in California. *Natural Areas Journal* 29: 344-366.

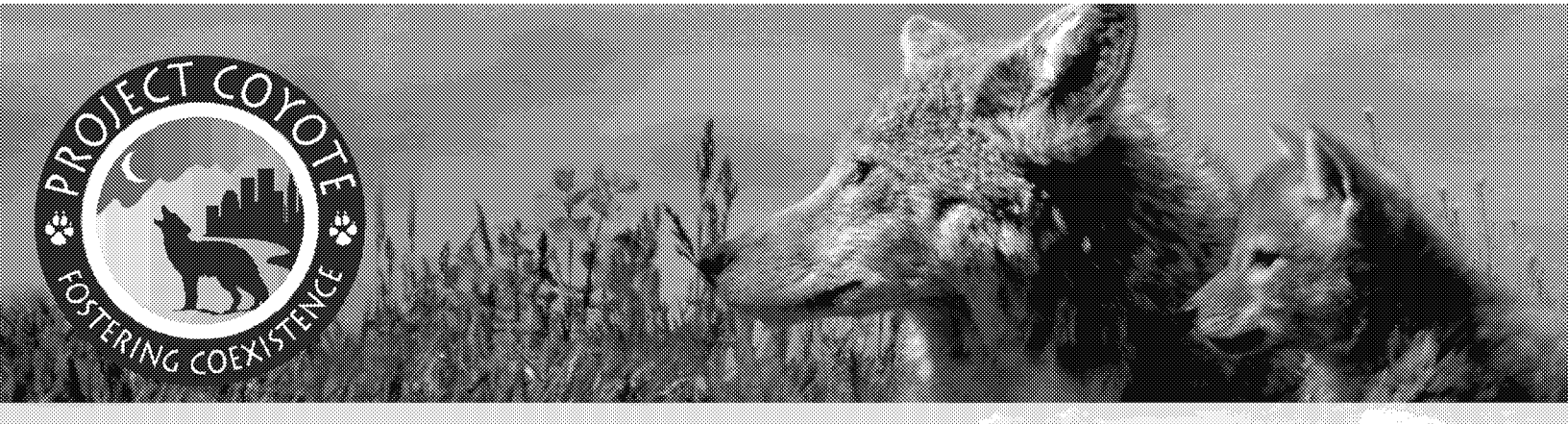
U.S. Fish and Wildlife Service. 2003. Recovery Plan for Coastal Plants of the Northern San Francisco Peninsula. U.S. Fish and Wildlife Service, Portland, Oregon. xvi + 304 pp.

Monitoring & Management Research Program for Dog Management Plan
in the Golden Gate National Recreation Area

Summary of Timeline & Deliverables

Project Duration: November 1, 2016 to December 31, 2017

Task item/deliverable	Date	Notes
1a. Literature review draft summary points	11/14/16	Survey of literature to inform first site visit
1b. Literature review final report	1/15/17	Complete prior to 2nd site visit and indicators meeting with park staff
2. Field visit 1	11/28/16-12/2/16	"show me" trip and team visit with specialists in field
2. Field visit 2	1/16/17-1/20/17	Visit selected sites; meet with NPS staff to discuss indicators
2. Submit meeting minutes	1/30/17	
3a. Draft visitor use & ecological matrix	2/20/17	
3b. Final visitor use & ecological matrix	3/5/17	
3b. External peer review of matrix & proposed representative indicators with range of potential standards	3/15/17	
4a. Selection of indicators & begin review of standards	3/20-3/23	NPS staff workshop; Formerly part of Task 5; moved to task 4
4a. Report on technology and software choices and recommendations as applications for monitoring program	3/20/17	Review & recommendations for technology applications and software program(s)
4a. Draft protocol & field guide	5/1/17	
4a. Review draft protocol by NPS staff	5/15/17	
4b. Final protocol & field guide	6/10/17	
4b. Peer review of protocol	6/20/17	
5. Public engagement workshops(3);(1) staff and team mtg	6/26/17-6/30/17	1 NPS meeting & 3 public meetings within 1 week
5. Finalize protocols and field guides	7/20/17	
6. Field training	8/1/17-8/5/17	
7. Example monitoring report	11/1/17	Summary of 2017 data and example report
7. Video conference with NPS staff	12/1/17	Discuss analysis & reporting



BE COYOTE AWARE

THEIR LIVES AND YOUR SAFETY DEPEND ON YOU

Coyotes are common throughout North America, including in urban areas. You may see and hear them more during mating season (Dec-Feb) and when juveniles are dispersing from family groups (Sept-Nov). These facts and safety tips will help increase comfort and decrease conflicts when living or recreating near North America's native "Song Dog."

FACTS

- Coyotes are members of the dog family; they are curious, adaptable, and learn quickly.
- Coyotes often mate for life, are devoted parents, and are highly communicative (barks, yips, howls).
- Coyotes weigh 18-35 pounds in the West and 30-50 pounds in the East. They live alone, in pairs, or in small family groups.
- Coyotes eat large numbers of rodents, as well as fruit, vegetation, insects and carrion. They help keep ecosystems vital, healthy and clean.

SAFETY

- **DON'T FEED COYOTES.** Their life and your safety depend on coyotes remaining wild and naturally wary of people.
- Coyotes may be more protective of dens/ territories during pup rearing (April-Aug). Walk dogs on leashes. Pick up your small dog if you see a coyote.
- If approached, don't run. Wave arms, make noise and walk toward the coyote until he retreats. Be "Big, Bad and Loud."
- Do not attract a coyote; pick up trash.
- Appreciate coyotes from a distance. Share this information with family and friends.

DO NOT FEED COYOTES. HELP KEEP THEM WILD AND WARY!

Report coyotes or the feeding of coyotes to the Marin Humane Society, 415.883.4621

It is illegal to feed wildlife (Marin County Ordinance 8.04.226)

MARIN COUNTY PARKS PRESERVATION · RECREATION

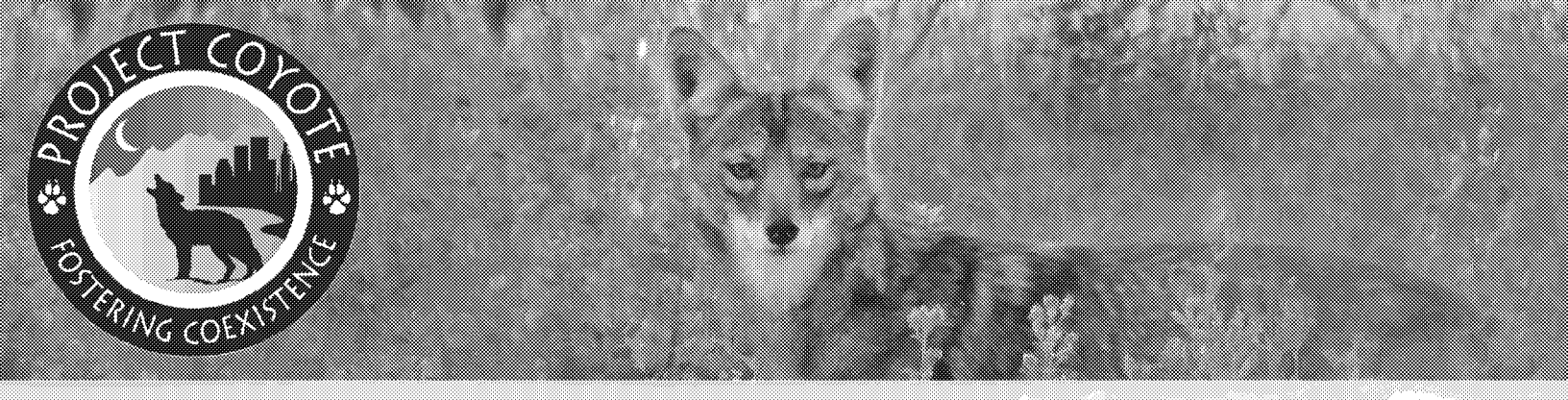
The Marin Humane Society

wildcare

PROJECT COYOTE FOSTERING COEXISTENCE

PROJECTCOYOTE.ORG

GGNRA191926



Feeding Wildlife:

It's hard to resist feeding the wildlife but please don't — for their heath and your safety.

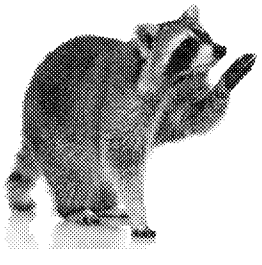
THEIR HEALTH

- The native animals who live here, including coyotes, birds, squirrels, raccoons, and other wildlife, need nature's diet to be healthy.
- Human food is "junk food" for wildlife. Well-intentioned handouts may cause disease, injury, and even death for the animals.
- Providing unnatural food encourages wildlife to congregate in large numbers, leading to territorial fighting, attacks by predators, and being hit by cars.
- Animals you feed today may be killed as "pests" tomorrow. Don't harm wildlife with your kindness... help them remain healthy, safe, and free.

YOUR SAFETY

Native animals who eat human food:

- May bite, scratch or threaten other visitors.
- May come into conflict with your pets.
- May spread disease.



FED WILDLIFE IS DEAD WILDLIFE. IF YOU CARE, DON'T FEED!

PROJECTCOYOTE.ORG

TASK ORDER: GOLDEN GATE NATIONAL RECREATION AREA
Dog Monitoring Program and Protocol Development

1. Background

Golden Gate National Recreation Area (GGNRA) is in need of assistance in developing a dog use monitoring program. This effort would include the generation of protocols for visitor use and biophysical impact related indicators, and the establishment of guidance for the implementation of a dog use monitoring and management program. Additionally, this task order will facilitate dialogue with GOGA staff to identify the visitor experience and resource quality issues associated with managing 20 various park locations in the management unit for various types of dog use by the public and commercial dog walkers. Dog management issues are contentious and have a long history of planning and public engagement with the upcoming proposed rule due out in Fall 2015..

The history of dog walking in some areas of GGNRA began prior to the establishment of the park, when dog walking, including off-leash dog walking, occurred informally at sites under various jurisdictions in San Francisco and Marin counties. In the park's early years, those practices continued largely uninterrupted in spite of the existence of the NPS pet regulation prohibiting off-leash dog walking within areas of the National Park System. 36 CFR 2.15. Park staff recognized and documented issues arising from these practices during this time period.

The park's enabling act established the GGNRA Citizens' Advisory Commission, which coordinated public involvement for the park. In 1978, responding to input from dog walkers, the Commission developed a pet policy with input from park staff which provided general guidance for dog walking and recommended locations for both on-leash dog walking and off-leash or "voice control" dog walking in certain park areas. In 1979, the Commission recommended the pet policy to the park Superintendent, which included a recommendation that the NPS promulgate a special regulation to allow off-leash dog walking in GGNRA. Although the NPS never promulgated this special regulation, for more than 20 years the recommended 1979 Pet Policy was unofficial practice in contravention of Service-wide regulations that require pets to be restrained on a leash no longer than 6 feet or otherwise physically confined at all times. 36 CFR 2.15.

Since the 1990s, the San Francisco Bay Area population and overall use of GGNRA lands have increased, as have the number of private and commercial dog walkers in the park. At the same time, the number of conflicts between park users with and without dogs has risen, as has the fear of dogs and dog bites or attacks. During this time, Park staff have also gained greater knowledge of park resources. These resources include several species with habitat in areas used by dog walkers that have been listed as threatened, endangered, or special-status species requiring special protection, as well as both plant and animal species native to the area requiring protection under the NPS's broader mission and mandate.

Because the San Francisco Bay Area is highly urbanized and some adjacent city, county, and state public lands have either no, few or limited large areas available for dogs or more restrictions on their lands, use by urban dog owners has been pushed onto NPS coastal lands. For residents of San Francisco and Marin counties, and increasingly for San Mateo residents, GGNRA lands are their "backyards," and residents have come to expect NPS lands to be made available for dog walking and other recreational activities despite its national park status and primary mandate to preserve and protect park resources and values..

In addition, the coastal areas with the park are very popular parts of the San Francisco Bay Area, a region whose population is currently over seven million and is expected to grow to eight million by 2020.

Underscoring the increasing conflict over off-leash dog use, dog walking groups and individuals have filed two lawsuits against the NPS when park management actions threatened the status of off-leash areas. The first lawsuit, in 2000, responded to the closure of a portion of an off-leash area that the park instituted to provide resource protection, restoration, and public safety. In 2004, a second lawsuit responded to an attempt by the NPS to transition and bring GGNRA into compliance with the NPS pet regulation as it proceeded with dog management planning. In both instances, the federal district court found that, except in an emergency, the NPS did not have the authority to either close or impose significant, long-term restrictions of public use of areas that had allowed off-leash dog walking pursuant to the 1979 Pet Policy, recommended by an Advisory Commission, without first completing a public notice and comment process. United States v. Barley, 405 F. Supp. 2d 1121 (N.D. Cal., June 2, 2005).

In 2002, the NPS issued an Advance Notice of Proposed Rulemaking asking for public input as to whether the NPS should consider developing a new regulation for dog walking in GGNRA. Following review of public comments, the NPS initiated planning under the National Environmental Policy Act of 1969 (NEPA), together with a Negotiated Rulemaking process, in an effort develop a proposed rule with stakeholder input. The Negotiated Rulemaking Committee did not reach consensus on a proposed rule, leaving the NPS to develop a range of alternatives for the draft Dog Management Plan/Environmental Impact Statement (draft Plan/EIS) that was released for public comment in 2011. The resulting significant public comment necessitated a Draft Dog Management Plan/Supplemental Environmental Impact Statement (draft Plan/SEIS) that was released for public comment on September 6, 2013. The public comment period for the draft Plan/SEIS closed on February 18, 2014. The draft Plan/SEIS is available online at http://parkplanning.nps.gov/goga by clicking the link entitled "GGNRA Dog Management Plan" and then clicking the link entitled "Document List." In all instances, the development of this monitoring program for purposes of ensuring compliance will need to be consistent with the SEIS's references on pages 63-68 in Chapter 2, and help ensure that the park does not allow any impacts identified therein to result in either impairment or "unacceptable impacts" as identified in NPS Management Policies (2006)1.4.7.1 (Unacceptable Impacts) and 8.2(Visitor Uses).It will also have to adhere to all NPS regulations regarding the highest scientific integrity and include addressing any comments from the peer-review and a public engagement process.

TABLE 1. GOLDEN GATE NATIONAL RECREATION AREA PARK SITES CONSIDERED FOR DOG MANAGEMENT

(SEE MAPS FOR VISUAL REFERENCES AND AREAS INCLUDED)

Marin County
Stinson Beach (parking lots/picnic areas only;northern access trail to upton beach)
Homestead Valley
Alta Trail / Orchard Fire Road
Oakwood Valley
Muir Beach
Rodeo Beach & Rodeo Valley/Marin Headlands Trails
Fort Baker
San Francisco County
Fort Mason

Crissy Field (including Crissy Field Wildlife Protection Area (WPA))
Fort Point Promenade / Fort Point National Historic Site (NHS) Trails
Baker Beach and Bluffs to Golden Gate Bridge
Fort Miley
Lands End
Sutro Heights Park
Ocean Beach (including Ocean Beach Snowy Plover Protection Area (SPPA))
Fort Funston
San Mateo County
Mori Point
Milagra Ridge
Sweeney Ridge
Rancho Corral de Tierra

The proposed initiation of the monitoring program responds to a commitment to the development of monitoring-based management strategies (MMS). MMS will gauge the effectiveness of management actions in minimizing violations of the dog walking special regulation, and resource and experiential quality effects caused by allowing various dog walking regulations across the 20 park locations. This iterative process requires GGNRA to undertake cyclical monitoring of these sites with indicators that are scientifically defensible and grounded. Additionally, this effort will facilitate the generation and management vetting of standards in which GGNRA will compare results and the need for follow-up prospective management actions.

NPS will prepare annual reports documenting monitoring data collected and any consequent outreach, enforcement, and/or following further non-compliance, consideration of short-term or longer term management actions, including short-term or long-term closures with public notice subject to 36CFR1.7, additional permitting or permit restrictions, and/or other management actions necessary to avoid "unacceptable impacts." NPS will also release a preliminary report providing baseline data after the first 6-12 months of monitoring.

Below are examples of federal regulations that will be monitored for compliance thru a phased program:

- Vegetation damage: 36 CFR 2.1 (a) (1) (ii)
- Wildlife disturbance: 36 CFR 2.2(a)(2)
- Disturbance to threatened and endangered species: 36 CFR 2.2 (a) (2), 50 CFR Part 17
- Violation of areas closed to dogs (threatened and endangered species and sensitive habitat): New Part 7 Special Regulation or 36 CFR 2.15
- Violation of areas closed to all (threatened and endangered species and sensitive habitat): 36 CFR 1.5 (f) or 36 CFR 2.15
- Violation of areas closed to dogs (safety): 36 CFR 1.5 (f), New Part 7 Special Regulation or 36 CFR 2.15
- Hazardous condition (aggressive behavior, pet rescues): 36 CFR 2.34 (a)

- Degree of compliance with special regulation (eg. no dogs, on leash, off-leash zones; uncontrolled dogs): New 36 CFR Part 7 Special Regulation or 36 CFR 2.15
- Government property damage: 36 CFR 2.31 (a) (3)
- Pet excrement: 36 CFR 2.15 (a) (5).

2. Introduction

This work outlined in this task order is performed for GGNRA with technical assistance provided by the National Park Service Social Science Branch (SSB) in the Washington Office (WASO) Natural Resources Stewardship and Science Directorate. Both recreation use and its impact, monitoring program design, sampling and implementation related to dog monitoring, and regionally specific ecological expertise, (especially with knowledge and expertise on dog walking impacts on wildlife, including shorebird and small and mid-size mammals, as well as native and sensitive vegetation, is required to fulfill the tasks associated with this task order. The contractor is expected to assemble a research and monitoring team with particular expertise related to dog walking impacts and the implementation of such a field monitoring program that must be approved finally by the NPS before initiating its work.
The Contractor will perform the following tasks.

Task 1:
Conduct a literature review and report on visitor use-specific impacts on ecological conditions (regionally specific or applicable, where feasible and available, and dog/pet/walker recreational impacts), starting with the SEIS research citations. Synthesize information down to critical elements for GGNRA consumption with the intent to develop a practical, scientific-based, dog monitoring compliance program to inform Monitoring-based Management Strategies (MMS).

a. Broader dog/pet recreation and associated ecological impact literature relevant to this issue and specific to the GGNRA research and monitoring requires increased understanding of the issues associated with the key GGNRA resource conditions, specific (flora and fauna) species sensitive to dog walking and applicable to the 20 sites, as referenced in the SEIS.[**any literature review should be informed by the very substantial literature reviews already conducted]**
b. The Contractor will consult with the NPS Technical Representative concerning the content and format of the literature review report for Task 1 and will provide draft deliverables to the NPS Technical Representative for review and comment before considered final.

Task 2:
Conduct two five-day field visits to GGNRA to review and advise on the representative indicators for key impacts at 20 sites with recreation, monitoring, and ecological specialists and managers at GGNRA. **Field visit one** will be used to outline, understand, and prioritize the issues and current state of knowledge surrounding dog management and development of a monitoring program along with GGNRA staff meetings. This includes primarily site visits for key members of the monitoring and protocol development team. **Field visit two** will prioritize the indicators and identify range of potential standards with GGNRA Leadership team and include follow up site visits.

a. Contractor will travel to GGNRA with various subject matter experts (representing ecological impacts, dog monitoring, recreation and human dimensions experts provided by Contractor) to identify the natural resources, visitor use, regulations and geographic context of the sites.
b. Contractor will use these field visits to conduct Task 3 & 4.

c. Contractor will summarize the field visits with minutes. The Contractor will consult with the NPS Technical Representative concerning the content and format of the minutes and will provide them first in draft to the NPS Technical Representative for review and comment before considered final.

Task 3:

Prepare an visitor use and ecological monitoring matrix and assessment (report) that outlines the core visitor experience and resource impact issues which are being protected at each of the 20-22 sites(from SEIS – note that the number of sites may vary depending on land acquisition).

a. Identify a matrix of the key visitor experience and sensitive natural resources that are being impacted at each site(from SEIS).
b. Utilize SEIS and GGNRA managed and external data sources that outline species location, visitor use data, and any additional data sources(like 36 CFR violations) that are available to demonstrate importance of sampling rationale and resource issues in relation to dog management and the monitoring program. The Contractor will rely on GGNRA staff and regional ecological expertise to identify the data resources to conduct this task.
c. For natural resources, the Contractor will outline the sites where these impacted natural resources are located and the rationale as to what would make most sound & measureable indicators within the dog monitoring program.
d. Spatial identification of appropriate, analogous control sites for impact comparisons for 5-7 similar park areas
e. The Contractor will consult with the NPS Technical Representative concerning the content and format of the ecological assessment (report) for Task 3 and will provide draft deliverables to the NPS Technical Representative for review and comment before considered final.

Task 4:

Develop a draft and final sampling plan and protocols that addresses all 20 sites as sections in a park field monitoring guide (example attached of level of detail for this report) that target prioritized indicators for GGNRA to implement, given its SEIS description of impacts and compliance under a Management Monitoring Strategy. Ensure that program developed is practical and implementable in field, considers best practice technologies, including types of cameras and legal concerns in their use, as well as a phased approach tackling range of most significant impacts first,recognizing different staffing and budgetary levels of federal agency as well as critical impact priorities to address in consult with interdisciplinary GGNRA dog management team.

a. Develop a field monitoring guide that highlights the procedures for sampling, collecting, and analyzing monitoring data. No data collection of monitoring indicators will be collected by the Contractor.
    - The Contractor will consult with the NPS Technical Representative concerning the content and format of the final report for Task 4 and will provide draft deliverables to the NPS Technical Representative for review and comment before considered final.
    - Identify the baseline conditions development needs for each indicator in which to compare incremental monitoring results against over time.
    - Establish a range of recommended sampling strategies for indicators with frequencies for monitoring indicators to ensure a defined range of statistical confidence in results for frequently-visited vs. remote park sites, and management decisions regarding each site to avoid "unacceptable impacts."
    - Include staffing needs for sampling approaches throughout the year and addressing visitation seasonality and results representation.

- Outline the recommended types of quantitative analyses required to report on monitoring results; provide GGNRA protocosl for data collection efforts as part of field guide.
- Recommend different approaches and capabilities for summarizing results and the associated representativeness and limitations of such results. Incorporate selected methods with protocols into field guide.
- Field monitoring guide reporting will be delivered to GGNRA and the SSB in hard copy (four copies) and electronic formats (PDF and Word).
- The draft report will be reviewed and commented on by GGNRA staff and select non-NPS subject matter experts to conform to the NPS Guidelines on peer review processes before proceeding with the finalization of the report. Contractor will have to address all peer review comments and integrate responses to the substantive ones in the final report.
- Peer review and NPS review of the field monitoring guide will take place within the 60-day period outlined in the Contractor's workflow. Peer review will comply with the NPS Interim Guidance (http://www.nps.gov/policy/Interimpeerreview.htm).

Task 5:
Conduct and facilitate a three-day workshop with GGNRA Leadership to establish final indicators and standards for the dog monitoring program.

a. The Contractor will introduce the prioritized indicators and respective protocol developed that have been occurred per the previous tasks. Based on this overview in addition to additional relevant knowledge to advise standards, the Leadership team will select standards to be used in the reporting deliverables.
    - Meeting minutes will be generated by the Contractor and reviewed/approved by GGNRA.
b. The Contractor will report the standards generated from the workshop via meeting minutes and incorporate them into the field monitoring guide (report) within each respective indicator section.
    - Reporting will be delivered to GGNRA and SSB in hard copy (four copies each respectively) and electronic formats (PDF and Word).
    - Highlight key points for full-scale implementation of the dog monitoring program in successive phases.

Task 6: Facilitate public engagement process and public understanding in development of a draft and final proposed dog management monitoring program

- Author four briefing statements with posters and tools for public engagement summarizing the task order efforts in developing a sound, compliance-based NPS monitoring program with the audience being GGNRA stakeholders particular to dog management and monitoring interest.
- Serve as monitoring program 'experts' in (4) public fora on indicators and standards selected for principal, representative ecological and visitor use impacts from SEIS.
- Facilitate a public engagement process with key contractor team expertise and GGNRA staff to facilitate public involvement and understanding in development of these indicators and standards and get public input thru 4 rounds with key stakeholder groups over 2-3 month period in GGNRA prior to implementation.

Task 7: Train field staff in adopted protocols for monitoring program

Provide field training to monitoring staff on indicators and data collection related to full range of impact topics

Provide field data collection sheets and/or data program that allows for simple recording and summarization

Pre-test field monitoring observations by staff with QA/QC report to ensure highest level of sampling representativeness and accuracy.

Deliverables:

The draft and final monitoring program field guide with draft and final sampling plan and protocols addressing each of the GGNRA 20 sites must address SEIS compliance requirements and include field data sheets for data collection, and sectional reports on key visitor use and ecological impacts identified in the SEIS and being addressed herein, along with GGNRA staff meeting minutes, GGNRA workshop minutes and visual reproduction, and graphically-facilitated, public engagement meetings with minutes as the core deliverables for this task order. Draft and final iterations of the field guide and sampling plan shall fully explain the data sources, methods, results, and limitations. While this material is essentially technical in nature, the narrative will use plain English where appropriate for general audiences. Travel and Training time of each team member will also be separate budget item. For example, human dimensions program manager will serve as key monitoring specialist and both program primary author and later monitoring staff trainer, requiring 3-4 visits. GIS layer identifying site specific, representative observation zones for each park location and recommendations on best practice utilizing related appropriate technology will be deliverable of spatial analytics specialist. All deliverables, except public meetings which will require participation of core team, shall be provided electronically to the call order contracting officer with a copy to the COR or technical point of contact defined in the individual call order. The reports shall be submitted in both Adobe (pdf) and Microsoft Word format (doc(x)) formats. Draft and Final Monitoring Program and protocols will meet the standard and level of detail consistent with the example from Colorado Open Space an Mountain Parks(attached).

Clearly outline data management protocols within Task 4 that conforms to SQL Server Compliant database use that can easily be transferred to the park and other users of these raw data. Database architecture shall be reviewed and approved by NPS for ease of transference and querying.

Reporting will be subject to peer and management reviews as required by the NPS Interim Guidance on Peer Review and Directors Order 11B. The Contractor is requiring responding and fully addressing comments via these processes as requested by the peer review manager.
http://www.nps.gov/policy/Interimpeerreview.htm
http:/www.nps.gov/applications/npspolicy/DOrders.cfm

Task orders issued by the National Park Service, Washington Contracting Office, Lakewood, CO shall be sent to:

Contracting Officer's Representative:

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NRSS, Social Science Program
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1201 Oakridge Dr.
Fort Collins, CO 80525
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PLACE OF PERFORMANCE

This task order will be performed remotely at times for the field visits and workshops in San Francisco, CA, particularly in and around the boundaries of GGNRA.

PERIOD OF PERFORMANCE

The period of performance for this task order will commence upon award for a period of 18 months. Please define your performance and deliverables based on the schedule below. Deliverables should address the park's general milestones for a monitoring program implementation as follows:

Dog Mgt Monitoring Program Development Milestones:

- September/October 2015 –Field visits; Contractor interviews of key program staff
- October 2015- Adjust Scope &contract of monitoring program research
- Fall 2015-Develop Preliminary Set of Indicators and Protocols
- *January 2016*-GGNRA workshop
    - Note: (Fall 2015-Draft rule released)
- *Spring 2016*-Draft Monitoring program(internal review)
- Late Spring/Early Summer 2016-Peer-review
- **Summer 2016*-Field Test Baseline conditions
- Late Fall 2016- public engagement workshops (following peer-review of indicators)
- Early Winter 2016/2017-GGNRA workshop: Finalize indicators and standards
- Early 2017-Training & Implementation of Dog Mgt Monitoring program: Phase 1
- Fall 2017-Phase 1 Evaluation

- Late Winter 2018-Implement Phase 2

TASK COMPLETION AND DELIVERABLE SCHEDULE

Task Item/Deliverable	Estimated Dates
1. SEIS and Literature review draft report	9/2015(review; contribute)
2.Core team field trip and GGNRA staff meetings	9/2015(field visits & mtgs X 5 days)
3. Literature review final report	10/2015(reviews; contribute)
4. Meeting notes on field visits(draft and final) & GGNRA staff meetings	Subject to scheduling the visit with GGNRA (field notes on your tasks; mtg notes on your tasks)
5a. Draft visitor use & ecological matrix (report)	11/2015 (contribution)
6. Final visitor use and ecological matrix assessment (report)	12/2015(contribution)
7.Spatial id & mapping of comparable control sites	2/2016
8. Draft field monitoring field guide with protocols without standards	4/2016(major organizer with inputs from others)
9. Draft Sampling plan	5/2016(contribution)
10. Draft Final field monitoring guide (protocols with draft standards)	6/2016(major organizer with inputs from others)
11. Analyses/Responses to Address Peer Review Comments	7/2016(each on contributions)
12. GGNRA indicators and standards workshop minutes (draft and final)-draft and final exec summary and workshop report	Subject to scheduling the visit with GGNRA (a principal contributor)
13. GIS layer of observation zones that address each representative monitoring zone	6/2016(integrate other's work into report)
14 Public Engagement Workshops (4)	Subject to scheduling the visit with GGNRA)a principal contributor for visitor use indicators and protocols)
15. Final field Monitoring guide(addressing peer review and public comments)	12/2016(major organizer with inputs from others)
16. Field Staff Training on Data Collection	5/2016; 12/2016(Principal trainer)

Subject: Draft Agenda for Dog Mgt Plan Coordination mtg.
(Thursday, 9/29:10:30-12PM); Location: GG room.
Call-in #: 1-866-732-4230, then dial Non-Responsive

A. CDW report (10:30-10:45)

-update & report on CDW use (Noemi/Katie)

B. Enforcement Reports(10:40-11)

-LE/USPP weekly field reports (Xave;Tim)
-Status of 2012-2016 incident summaries for FEIS (Xave, Tim)

C. FEIS/final Rule (11-11:30)

-Status of Responses (Mike & Michael)
-Other referred issues from IDT(Mike)
    a. Unattended dog(s)
    b. Uncontrolled dog(s)
-Update on County Ordinances (Mike)
-Maps for FEIS(Mike)
-Updated Regional matrix(Erin)
-FEIS timeline (Mike/Michael)

D. Communications (11:30-11:50)

-Letter from Huffman(Howard/Hale)
-Update on Media/Messaging Results (Erin)
-Status/Comments on Comms Plan (Hale/Kristin/Mike/Michael)
-FOIA Update; Production Schedule: Milestones with Actions Required; Questions TBA for 10/16 (Kristin)

E. Update on Planning Considerations (11:50-12) (Mike)

-Outreach & Educ
-Facilities
-Monitoring

Wildlife responses to pedestrians and dogs

Scott G. Miller, Richard L. Knight, and Clinton K. Miller

Abstract As participation in outdoor recreational activities escalates, land managers struggle to develop management policies that ensure coexistence of wildlife and recreation. However, this requires an understanding of how wildlife responds to various forms of recreational activities and the spatial context in which the activities occur. Therefore, we measured responses of 2 species of grassland songbirds, one species of forest songbird, and mule deer (*Odocoileus hemionus*) exposed to a pedestrian, a pedestrian accompanied by a dog on leash, and a dog alone (only for grassland birds), on and away from recreational trails. We assessed the "area of influence" for each treatment by determining the probability that an animal would flush or become alert (for mule deer only) given its perpendicular distance to a trail or a line of movement in areas without trails. When animals were disturbed, we measured flush distance (the distance between the disturbance and the animal when flushed), distance moved, and, for mule deer, alert distance (the distance between the disturbance and the deer when it became alert). For all species, area of influence, flush distance, distance moved, and alert distance (for mule deer) was greater when activities occurred off-trail versus on-trail. Generally, among on-trail and off-trail treatments in grasslands for vesper sparrows (*Pooecetes gramineus*) and western meadowlarks (*Sturnella neglecta*), the smallest area of influence and shortest flush distance and distance moved resulted from the dog-alone treatment, and these responses were greater for the pedestrian-alone and dog-on-leash treatments. In forests, for American robins (*Turdus migratorius*), the area of influence, flush distance, and distance moved did not generally differ between the pedestrian-alone and dog-on-leash treatments. For mule deer, presence of a dog resulted in a greater area of influence, alert and flush distance, and distance moved than when a pedestrian was alone. Natural lands managers can implement spatial and behavioral restrictions in visitor management to reduce disturbance by recreational activities on wildlife. Restrictions on types of activities allowed in some areas such as prohibiting dogs or restricting use to trails will aid in minimizing disturbance. Additionally, managers can restrict the number and spatial arrangement of trails so that sensitive areas or habitats are avoided.

Key words American robin, disturbance, dog, mule deer, outdoor recreation, pedestrian, trail, vesper sparrow, western meadowlark

As participation in outdoor recreational activities escalates, land managers are becoming concerned about the effects of recreation on wildlife (Boyle and Samson 1985, Knight and Gutzwiller 1995). Because outdoor recreation has become common and widespread, managers must now incorporate actions into their management decisions that minimize potential impacts of these activities. This

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requires an understanding of how wildlife responds to various forms of outdoor recreation and also the temporal and spatial context in which the activity occurs (Knight and Cole 1995).

Information on how wildlife reacts to hikers and dogs is limited, although preliminary evidence suggests that presence of dogs increases the response. For example, mountain sheep (*Ovis canadensis*, MacArthur et al. 1979,1982), golden plovers (*Pluvialis apricaria*, Yalden and Yalden 1990), and marmots (*Marmota marmota*, Mainini et al. 1993) exhibited a greater response when pedestrians were accompanied by a dog compared to solitary pedestrians.

Location and frequency of recreational activities also can influence wildlife responses (Knight and Cole 1995). If animals perceive an activity as spatially predictable and nonthreatening, they may habituate to that activity (Whittaker and Knight 1998). For example, humans approaching from a parking area (an area with consistent human use) elicited less of a response from mountain sheep than did humans approaching from over a ridge, where human use was sporadic (MacArthur et al. 1982).

Of the numerous studies on effects of recreational activities on wildlife, most present information on flush distance (the distance between the activity and the animal when it flushes) as the animal is approached directly by humans. Although birdwatchers, photographers, and others do approach wildlife, most recreationists do not go out of their way to do so. Rather, most recreationists, such as hikers walking on trails, do not commonly leave the trail. To investigate this type of disturbance, we correlated an animal's flush response with its perpendicular distance to the trail or line of human movement. With this information, we were able to assess an "area of influence" for each treatment. Area of influence was defined as the probability that an animal will flush or become alert (for mule deer only) at a given perpendicular distance from a trail or line of human movement. The greater the area of influence, the more disturbing the activity is to wildlife. For example, if the probability of flushing for a bird 30 m away from a trail is 0.40 to a pedestrian accompanied by a dog and 0.70 to a pedestrian alone, then the area of influence is greater for the pedestrian alone.

Our objective was to assess the area of influence around a lone pedestrian, a pedestrian accompanied by a dog on leash, and a dog alone, on and off trails. For animals that flushed, we compared information on flush distance (the distance between the activity and the animal when flushed) and distance moved to further assess the magnitude of disturbance for each treatment. Additionally, for mule deer, we compared information on alert distance (the distance between the activity and the deer when it became alert) among treatments. In grasslands, we recorded responses of vesper sparrows and western meadowlarks to all treatments. In forests, we recorded responses of American robins and mule deer to all treatments except the dog alone. For each species, we tested the null hypothesis that the area of influence and magnitude of disturbance did not differ between treatments.

Methods and study area

We conducted our study on 8,000 ha of City of Boulder Open Space property in and around the city of Boulder, Colorado (40°00′N, 105°18′45″E). Elevation within the study area ranged from 1,219 to 2,438 m, encompassing forest, riparian, shrubland, and grassland habitats. Visitor use on City of Boulder Open Space is approximately 2 million visits/year and is greatest during the spring, followed by summer, fall, and winter (Zeller et al. 1993). Recreational activities included hiking, wildlife viewing, exercising pets, jogging, mountain biking, and horseback riding (hunting is not allowed).

We located study sites in pine forests and mixed-grass prairies. Forests were dominated by ponderosa pine (*Pinus ponderosa*) associated with shrubs, grasses, and forbs. Mixed-grass prairies contained a variety of tall, mid-height, and shortgrass species, including little bluestem (*Schizachyrium scoparium*), western wheatgrass (*Agropyron smithii*), blue grama (*Bouteloua gracilis*), and side oats grama (*Bouteloua curtipendula*).

We conducted treatments on trails and, for off-trail sites, on areas >400 m from trails. Trails received frequent use, whereas off-trail sites were used sporadically by recreationists. We located all sites >800 m from urban development, and >400 m from physiographic features such as forest edge, riparian areas, and ridge lines. Trail width was 1.25 ±0.22 m (mean±1 SE) in the grasslands and 1.17± 0.20 m (mean±1 SE) in the forests.

We collected data between 14 April and 20 July 1996. We rotated visits to on-trail and off-trail sites to avoid repeatedly sampling the same areas. Birds and mule deer were not marked, so we could not assure the same individuals were not multiply sampled.

Grassland

In grasslands, we recorded responses of vesper sparrows and western meadowlarks to 3 activities, on- and off-trail: 1) a pedestrian alone, 2) a pedestrian accompanied by a dog on leash, and 3) a dog alone. We selected these species because of their abundance on the study site, and we were able to obtain adequate sample sizes for statistical comparisons. For treatments involving dogs, we used either a 25-kg or a 40-kg dog. Leash length was 1.8 m. For on- and off-trail dog alone treatments, the dog maintained an approximate distance of 20 m in front of the observer. For dog-alone treatments we assumed that birds were responding to the dog only and not the observer. In no case did the dogs attempt to chase birds.

For on-trail treatments, we detected individual birds on or near the trail ahead of us and proceeded along the center of the trail at approximately 1.5 m/second until the bird flushed or the observer had passed by eliciting no flush response. At that time, the observer stopped momentarily to record: 1) flush response, 2) the perpendicular distance between the bird and the trail, 3) flush distance, and 4) distance moved. On off-trail sites, we located birds on or near our line of movement and proceeded parallel to the bird's position so as to pass by at various distances (0 m to 200 m perpendicular distance). After the bird flushed or the observer passed by eliciting no flush response, we stopped momentarily to record the same information as that for on-trail treatments.

Forest

In forests, we recorded responses of American robins and mule deer, both on- and off-trail, to a pedestrian alone and a pedestrian accompanied by a dog on leash. We selected these species because of their abundance on the study site, and we were able to obtain adequate sample sizes for statistical comparisons. Information for a dog alone was not recorded because we were unable to maintain an adequate distance behind the dog and still assume that robins or deer were responding only to the dog.

We conducted treatments with robins and deer the same as in the grassland trials. For robins, we also measured (to the nearest 1 m) height above the ground (if perched in a tree). For deer, we also recorded: 1) alert response (i.e., lifted its head), 2) alert distance, and 3) time elapsed from when a deer first exhibited a response until it resumed the pre-disturbance behavior. When group size was >1, we recorded information for the first deer to elicit a response. We used a Lietz rangefinder (model 3390) to measure all distances to the nearest 1 m.

Statistical analyses

We used logistic regression (GENMOD procedure, SAS Institute Inc. 1993) to determine whether flush response (and alert response for deer) of individual species was correlated with treatment, perpendicular distance to trail or line of movement, date, time of day, height of bird if perched in tree (for American robins), and group size and sex (for mule deer). For the animals that flushed, we used analysis of variance (SAS Institute Inc. 1988) to compare flush distance among treatments and also distance moved among treatments of individual species. Because we attempted to simulate typical recreationist behavior (i.e., continuing to proceed along the trail or line of movement without stopping), many deer remained alert to our presence until we moved out of their sight. Consequently, mean and SE of time elapsed from when a deer first exhibited a response until it resumed the pre-disturbance activity could not be determined and we did not conduct statistical analysis comparing treatments. For each grassland treatment, we compared flush distance and also distance moved between vesper sparrows and western meadowlarks using *t*-tests (SAS Institute Inc. 1988). We used an $\alpha=0.05$ for all analyses.

Results

Grassland

We conducted 462 and 393 trials for vesper sparrows and western meadowlarks, respectively. For both species, logistic regression models indicated that treatment ($P<0.001$) and perpendicular distance of the bird ($P<0.001$) to a trail or line of movement (for off-trail) were significant predictors of flush response (Figure 1). The shorter the perpendicular distance of a bird to the trail or line of movement, the greater the probability that a bird would flush. For both species, the area of influence was greater for off-trail treatments than for on-trail treatments (Figure 1). For vesper sparrows, on- and off-trail, and also for western meadowlarks on-trail, the dog-alone treatment resulted in a smaller area of influence than the pedestrian-alone or dog-on-leash treatments, which did not differ from each other. For western meadowlarks, area of influence

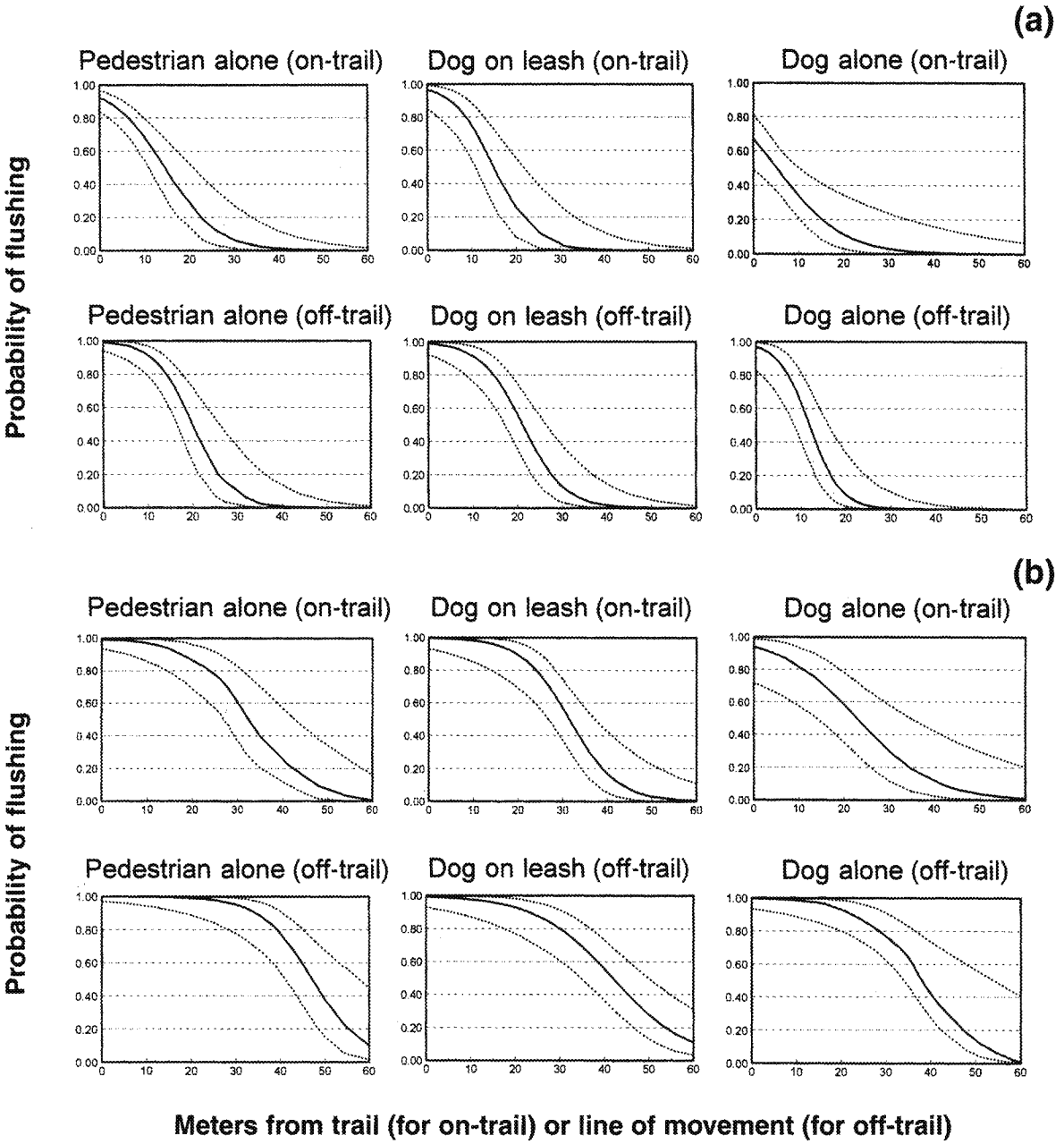


Figure 1. Predicted probability of a vesper sparrow (a) and western meadowlark (b) flushing to treatments in grasslands during 1996, City of Boulder Open Space, Boulder Colorado (dashed lines indicate 95% CI).

did not differ among off-trail treatments. Date and time of day were not significant predictors of whether a bird would flush ($P > 0.05$ for both species).

When vesper sparrows flushed, mean flush distance differed among treatments ($F_{3,269} = 11.75$, $P < 0.001$, Table 1). Flush distance was greater for the off-trail pedestrian-alone and off-trail dog-on-leash treatments than for any other treatment. Other treatments did not differ. For vesper sparrows, distance moved did not differ among treatments ($F_{5,269} = 1.46$, $P = 0.204$, Table 1); however, birds at off-trail sites tended to fly farther when compared to on-trail sites.

When western meadowlarks flushed, mean flush distance differed among treatments ($F_{5,244} = 8.00$, $P < 0.001$, Table 1). For each activity, flush distance was greater for off-trail than on-trail treatments.

Table 1. Mean (SE) of flush distance[a] and distance moved for vesper sparrows and western meadowlarks in grasslands, City of Boulder Open Space, Boulder, Colorado, 1996.

Treatment	Flush distance (m)	Distance moved (m)
Vesper sparrow		
Pedestrian alone (on-trail)	9.25 (0.85)A[b]	43.06 (3.95)A
Dog on leash (on-trail)	10.13 (0.92)A	39.39 (4.56)A
Dog alone (on-trail)	9.89 (1.85)A	35.41 (6.52)A
Pedestrian alone (off-trail)	16.95 (0.87)B	51.49 (5.44)A
Dog on leash (off-trail)	15.11 (0.89)B	52.23 (3.99)A
Dog alone (off-trail)	10.87 (1.16)A	43.43 (5.91)A
Western meadowlark		
Pedestrian alone (on-trail)	30.63 (1.91)A[b]	75.33 (6.55)A,B,C[b]
Dog on leash (on-trail)	28.21 (1.52)A	65.68 (6.09)C
Dog alone (on-trail)	18.78 (2.34)B	91.50 (7.47)B,D
Pedestrian alone (off-trail)	37.73 (2.07)C	95.97 (6.57)D
Dog on leash (off-trail)	36.71 (1.50)C	102.29 (6.73)D
Dog alone (off-trail)	33.50 (2.03)A,C	88.75 (5.38)A,D

[a] Distance between the activity and bird when flushed.

[b] Means with the same letter within a column do not differ ($P > 0.05$).

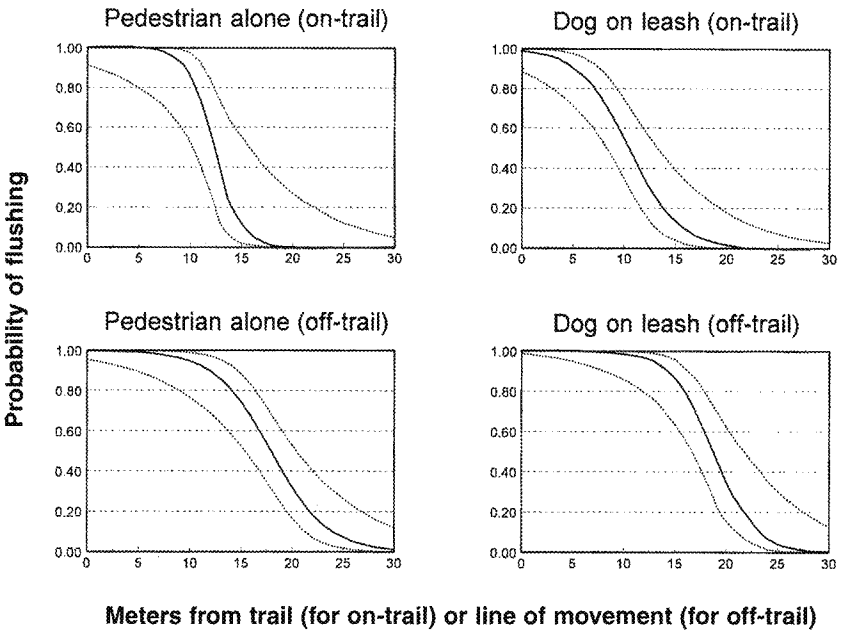
Among on-trail treatments, flush distance was shorter for the dog-alone treatment than either the pedestrian-alone or dog-on-leash treatments, which did not differ. There were no differences in flush distance among off-trail treatments. For meadowlarks, the distance moved after flushing differed among treatments ($F_{5,244} = 3.99$, $P = 0.002$, Table 1). Distance moved was greater for a pedestrian alone and a dog on leash when these activities occurred off-trail vs. on-trail. On- and off-trail dog-alone treatments did not differ. Among on-trail treatments, distance moved differed only between the dog-on-leash and dog-alone treatments, with the latter being greater. There were no differences in distance moved among off-trail treatments.

For each treatment, flush distance was greater for western meadowlarks than for vesper sparrows ($t \geq 2.98$, $P \leq 0.005$) and meadowlarks flew greater distances once flushed ($t \geq 3.40$, $P \leq 0.001$).

Forest

We ran 228 trials for American robins. Logistic regression models indicated that treatment ($P = 0.001$) and perpendicular distance of the bird ($P < 0.001$) to the trail (for on-trail) or line of movement (for off-trail) were significant predictors of flush response (Figure 2). The shorter the perpendicular distance of the robin to the trail or line of movement, the greater the probability that it would flush. The area of influence was greater for off-trail than for on-trail treatments (Figure 2). However, the area of influence did not differ between the pedestrian-alone and dog-on-leash treatments, either on- or off-trail. Date, time of day, and height of bird (if perched in tree) pre-flush were not significant predictors of whether a robin flushed (all $P > 0.05$).

When robins flushed, mean flush distance differed among treatments ($F_{3,129} = 17.92$, $P < 0.001$, Table 2). Flush distance was greater for off-trail treatments than for on-trail, with the greatest flush distance for the off-trail dog-on-leash treatment. Distance moved after flushing also differed among treatments ($F_{3,129} = 3.50$, $P = 0.017$, Table 2). Distance moved was greatest for the off-trail dog-on-leash treatment and shortest for the on-trail pedestrian-alone treatment.



Fiugre 2. Predicted probability of an American robin flushing to treatments in forests during 1996, City of Boulder Open Space, Boulder Colorado (dashed lines indicate 95% CI).

Table 2. Mean (SE) of flush distance[a] and distance moved for American robins in forests, City of Boulder Open Space, Boulder, Colorado, 1996.

Treatment	Flush distance (m)	Distance of Flush (m)
Pedestrian alone (on-trail)	9.61 (0.63)A[b]	14.97 (2.19)A[b]
Dog on leash (on-trail)	9.82 (0.55)A	20.79 (2.09)A,B
Pedestrian alone (off-trail)	13.74 (1.08)B	17.31 (1.85)A,B
Dog on leash (off-trail)	16.27 (0.60)C	23.49 (2.05)B

[a] Distance between the activity and bird when flushed.

[b] Means with the same letter within a column do not differ ($P > 0.05$).

We ran 88 trials for mule deer. Logistic regression models indicated that treatment ($P = 0.003$) and perpendicular distance of the deer ($P = 0.002$) to the trail or line of movement (when off-rail) were significant predictors of alert response (Figure 3). For on-trail treatments, the shorter the perpendicular distance of deer to trail, the greater the probability that it would become alert. The area of influence was greatest for off-trail treatments, where the deer became alert regardless of activity type or their perpendicular distance to the line of movement (Figure 3). On-trail, the dog-on-leash treatment resulted in a greater area of influence than the pedestrian-alone treatment. Deer group size, sex, date, and time of day were not significant predictors of whether a deer would become alert (all $P > 0.05$). When deer did become alert, mean alert distance differed among treatments ($F_{3,72} = 7.97$, $P < 0.001$, Table 3). When comparing each activity individually, there were no differences in alert distance whether the activity occurred on- or off-trail. However, within on- or off-trail treatments, alert distance was greater when a dog was present.

Logistic regression models indicated that treatment ($P < 0.001$) and perpendicular distance of the deer ($P = 0.001$) to the trail (for on-trail) and line of movement (for off-trail) were significant predictors of flush response (Figure 3). The closer the deer was to the trail or line of movement, the greater the probability that it would flush. The area of influence was greater for off-trail treatments than for on-trail (Figure 3). For both on- and off-trail, area of influence was greater when a dog was present. Deer group size, sex, date, and time of day were not significant predictors of whether a deer would flush (all $P > 0.05$).

When deer flushed, mean flush distance differed among treatments ($F_{3,42} = 13.40$, $P < 0.0001$, Table 3). Flush distance was greater for the off-trail dog-on-leash treatment than any other. Because many of the deer that flushed moved out of sight for the off-trail dog-on-leash treatment, we could not calculate mean and SE of distance moved for this treatment. Therefore, we did not include the off-trail dog-on-leash treatment in statistical comparisons of distance moved among treatments. When comparing the other treatments, distance moved differed between treatments ($F_{2,30} = 7.80$, $P = 0.002$, Table 3). Distance moved was greater for the off-trail pedestrian-alone treatment than the on-trail treatments, which did not differ.

Discussion

Wildlife may exhibit diverse responses to various types of recreational activities and may be influenced by the frequency and spatial context in which the activity occurs (Knight and Cole 1995). In general, for vesper sparrows and western meadowlarks, the flush distance and distance moved was shortest and the area of influence was smallest for dog-alone treatments and greatest when a pedestrian was present. Because dogs closely resemble coyotes (*Canis latrans*) and foxes (*Vulpes fulva*) and because these species are typically not considered significant predators on song-

Table 3. Mean and SE of alert distance[a], flush distance[b], and distance moved[c] for mule deer in forests, City of Boulder Open Space, Boulder, Colorado, 1996.

Treatment	Alert distance (m)	Flush distance (m)	Distance moved (m)
Pedestrian alone (on-trail)	45.55 (12.75)A[d]	33.50 (0.50)A[d]	31.50 (1.50)A[d]
Dog on leash (on-trail)	85.37 (8.13)B,C	48.50 (3.75)A	35.89 (5.96)A
Pedestrian alone (off-trail)	66.77 (4.34)A,B	34.19 (4.63)A	77.0 (9.61)B
Dog on leash (off-trail)	100.60 (7.81)C	81.92 (7.85)B	(>76 — >300)[e]

[a] Distance between the activity and deer when it became alert.

[b] Distance between the activity and deer when it flushed.

[c] Mean and SE could not be determined because some deer moved out of view for the dog on leash treatment, therefore this treatment was not included in the analysis.

[d] Means with the same letter do not differ ($P > 0.05$).

[e] Indicates range of distance moved before deer moved out of view.

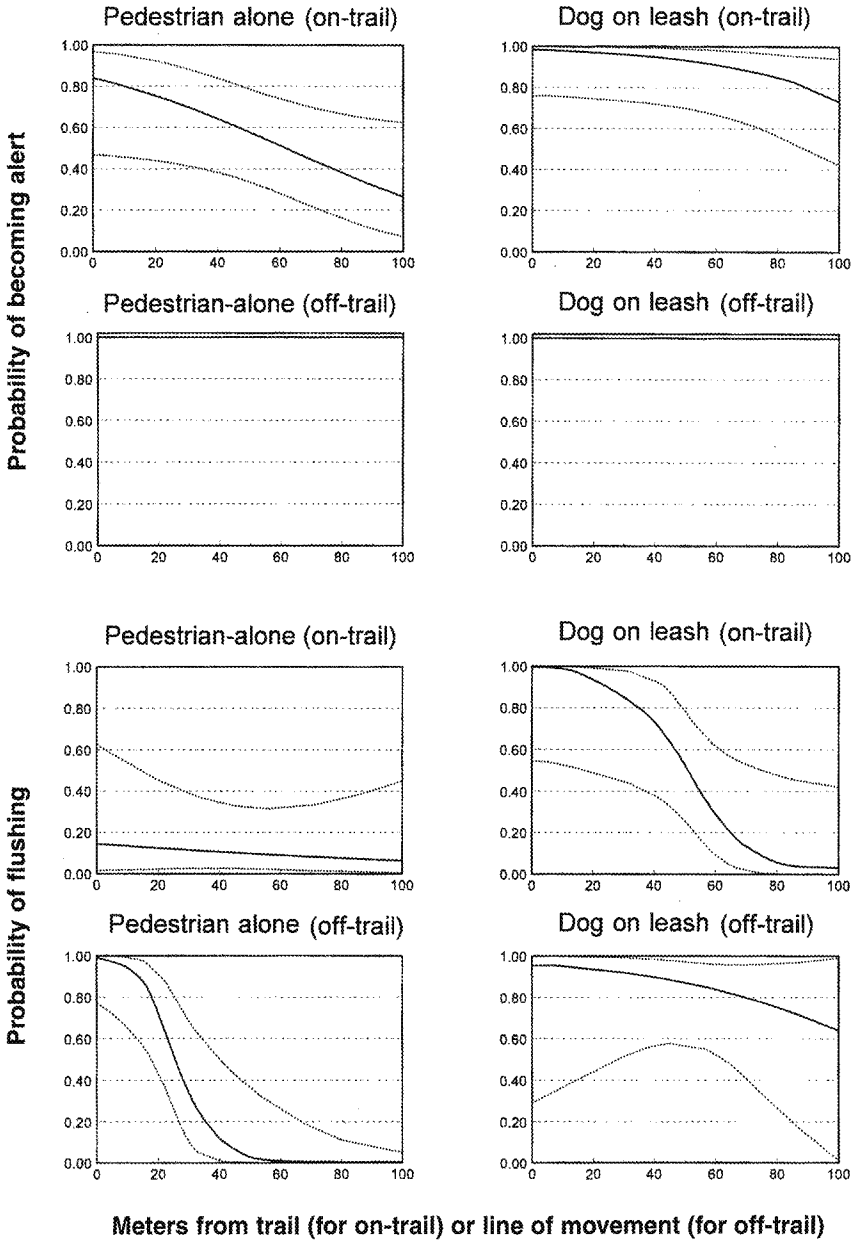


Figure 2. Predicted probability of an American robin flushing to treatments in forests during 1996, City of Boulder Open Space, Boulder Colorado (dashed lines indicate 95% CI).

birds (Leach and Frazier 1953, Andelt et al. 1987), these bird species may not have perceived dogs as an important threat. Alternatively, dogs may pose a different kind of threat than a pedestrian and birds may hold their position until the last moment, attempting to remain undetected. Because the area of influence was generally the smallest for the dog-alone treatments and because there were no significant differences between the pedestrian-alone and dog-on-leash treatments, it appears that presence of a pedestrian is the additive factor. This is further supported by the fact that the area of influence did not differ between the pedestrian-alone and dog-on-leash treatments for American robins in the forest, either on- or off-trail.

For all species in our study, area of influence, flush distance, and distance moved were almost always greater when activities occurred off-trail versus when the same activity occurred on-trail. Recreational use occurred on our off-trail study sites but was sporadic; conversely, recreational use on trails was common (City of Boulder Open Space 1996). Because recreational activities occurring on-trail were frequent and spatially predictable, animals had likely habituated to activity in these locations. Off-trail recreation, however, was infrequent and spatially unpredictable. Thus, animals were not accustomed to activity in these areas, resulting in the greater area of influence, flush distance, and distance moved. In Switzerland, a study of marmots revealed similar results (Mainini et al. 1993). They found that marmots exhibited the greatest response to hikers when hikers strayed away from trails. Cooke (1980), Yalden and Yalden (1989), Burger and Gochfeld (1991), and Kenny and Knight (1992) showed that in areas where human activity was common and frequent, birds were less disturbed than those in areas where humans were uncommon. Likewise, Schultz and Bailey (1978), MacArthur et al. (1982), and Hamr (1988) found that large mammals exhibited the

greatest response when human activity was spatially unpredictable.

Unlike the responses of bird species in our study, mule deer exhibited the greatest response when a dog was present. Similar to our results, MacArthur et al. (1979, 1982) and Mainini et al. (1993) found that mountain sheep and marmots, respectively, exhibited heightened responses when dogs were present. Although City of Boulder Open Space regulations require that dogs be under voice control, there were no leash laws on our study sites and dogs are known to harass and attack deer (personal observation). Because dogs can kill deer (Bowers 1953, Barick 1969, Lowry and McArthur 1978) and because canids have preyed on deer throughout their evolutionary history, we assume that deer have become sensitized to the presence of dogs, explaining the greater reaction when a pedestrian was accompanied by a dog.

For the species measured in our study, the area of influence was smaller when treatments occurred on-trail than off-trail. However, all species appeared to have a threshold of tolerance to disturbance based on distance, with a greater flush response (and alert response for mule deer) when wildlife were close to trails. An earlier study on the same area revealed a positive correlation between abundance of some bird species, nest occurrence, and nest success with distance from trails (Miller et al. 1998). The authors felt that this correlation was in part a result of recreational activity and the associated disturbance. Even though the area of influence for all species was smaller on-trail versus off-trail, on-trail activities may still constitute an important source of disturbance. Thus, our results suggest that human activities may displace wildlife and reduce fitness in local wildlife populations. As mentioned earlier, off-trail recreational use was sporadic. However, should recreational use away from trails increase, displacement of wildlife may ultimately result. Experiments conducted in forested areas of Wyoming without trails support this conclusion (Gutzwiller et al. 1994, Riffell et al. 1996, Gutzwiller et al. 1997), showing that recreational activities away from trails resulted in altered behavior and displacement of birds.

Management implications

Land managers can use spatial and behavioral restrictions in visitor management to ensure coexistence of wildlife and recreationists (Knight and Temple 1995). Because off-trail treatments resulted in the greatest area of influence for all wildlife in this study, recreational use could be restricted (through education and enforcement) to trails as a way to reduce impacts. However, because negative impacts occur even from on-trail use, number and spatial arrangement of trails must be considered in conservation planning. Furthermore, because type of recreational activity influenced the magnitude of wildlife response, managers could restrict certain recreational activities, such as prohibiting dogs in some areas or requiring dogs to be leashed. Partitioning the landscape into recreation zones, allowing certain activities in some zones while restricting them in others, may aid in reducing conflicts with sensitive species.

People are often not aware of how their activities affect wildlife, even if they see animals respond to their actions (Stalmaster and Kaiser 1998). Even though the dog-alone treatment resulted in the smallest area of influence for grassland birds in our study, area of influence will increase if recreationists allow their dogs to roam away from a trail. Additionally, in our study we did not stop and view the subjects for extended periods of time or attempt to move toward them. Behaviors of this kind are common among nature viewers and could lead to elevated wildlife responses (Klein 1993).

Recreationists are more likely to support restrictions if they understand how wildlife will benefit (Purdy et al. 1987, Harris et al. 1995). By emphasizing how human activities affect wildlife, people can associate their actions with either benefiting or harming animal populations and begin to develop a conservation ethic. Such an ethic can minimize the number of wildlife–human conflicts occurring in natural areas (Knight and Temple 1995). Klein (1993) found that visitors who spoke to wildlife refuge personnel were less likely to disturb wildlife than recreationists who did not. Thus, effective visitor education can aid in developing a conservation ethic. Through education, land managers can inform recreationists of how their activities affect wildlife and how they can modify their behavior to minimize impacts.

Acknowledgments. We thank Madison and Bo for their assistance in the field. We are grateful to the City of Boulder Open Space Department for financial support.

Literature cited

Andelt, W. F., J. G. Kie, F. F. Knowlton, and K. Cardwell. 1987. Variation in coyote diets associated with season and successional

changes in vegetation. Journal of Wildlife Management 51: 273–277.

Barick, F. B. 1969. Deer predation in North Carolina and other southeastern states. Pages 25–31 *in* White-tailed deer in the southern forest habitat. Proceeding of a symposium. United States Forest Service, Southern Forest Experiment Station, Nacogdoches, Texas, USA.

Bowers, R. R. 1953. The free-running dog menace. Virginia Wildlife 14: 5–7.

Boyle, S. A, and F. B. Samson. 1985. Effects of nonconsumptive recreation on wildlife: a review. Wildlife Society Bulletin 13: 110–116.

Burger, J., and M. Gochfeld. 1991. Human distance and birds: tolerance and response distances of resident and migrant species in India. Environmental Conservation 18: 158–165.

City of Boulder Open Space. 1996. North Boulder Valley inventory report. City of Boulder Open Space Department, Boulder, Colorado, USA.

Cooke, A. S. 1980. Observations on how close certain passerine species will tolerate an approaching human in rural and suburban areas. Biological Conservation 18: 85–88.

Gutzwiller, K. J., E. A. Kroese, S. H. Anderson, and C. A. Wilkins. 1997. Does human intrusion alter the seasonal timing o avian song during breeding periods? Auk 114: 55–65.

Gutzwiller, K. J., R. T. Wiedenmann, K. L. Clements, and S. H. Anderson. 1994. Effects of human intrusions on song occurrence and singing consistency in subalpine birds. Auk 111: 28–37.

Hamr, J. 1988. Disturbance behaviour of chamois in an alpin tourist area of Austria. Mountain Research and Development 8: 65–73.

Harris, L. K., R. R. Krausman, and W. W. Shaw. 1995. Human attitudes and mountain sheep in a wilderness setting. Wildlife Society Bulletin 23: 66–72.

Kenny, S. A., and R. L. Knight. 1992. Flight distances of black-billed magpies in different regimes of human density and persecution. Condor 94: 545–547.

Klein, M. L. 1993. Waterbird behavioral responses to human disturbances. Wildlife Society Bulletin 21: 31–39.

Knight, R. L., and D. N. Cole. 1995. Factors that influence wildlife responses to recreationists. Pages 71–79 *in* Wildlife and recreationists: coexistence through research and management. R. L. Knight and K. J. Gutzwiller, editors. Island, Covelo, California, USA.

Knight, R. L., and K. J. Gutzwiller. 1995. Wildlife and recreationists: coexistence through research and management. R. L. Knight and K. Gutzwiller editors. Island, Covelo, California, USA.

Knight, R. L., and S. A. Temple. 1995. Wildlife and recreationists: coexistence through management. Pages 327–333 *in* Wildlife and recreationists: coexistence through research and management. R. L. Knight and K. J. Gutzwiller, editors. Island, Covelo, California, USA.

Leach, H. R., and W. H. Frazier. 1953. A study of the possible extent of predation on heavy concentrations of valley quail with special reference to the bobcat. California Fish and Game 39: 527–538.

Lowry, D. A., and K. L. McArthur. 1978. Domestic dogs as predators on deer. Wildlife Society Bulletin 6: 38–39.

MacArthur, R. A., R. H. Johnston, and V. Geist. 1979. Factors influencing heart rate in free-ranging bighorn sheep: a physiological approach to the study of wildlife harassment. Canadian Journal of Zoology 57: 2010–2021.

MacArthur, R. A., V. Geist, and R. H. Johnston. 1982. Cardiac and behavioral responses of mountain sheep to human disturbance. Journal of Wildlife Management 46: 351–358.

Mainini B., P. Neuhaus, and P. Ingold. 1993. Behaviour of marmots *Marmota marmota* under the influence of different hiking activities. Biological Conservation 64: 161–164.

Miller, S. G., R. L. Knight, and C. K. Miller. 1998. Influence of recreational trails on breeding bird communities. Ecological Applications 8: 162–169.

Purdy, K. G., G. R. Gofe, D. J. Decker, G. A. Pomerantzy, and N. A. Connelly. 1987. A guide to managing human activity on National Wildlife Refuges. Human Dimensions Resources Unit, Department of Natural Resources, Cornell University, Ithaca, New York, USA.

Riffell, S. K., K. J. Gutzwiller, and S. H. Anderson. 1996. Does repeated human intrusion cause cumulative declines in avian richness and abundance? Ecological Applications 6: 492–505.

SAS Institute Inc. 1988. SAS/STAT User's Guide, Release 6.03 Edition. SAS Institute Inc., Cary, North Carolina, USA.

SAS Institute Inc. 1993. SAS Technical Report p-243, SAS/STAT Software: the GENMOD procedure. Release 6.09. SAS Institute Inc., Cary, North Carolina, USA.

Schultz, R. D., and J. A. Bailey. 1978. Responses of national park elk to human activity. Journal of Wildlife Management 42: 91–100.

Stalmaster, M. V., and J. L. Kaiser. 1998. Effect of recreational activity on wintering bald eagles. Wildlife Monograph 137.

Whittaker, D., and R. L. Knight. 1998. Understanding wildlife responses to humans. Wildlife Society Bulletin 26: 312–317.

Yalden, D. W., and P. E. Yalden. 1989. The sensitivity of breeding golden plovers *Pluvialis apricaria* to human intruders. Bird Study 36: 49–55.

Yalden, P. E., and D. W. Yalden. 1990. Recreational disturbance of breeding golden plovers *Pluvialis apricarius*. Biological Conservation 51: 243–262.

Zeller, M., H. C. Zinn, and M. J. Manfredo. 1993. Boulder Open Space visitation study. Final report prepared for City of Boulder Open Space–Real Estate Department. Boulder, Colorado, USA.

Scott G. Miller received his B.S. in wildlife ecology from the University of Wisconsin-Madison and his M.S. in wildlife biology from Colorado State University. His research interests have focused on how landscape modifications influence wildlife and vegetative communities and also the impacts of outdoor recreation on wildlife. Currently, Scott coordinates the United States Fish and Wildlife Service's Partners for Fish and Wildlife Program in the San Luis Valley, Colorado, where he restores–enhances wetlands on private property. ***Richard L. Knight*** is a professor in the Department of Fishery and Wildlife Biology at Colorado State University. His research interests include investigating the impacts of outdoor recreation on wildlife and how rural housing developments affect wildlife communities. Rick also devotes much time to preserving ranch land in the West. ***Clinton K. Miller*** received his B.S. in wildlife ecology from the University of Wisconsin-Madison and his M.S. in wildlife biology from Colorado State University. As the wildlife biologist for the city of Boulder, Colorado, he has dealt heavily with issues of how to manage for both outdoor recreation and wildlife. Currently, he works for The Nature Conservancy in eastern South Dakota.

Associate editor: *Bright*

*What are the main negative effects of dogs on habitat?

One of the main observable impacts is dogs chasing wildlife. GGNRA has important overwintering habitat for many species of shorebirds, including federally threatened western snowy plovers. Shorebirds react to dogs at a greater distance and are more likely to fly (compared to walking away) when compared to disturbance from humans without pets or other sources of disturbance. In addition, short flights have been identified as being particularly energetically costly for small birds. Reduced time foraging or resting, or flying from preferred foraging areas, could have cumulative impacts on reproduction and survivorship for these birds. The park also has observations of dogs chasing other wildlife, mainly deer, but this is less frequently observed.

Dogs also have been shown to affect the distribution, abundance, and habitat use by wildlife. This may be a factor of dog's presence, but also scent marking. Published research has demonstrated reduced abundance of deer, squirrels, rabbits and bobcats along areas that allow dogs compared to control areas without dogs. Carnivore species as a group showed a strong aversion to trailheads where dog use and waste was most concentrated; this effect was strongly reduced in areas on trails away from trailheads, and the effect was not present in trailheads where dogs were not allowed. Another study found that dog use reduced bird abundance and diversity, particularly for ground-dwelling birds, and that birds did not habituate to this repeated disturbance.

Also, dogs can trample or dig vegetation. Dog waste is a nutrient source that can affect plants and water bodies, and dogs may be a source for the spread of invasive plant seed. Dogs entering wetlands can disturb wildlife in these sensitive habitats, and also dislodge amphibian egg masses, which could be particularly problematic for threatened California red-legged frogs. Finally, dogs can be a source of disease transmission to wildlife.

*One concern that surprised me is the way the smell or sound of dogs can actually deter predators like coyotes and mountain lions from entering dog-friendly areas. What effect do dogs have on the habitat/ range of predator species? Is this a consideration when determining dog-friendly areas in parks?

See paragraph 2 above. These upper level predators are key parts of terrestrial ecosystems.

A variety of factors was used in developing our dog management plan. First and foremost was providing for a variety of visitor uses and experiences in the park and providing for visitor and staff safety. Other factors were: protection of habitat for sensitive or threatened and endangered species, **providing for large areas of contiguous habitat (for wide ranging mammals (e.g. lions, coyotes, and bobcats) and for habitat connectivity/corridors)**, attempting to focus dog walking opportunities along the edge of the park or in developed areas where demand for these opportunities is greatest, and to attempt to balance dog walking opportunities geographically.

So, yes we did use information about the potential for dogs to affect carnivores in trying to plan where dog walking would be allowed. In our planning, we identified large areas of contiguous habitat in the Marin Headlands, Sweeney Ridge, and Rancho Corral de Tierra that would benefit lions, coyotes, and bobcats, as well as other wildlife.

*What is one thing you wish dog owners realized or knew about the effects of dogs on the animals and habitat of the parks?

The GGNRA has an incredible diversity of native plant and animal communities, including 37 species of federally listed threatened and endangered species. Although the park is adjacent to

development and a large urban center, this may make our efforts to protect sensitive wildlife and habitats in this area that much more important. For the reasons described above, I would really like for people to be more aware that bringing their pet to the park does affect wildlife and habitat. However, by abiding to the proposed park regulations which identify where dogs can be off-leash, are required to be on leash, and areas that are closed to dogs will help to minimize the potential for adverse impacts to park wildlife.

Subject: Draft Agenda for Dog Mgt Plan Coordination mtg.
(Thursday, 9/15:10:30-12PM); Location: Supt office.
Call-in #: 1-866-732-4230, then dial Non-Responsive

A. CDW report (10:30-10:45)

-update & report on CDW use (Noemi/Katie)

B. Enforcement Reports(10:40-11)

-LE/USPP weekly field reports (Xave;Tim)
-Status of 2012-2016 incident summaries for FEIS (Xave, Tim)

C. FEIS/final Rule (11-11:30)

-Map review for final changes(Rancho-Flat Top)(Mike)
-Other referred issues from IDT(Mike)
a. Private vs. Commercial permits
b. Limit to 3 dogs
c. Unattended dog(s)
d. Uncontrolled dog(s)
-FEIS timeline (Mike/Michael)

D. Communications (11:30-11:50)

-Status of Legislative Action (Hale/Aaron)
-Update on Media/Messaging Results (Erin)
-Status of Comms Plan (Hale/Kristin)
-FOIA Update; Production Schedule: Milestones with Actions Required (Kristin)

E. Update on Planning Considerations (11:50-12) (Mike)

-Outreach & Educ
-Facilities
-Monitoring

National Park Service
U.S. Department of the Interior

Natural Resource Program Center

Monitoring Western Snowy Plovers in Golden Gate National Recreation Area

2014 Report

Comment [WWM1]: This should have DRAFT and a draft stamp

Natural Resource Technical Report NPS/SFAN/NRTR—2014/XXX

[PAGE * MERGEFORMAT]

[PAGE * MERGEFORMAT]

ON THE COVER
Western Snowy Plover on Ocean Beach on May 16th, 2015.
Photograph by: Rebecca Acosta, NPS.

Monitoring Western Snowy Plovers in Golden Gate National Recreation Area

2014 Report

Natural Resource Technical Report NPS/SFAN/NRTR—2014/XXX

Rachel Townsend

National Park Service
Inventory and Monitoring Program
Golden Gate National Recreation Area
201 Fort Mason
San Francisco, CA 94123

Month 2016

U.S. Department of the Interior
National Park Service
Natural Resource Stewardship and Science
Fort Collins, Colorado

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The National Park Service, Natural Resource Stewardship and Science office in Fort Collins, Colorado publishes a range of reports that address natural resource topics of interest and applicability to a broad audience in the National Park Service and others in natural resource management, including scientists, conservation and environmental constituencies, and the public.

The Natural Resource Technical Report Series is used to disseminate results of scientific studies in the physical, biological, and social sciences for both the advancement of science and the achievement of the National Park Service mission. The series provides contributors with a forum for displaying comprehensive data that are often deleted from journals because of page limitations.

All manuscripts in the series receive the appropriate level of peer review to ensure that the information is scientifically credible, technically accurate, appropriately written for the intended audience, and designed and published in a professional manner. This report received formal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data, and whose background and expertise put them on par technically and scientifically with the authors of the information.

Views, statements, findings, conclusions, recommendations, and data in this report do not necessarily reflect views and policies of the National Park Service, U.S. Department of the Interior. Mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. Government.

This report is available from the San Francisco Area Network Inventory and Monitoring website ([HYPERLINK "http://science.nature.nps.gov/im/units/sfan"]) and the Natural Resource Publications Management website ([HYPERLINK "http://www.nature.nps.gov/publications/nrpm/"]).

Please cite this publication as:

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NPS XXXXXXXXXX, Month 2015

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[TOC \h \z \t "nrps Heading 1,1,nrps Heading 3,3,nrps Heading 2,2"] **Figures**

[TOC \h \z \t "nrps Figure caption,1"]

Tables

Abstract

This report summarizes results from the 2014 field season of the National Park Service's (NPS) western snowy plover (*Charadrius alexandrinus nivosus*) monitoring program at Golden Gate National Recreation Area (GOGA). The western snowy plover was listed as a federally threatened species in 1993 due to loss of habitat by encroachment of non-native vegetation, disturbance from recreational use of beaches, predation and development. The goals of our western snowy plover monitoring program are to estimate trends in the overwintering snowy plover population size and distribution, and potential threats to snowy plovers on Ocean Beach and Crissy Field within the GOGAboundary in San Francisco.

These two sites, Ocean Beach and Crissy Field, were monitored using standardized methods during the 2014 overwintering season. Higher than average numbers of snowy plovers were observed on Ocean Beach, with a maximum count of 74 plovers and winter season average count of 55 plovers per survey. Fewer than average numbers were observed on Crissy Field. The maximum count was five plovers, with a winter season average of only one plover per survey.

Compliance rates with pets on leash restrictions remain low, particularly at Ocean Beach. 74 percent of dogs were observed unleashed in the area with leash restrictions during the 2014 overwintering season. In contrast, just four percent of dogs were observed off leash in the leash restriction area at Crissy Field, where protective fencing and signage were installed in 2010. Dog owners are often observed approaching the leash restriction area, but turn back when reaching the fence without entering.

We recommend continued annual monitoring of the snowy plover population, and continuing to share information and work with city officials to reduce potential adverse impacts of projects on snowy plovers.. NPS should also continue to provide outreach materials related to snowy plover awareness and recovery.

Comment [WWM2]: I am thinking about flipping how we introduce this in both intro and abstract. I think maybe what is bothering me now is that we go from NPS/SFAN/I&M to threatened species to something about the plovers within the park. I think we should consider flipping this to:
Overwintering WSP occur at OB and Crissy Field at GOGA
WSP is fed. Threatened species (I think we do monitor b/c plovers are threatened)
Then into our monitoring/objectives

Comment [WWM3]: I understand this sentence; BUT I don't think we really need it. We do have a title page.

Comment [WWM4]: I don't think we need that in the abstract

Comment [WWM5]: Lot of continues in this paragraph

Acknowledgments

Introduction

Comment [WWM6]: I don't see any need for this whole paragraph—it seems like I&M propaganda
Let's have the lead in be similar to a revised abstract!

Life History

Comment [WWM7]: I think this is mostly useful information, but probably doesn't need a separate section from rest of intro.
2nd paragraph may fit better into introducing idea that plovers occur in park.

The western snowy plover is found along the Pacific coast from Washington to Baja California, portions of the interior western and southwestern United States, the Gulf coast of Texas, and interior portions of Mexico and is the only recognized snowy plover in the U.S. (Page et al. 1995b). The populations of snowy plovers that nest along the Pacific Coast of North America from southern Washington to Baja California were declared threatened by the U.S. Fish and Wildlife Service (USFWS) in March 1993 (USFWS 2007). The populations of snowy plovers that nest in interior California have been classified by the State of California as a bird species of special concern, but have no federal designation (Shuford et al. 2008). Both the federally threatened, Pacific coast population and the non-federally listed, interior nesting snowy plover population winter along the Pacific coast from southern Washington to Baja California (Page et al. 1986, 1995a, 1995b).

Snowy plovers inhabit Ocean Beach and the beach at Crissy Field at GOGA (Figure 1) in the non-breeding season, from July through mid-April or May (Page et al. 1986, NPS 2006a). Snowy plovers seen on Ocean Beach and Crissy Field represent about 1% of the snowy plovers recorded on the USFWS window winter season counts of snowy plover seen on the U.S. Pacific coast (USFWS 2008).

Threats to the Population

Comment [WWM8]: Again, I wouldn't separate this into its own section, though I think we should really try to condense this and cite other sources.

Snowy plover populations have declined over the last century (USFWS 2007). Along the California coast, breeding and wintering populations declined significantly from the late 1970's to 2000 (Page and Stenzel 1981, USFWS 2007). The reasons for decline and degree of threats vary by geographic area; however, the USFWS has identified the primary threat as habitat destruction and degradation (USFWS 2007). Habitat degradation is primarily caused by human disturbance, urban development, introduced beachgrass, and expanding predator populations. In recent years breeding numbers have increased substantially due to habitat restoration and management, though many breeding sites in southern California have been lost (USFWS 2007).

Among the factors contributing to population declines of snowy plovers are heavy human use of beaches in or near urban areas and associated disturbance to roosting plovers by people and dogs (Burger 1986, Klein 1993, USFWS 1993, Page et al. 1995b, Lafferty et al. 2006). When shorebirds are disturbed, they must spend more energy on vigilance and avoidance behaviors at

the cost of opportunities for foraging and resting (Burger 1993, Hatch 1996). High visitation by people and dogs, particularly off-leash dogs, has been noted as a major source of disturbance to snowy plovers on Ocean Beach and Crissy Field (Hatch 1996, NPS 2006a, Zlatunich 2007).

Changing regulations related to dog walking on the GOGA beaches have made it difficult to gain compliance with the current, stricter regulations requiring pets to be on leash. The 1979 GOGA Pet Policy informally identified several areas of the park as suitable for recreational users with off-leash dogs under voice control, which included Ocean Beach and Crissy Field. The Pacific coast population of the western snowy plover was not listed as threatened until 1993 (USFWS 2007). As part of the conditions from a 1995 USFWS Biological Opinion for the City of San Francisco related to the movement of sand, GOGA was required to implement leash restrictions for dogs on portions of Ocean Beach to benefit snowy plovers. Enforcement of the leash regulation at Ocean Beach began in 1997. Furthermore, the 1998 Draft Snowy Plover Management Plan for Ocean Beach recommended that dogs be required to be on-leash in the Snowy Plover Protection Area at Ocean Beach from Stairwell 21 to Sloat Boulevard (GOGA 1998). From 1997 until December 2004, dogs were required to be leashed within the Ocean Beach Snowy Plover Protection Area, and dogs were prohibited within the Crissy Field Wildlife Protection Area. The environmental assessment for the Crissy Field Plan established a Waterbird Protection Area that was later formalized as the 'Wildlife Protection Area', which closed this area to dogs (Jones and Stokes Associates, Inc. 1996).

Comment [WWM9]: Dog stuff and changing regulations is important and need to think how and where is best to include it, for now here is good.

The rulings in *U.S. v. Barley*, allowed unleashed dogs in certain areas of the park (areas identified in the 1979 Pet Policy as appropriate for voice control that did not go through the formal rulemaking process) beginning in December 2004 (U.S. District Court of Northern California 2005). These areas included Ocean Beach and the Crissy Field Wildlife Protection Area where snowy plovers are seasonally present. In November of 2006, seasonal leash requirements were put in place at Ocean Beach and the Crissy Field Protection Areas through the NPS Compendium process for GOGA. In September 2008, a final rule was issued by the NPS, which requires dogs to be on-leash in the Snowy Plover Protection Area at Ocean Beach and the Wildlife Protection Area of Crissy Field, except for the period from May 15 to July 1, when dogs can be off-leash in those areas (36 CFR 7.97).

Loss of habitat and pressure from predators are identified as factors contributing to the population decline of plovers (USFWS 2007). In particular, coastal erosion and the spread of European beach grass (*Ammophila arenaria*), which was introduced in an attempt to stabilize dunes, adversely impacts the snowy plover population at Ocean Beach (Stenzel et al. 1995; USFWS 2007). Sea-level rise and increased storm surge associated with climate change threaten snowy plover habitat at both Ocean Beach and Crissy Field (Heberger et al. 2009).

This report provides a summary of monitoring results for the western snowy plover during the 2014 season (July 2nd, 2014 – June 3rd, 2015) on Ocean Beach and Crissy Field in the Golden Gate National Recreation Area.

Monitoring Objectives

The specific monitoring objectives for the GOGA snowy plover monitoring program are to:

1. Determine trends in snowy plover winter season average population size at Ocean Beach and Crissy Field.

2. Determine trends in the spatial distribution of snowy plovers during the winter season at Ocean Beach and Crissy Field.

In addition to monitoring long-term population and distribution changes, GOGA also collects data to evaluate potential effects of public beach uses on snowy plovers. For example, understanding when snowy plovers arrive and depart from Ocean Beach and Crissy Field allows GOGA management to evaluate the current seasonal public use restrictions and to inform timing of the use of heavy equipment on the beach for infrastructure maintenance.

In the urban setting of both Ocean Beach and Crissy Field, recreational use of park beaches is potentially one of the major factors affecting habitat quality for snowy plovers (Page et al. 1986, Hatch 1996, Lafferty 2001a, b, NPS 2006a). Dogs have been identified as particularly disturbing to plovers and shorebirds (Hatch 1996, Lafferty 2001a, b, NPS 2006a, 2007, USFWS 2007). Thus, it is important to collect data on beach use by people and dogs that are a potential source of disturbance to non-breeding snowy plovers. GOGA has reestablished public use restrictions that seasonally require pets to be on-leash in portions of Ocean Beach and Crissy Field. Monitoring compliance with these public use restrictions allows for the evaluation of their effectiveness. The western snowy plover is listed as a federally threatened species and is afforded protections against take and harassment under the Endangered Species Act, as well as NPS regulations prohibiting the harassment of wildlife. Tracking rates of dogs chasing snowy plovers and other shorebirds provide an indication of direct disturbance levels to these birds, as well as violations of federal regulations.

The overall management objective for the GOGA snowy plover monitoring program is to reduce human-caused disturbance to over wintering plovers. The monitoring objectives in support of that management objective are to:

1. Determine the phenology of snowy plover arrival and departure dates from Ocean Beach and Crissy Field.

2. Monitor number and distribution of people and dogs at Ocean Beach and Crissy Field.

3. Monitor compliance rates for seasonal restrictions requiring pets to be on-leash in the Snowy Plover Protection Area and Wildlife Protection Area from July 1 through May 15.

4. **Monitor the rates of dogs chasing snowy plovers or other shorebirds at Ocean Beach and Crissy Field.**

In addition to meeting specific objectives, regular monitoring also allows for regular observation of wildlife and interactions with recreational activities and provides opportunities for public outreach related to protecting snowy plovers.

Methods

Study Area

Ocean Beach in San Francisco is the longest stretch of dune-backed beach between Point Reyes and Half Moon Bay on the outer California coast (Figure 1), providing important habitat for migratory and non-breeding shorebirds (Stenzel et al. 1995, GOGA 1998). From 1997 to 1999, approximately 100 acres of Crissy Field (Figure 1) were restored by enhancing and protecting coastal dunes, removing rubble from the beach, and construction of a 20-acre tidal marsh (Jones and Stokes Associates, Inc. 1996). A portion of the beach in the Crissy Field area was designated as a Wildlife Protection Area, largely to benefit shorebirds and birds using the nearshore waters of the San Francisco Bay. The beach at the Crissy Field Wildlife Protection Area provides important habitat along the highly modified San Francisco Bay shoreline. The GOGA snowy plover populations are accessible to a large urban population, providing viewing, education and outreach, and opportunities for engagement in stewardship. There are no recent or historical nesting records for snowy plovers on GOGA beaches, although they breed on nearby beaches within about 25 miles to the north and south of GOGA, and on salt ponds in South San Francisco Bay at Don Edwards San Francisco Bay National Wildlife Refuge.

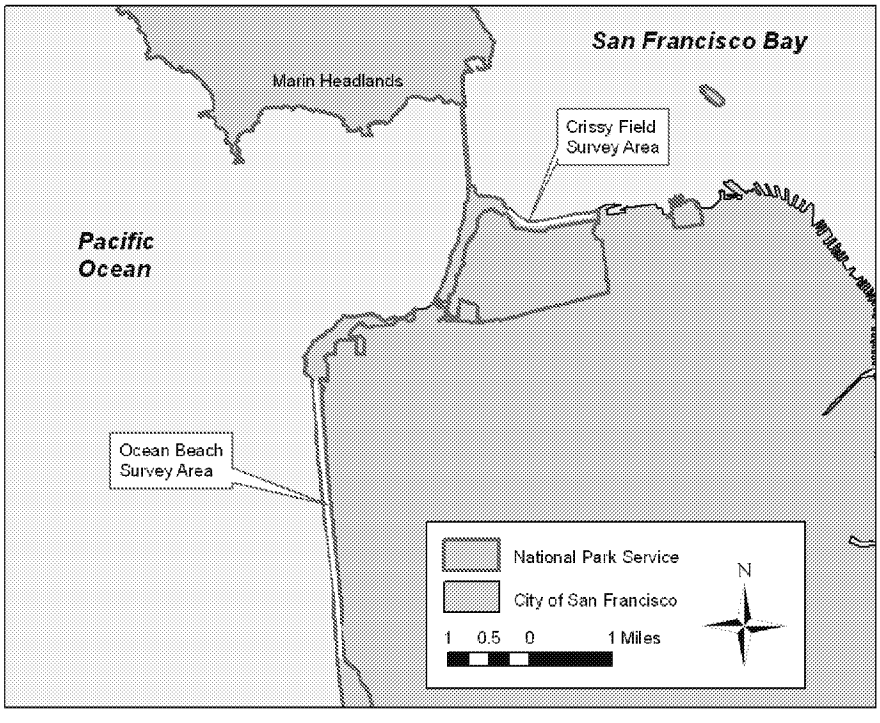


Figure [SEQ Figure * ARABIC]. Ocean Beach and Crissy Field wintering areas for snowy plovers at Golden Gate National Recreation Area, San Francisco.

Monitoring History and Study Design

Comment [WWM10]: I think that this needs to be condensed and cited—and results from other monitoring should be more for discussion section—not in methods.

From 1979 to 1985, in an effort to determine the abundance and distribution of wintering snowy plovers across all of California, Ocean Beach was surveyed for plovers 26 times, with at least four surveys in each year (Page et al. 1986). Snowy plovers were observed on 21 of these 26 surveys, with annual maximum counts ranging from 4 to 16 plovers observed. Ocean Beach was classified as an urban shoreline with a sandy beach, backed by development, and usually receiving high recreational use (Page et al. 1986). Additionally, all the snowy plovers observed in San Francisco County through this effort were from Ocean Beach.

From 1988 to 1994, Point Reyes Bird Observatory Conservation Science (PRBO) volunteers conducted snowy plover counts on Ocean Beach from Lincoln Street to Noriega or Sloat Boulevard as part of coordinated efforts to count plovers along the California coast (Hatch 1996). Additional data collected by an interested citizen between 1992 and 1994 was combined with the PRBO data to provide an indication of the maximum number of snowy plovers at Ocean Beach from 1988 to 1994 (Figure 2).

GOGA implemented a snowy plover monitoring program in December 1994 using a monitoring protocol developed by PRBO and NPS (Stenzel et al. 1995). Snowy plover monitoring has continued on Ocean Beach using the methods from this protocol through the present. Hatch (1996) summarized results of this monitoring using data from 1988 through the 1995 season (a survey year is considered to be the entire overwintering period during which snowy plovers are present in the park, which extends from July 1st through May 15th of the next year). In addition, based upon a study of disturbance using focal groups of snowy plovers, 19 dogs were observed deliberately chasing snowy plovers, and 15 dogs were observed to inadvertently disturb plovers or chase other shorebirds during 111 surveys totaling approximately 40 hours of direct plover observation from 1994 to 1996 (Hatch 1996). People, aircraft, bulldozers, bicycles, and kite flying were also sources of disturbance to plovers. However, it was noted that snowy plovers seemed more likely to fly when disturbed by dogs as compared to disturbances by people where the plovers tended to walk or run away (Hatch 1996). This observation is consistent with findings at other beaches (Lafferty et al. 2006).

Observers walk the entire beach project area which is an efficient way of accurately counting plovers and meeting our suite of monitoring and management objectives. By dividing the beach into sectors, snowy plover distribution, as well as people and dog use on different areas of the beach, can be tracked. By recording the time spent in each sector, encounter rates can be calculated for people and dogs. Observers also record other potential threats and disturbance to snowy plovers by sector.

To capture the full range of recreational use, the censuses are evenly split between weekday mornings and weekend afternoons. Weekday morning surveys occur when there are typically fewer people and dogs present. Weekend afternoon surveys, when there are typically more people and dogs on the beaches, have the potential for detecting higher levels of disturbance to snowy plovers. However, recreational use of the beaches is often determined by weather, with high numbers of people coming out to the beaches on warm, sunny days.

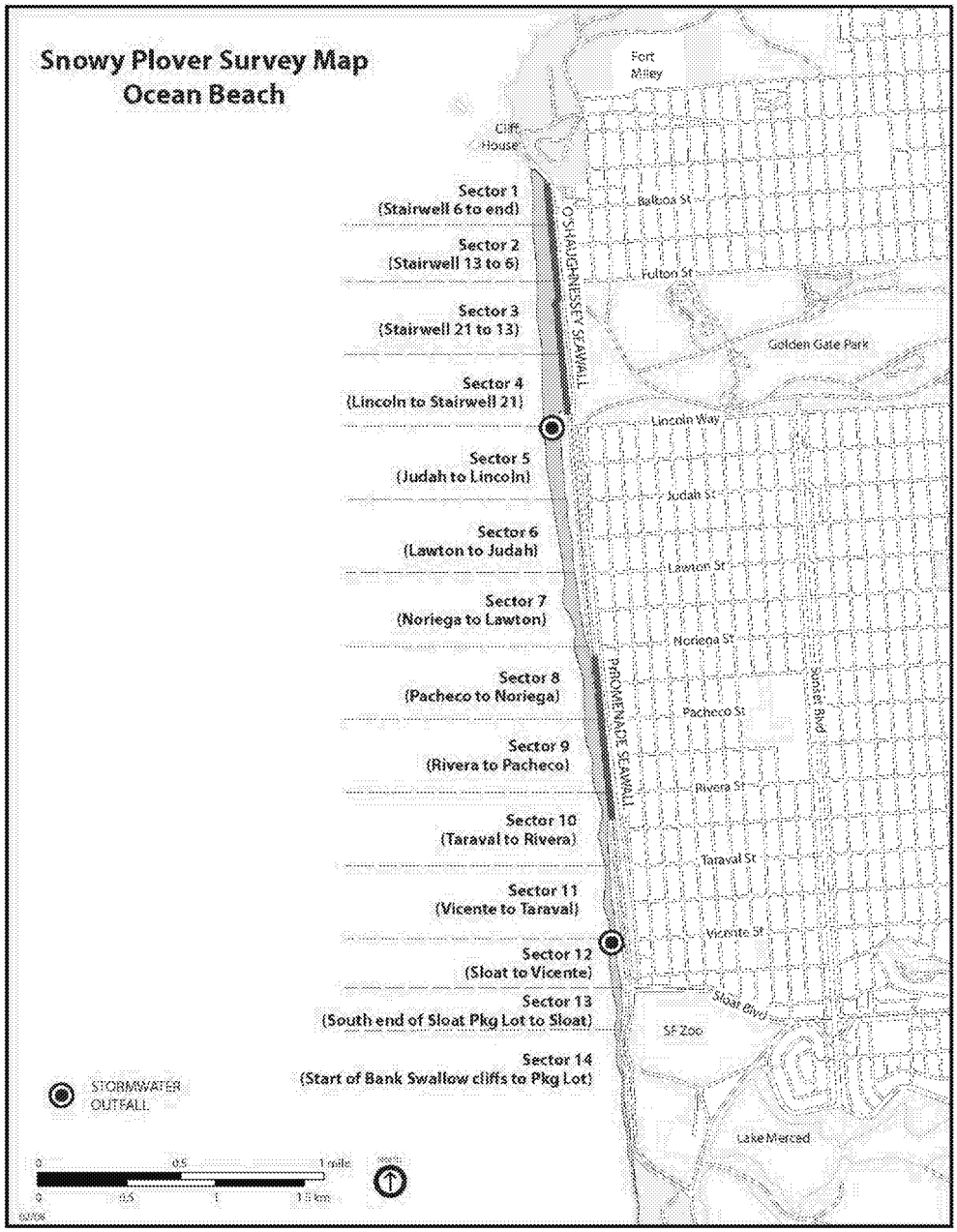


Figure 2. Snowy plover census area at Ocean Beach, San Francisco.

The Snowy Plover Protection Area extends from Stairwell 21 in the north to Sloat Blvd. in the south (Sectors 4 - 12).

Snowy plovers were first observed consistently using the Wildlife Protection Area at Crissy Field in January 2005 (NPS 2006a, Zlatunich 2006). In September 2006, the snowy plover monitoring protocol from Ocean Beach was implemented at Crissy Field. Since that time, a small population of 1-6 plovers has been observed in this area during the overwintering season. A vast majority of the plover observations have been in Sector 2 of the monitoring area (Figure 6), with a handful of observations in Sector 1 (NPS unpublished data).

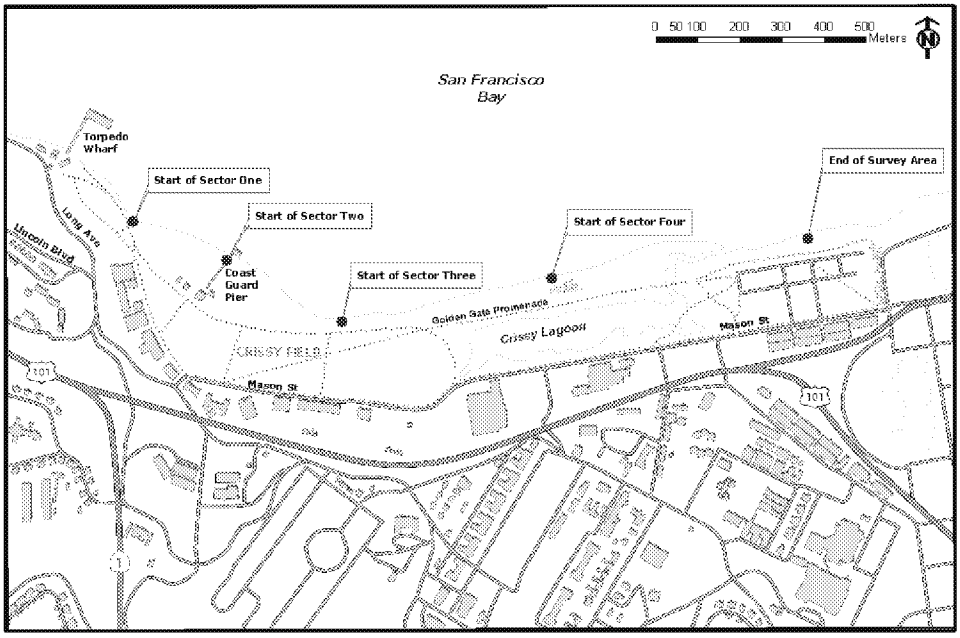


Figure 3. Snowy plover census area at Crissy Field, San Francisco.

Field Methods

All long-term monitoring surveys follow the SFAN GOGA Monitoring Protocol. Field surveyors begin surveying for snowy plovers during the first week of July, before snowy plovers are likely to be present and continue through the end of the non-breeding season which is typically early May. Surveys are conducted until plovers are not observed in two consecutive surveys in different bi-weekly survey windows (e.g., no plovers observed on a Saturday survey and then no plovers observed on next Wednesday survey one and a half weeks later).

The goal is to complete an accurate and complete count of the snowy plovers in each sector of beach. Surveyors record the start and end time for each sector. Observations are made by slowly

walking along the beach, stopping every 50–150 m and scanning about 100–200 m ahead to look for snowy plovers. If multiple surveyors are present, each one should be responsible for one portion of the data and data sheets. One data sheet is used to keep track of the number of snowy plovers encountered, the time and sector they were encountered in, whether they were foraging, and the beach elevation zone and the substrate they were located in. Notes are taken of colored leg bands if they are present to record the unique color band combination.

A separate data sheet is used to count potential disturbances including the number of people, dogs (counted by whether they are on-leash, off-leash within 10 feet of their owner, roaming, or chasing shorebirds or plovers), equestrians, vehicles, predators, aircraft, kite flying, or other potential sources of disturbance. A third data sheet is used to count other shorebird species encountered.

It takes at least two hours to complete the Ocean Beach census and about an hour to conduct the Crissy Field census.

Comment [WWM11]: Either delete this sentence or put in with another paragraph. I think a paragraph should have 3 sentences.

Results

2014 Results

From July 2nd, 2014 to June 2nd, 2015, the survey team conducted 34 surveys on Ocean Beach and 22 on Crissy Field.

Ocean Beach

Overwintering Population Size

Higher than average numbers of snowy plovers were observed on Ocean Beach, with a max count of 74 and average of 55 (figure 4). This is more than a 50 percent increase from the 2013 season and the highest values seen since the first year of monitoring in 1994.

Temporal and Spatial Distribution

2014 saw the longest period of time with plovers present on Ocean Beach since monitoring began. Plovers were present on the first survey of the season, with two individuals observed on July 2, 2014 and were last observed during a survey on May 27, 2015 (Table 1).

The 2014 survey year exceeded the 1994-2013 average in terms of the number of snowy plovers observed in all months (Figure 5). The January 2015 average snowy plover count was more than twice the 1994-2013 January average plover count. Snowy plover numbers gradually increased throughout Fall 2014 and peaked in January, 2015 before declining as the breeding season approached. In contrast, average plover numbers peaked in October for survey years 1994-2013.

In 2014, the majority of plover observations were in sectors 5 and 6, with a combined total of 88% (Figure 6). While 23% of observations from 1994-2013 were in sector 5, a higher percentage were further south in sectors 8 and 9, having a combined total of 62%.

Number and Distribution of People and Dogs

Nearly 130 people were encountered per hour in the SPPA on Ocean Beach in 2014, a record since monitoring began. The number of people has increased each year from 2011 to 2014; however there is no obvious trend in the number of people encountered across the twenty-one years of surveys (Figure 7).

Leash compliance rates remained low within the snowy plover protection area on Ocean Beach (Figure 8). A median of 13 dogs per hour were encountered, and of those an average of 74% were not leashed. This is a five percent decline from the previous season but still significantly higher than the low of 57% unleashed in 2007.

Crissy Field

22 Surveys were conducted on Crissy Field, from July 2nd, 2014 to May 6th, 2015. Fewer than average numbers were observed on Crissy Field (Figure 9). A max count of five individuals was recorded and there was an average of one plover per survey.

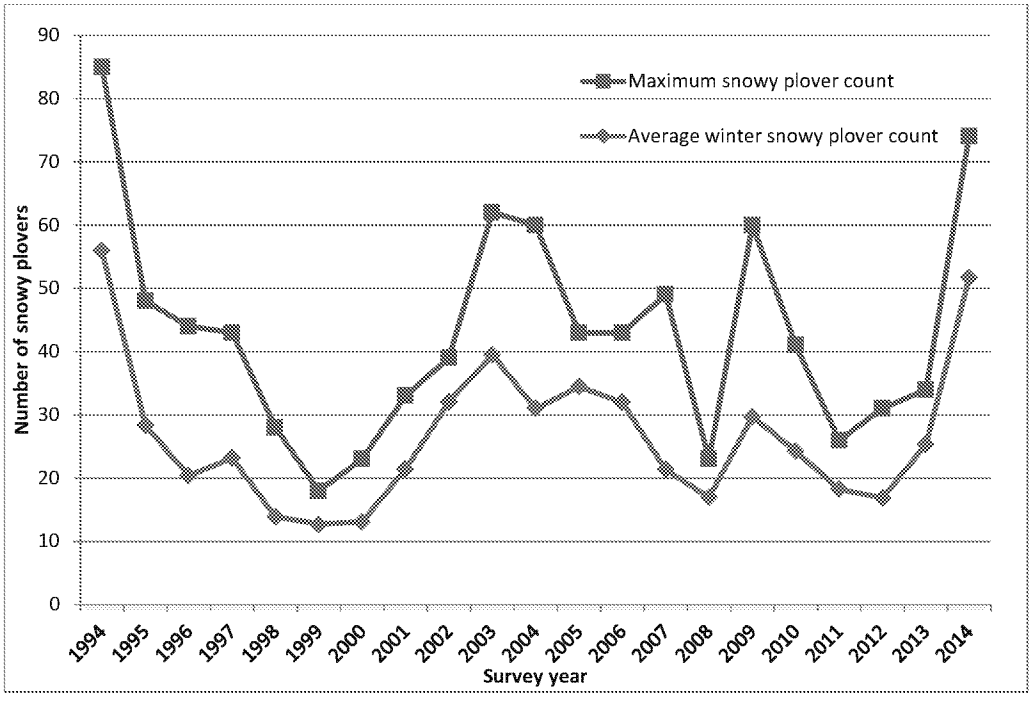


Figure 4. Winter season average and maximum number of snowy plovers on Ocean Beach during the 2014 season.

Survey Year	Date of First Complete Survey	First Date Plovers Observed	# of Plovers	Date of Last Complete Survey	Last Date Plovers Observed	# of Plovers
1994	12/8/1994	12/8/1994	69	5/13/1995	5/13/1995	2
1995	7/19/1995	7/19/1995	17	4/27/1996	4/20/1996	2
1996	7/10/1996	7/10/1996	4	5/14/1997	4/30/1997	2
1997	7/3/1997	7/9/1997	3	5/20/1998	5/13/1998	2
1998	7/11/1998	7/11/1998	1	4/28/1999	3/31/1999	7
1999	7/21/1999	7/21/1999	4	5/10/2000	4/26/2000	3
2000	7/5/2000	7/9/2000	2	4/11/2001	4/11/2001	9
2001	7/12/2001	7/25/2001	11	4/6/2002	3/30/2002	12
2002	7/24/2002	7/24/2002	8	5/21/2003	5/7/2003	2
2003	7/30/2003	7/30/2003	10	5/15/2004	4/28/2004	4
2004	7/28/2004	7/28/2004	16	5/25/2005	4/30/2005	4
2005	8/10/2005	8/10/2005	20	4/19/2006	4/19/2006	6
2006	7/12/2006	7/26/2006	13	5/12/2007	4/25/2007	2
2007	7/7/2007	7/21/2007	9	5/14/2008	5/6/2008	1
2008	7/2/2008	7/9/2008	1	5/20/2009	4/29/2009	2
2009	7/1/2009	7/22/2009	7	5/26/2010	5/5/2010	2
2010	7/3/2010	8/4/2010	10	5/31/2011	5/18/2011	1
2011	7/20/2011	8/10/2011	24	5/23/2012	5/9/2012	1
2012	7/7/2012	7/7/2012	1	5/16/2013	3/20/2013	8
2013	7/8/2013	7/18/2013	4	5/16/2014	5/4/2014	1
2014	7/2/2014	7/2/2014	2	6/3/2015	5/27/2015	1

Table 1. First and last dates snowy plovers were observed at Ocean Beach and snowy plover numbers seen on those dates, 1994-2014 survey years.

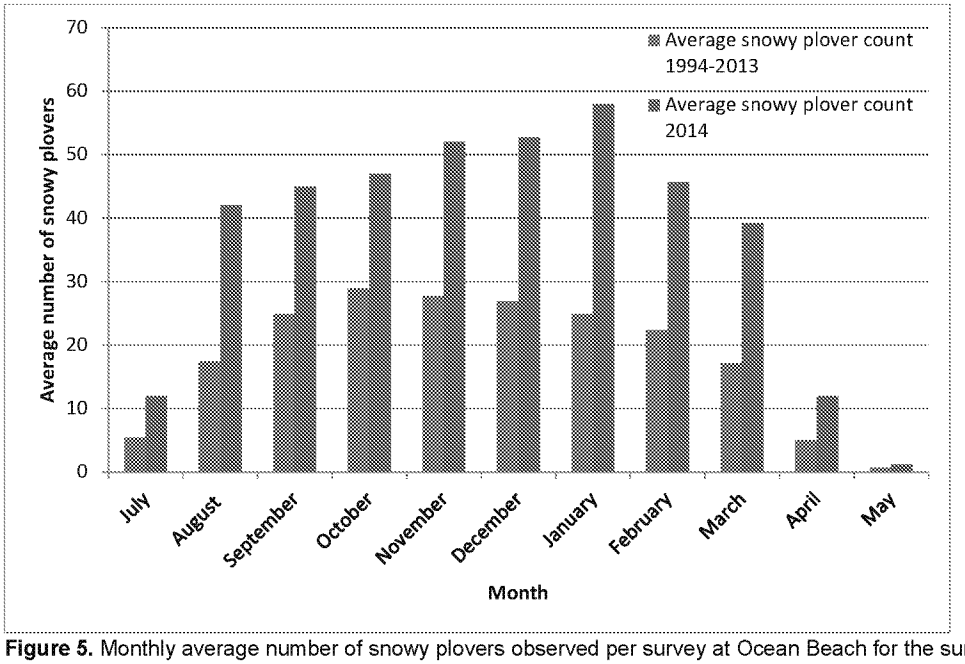


Figure 5. Monthly average number of snowy plovers observed per survey at Ocean Beach for the survey years 1994-2013 combined in comparison with 2014 survey year.

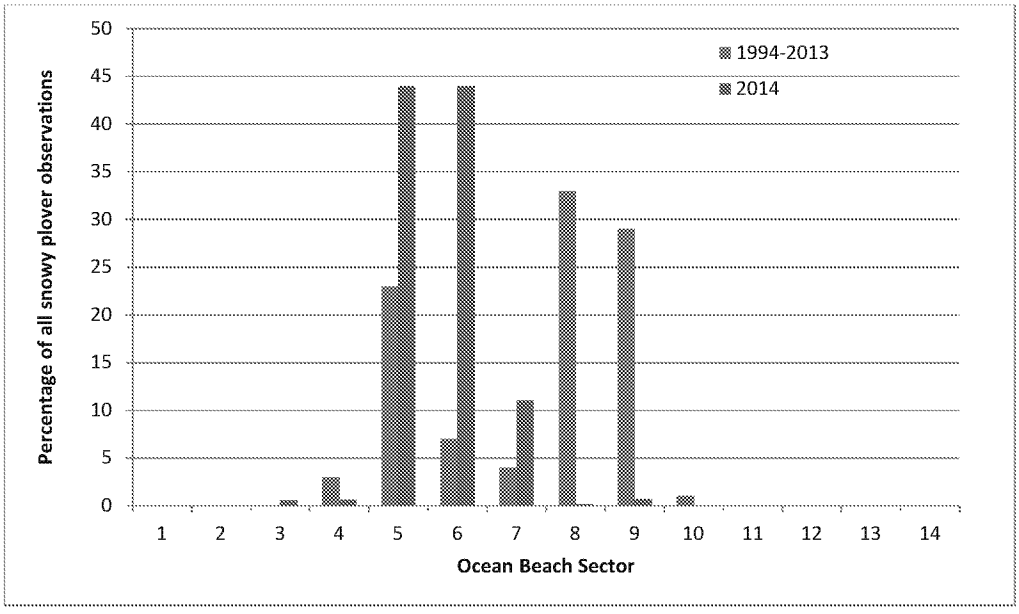


Figure 6. Percentage of snowy plovers observations 1994–2013 and in 2014 by sector on Ocean Beach

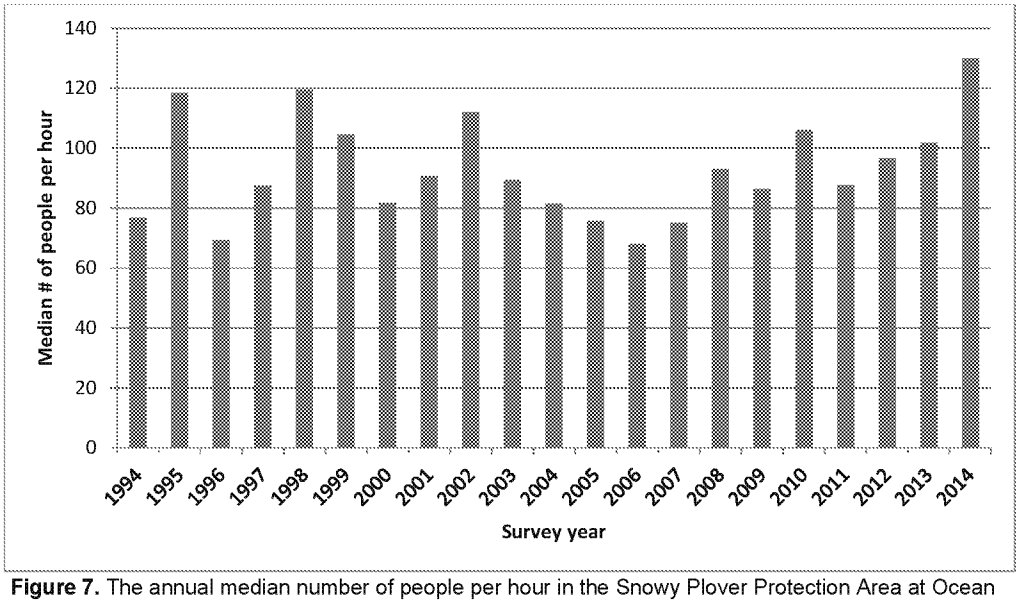


Figure 7. The annual median number of people per hour in the Snowy Plover Protection Area at Ocean Beach (sectors 4-12) from 1994 to 2014 survey years.

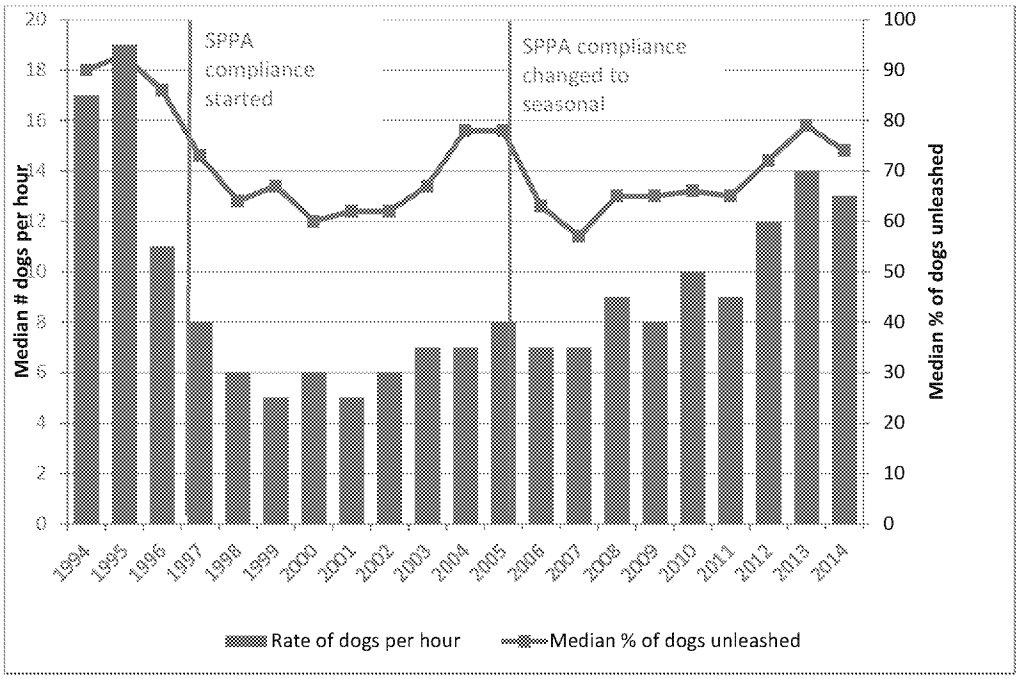


Figure 8. Median number of dogs per hour and percentage of dogs unleashed at the Ocean Beach Snowy Plover Protection Area, 1994-2014

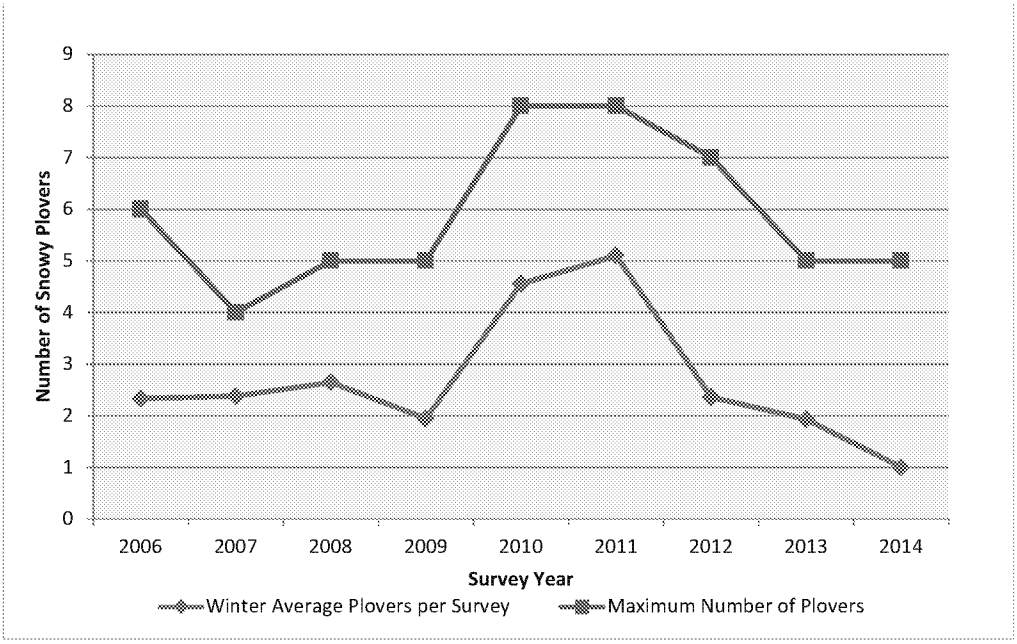


Figure 9. Winter season average and maximum snowy plover count on Crissy Field during the 2014 season.

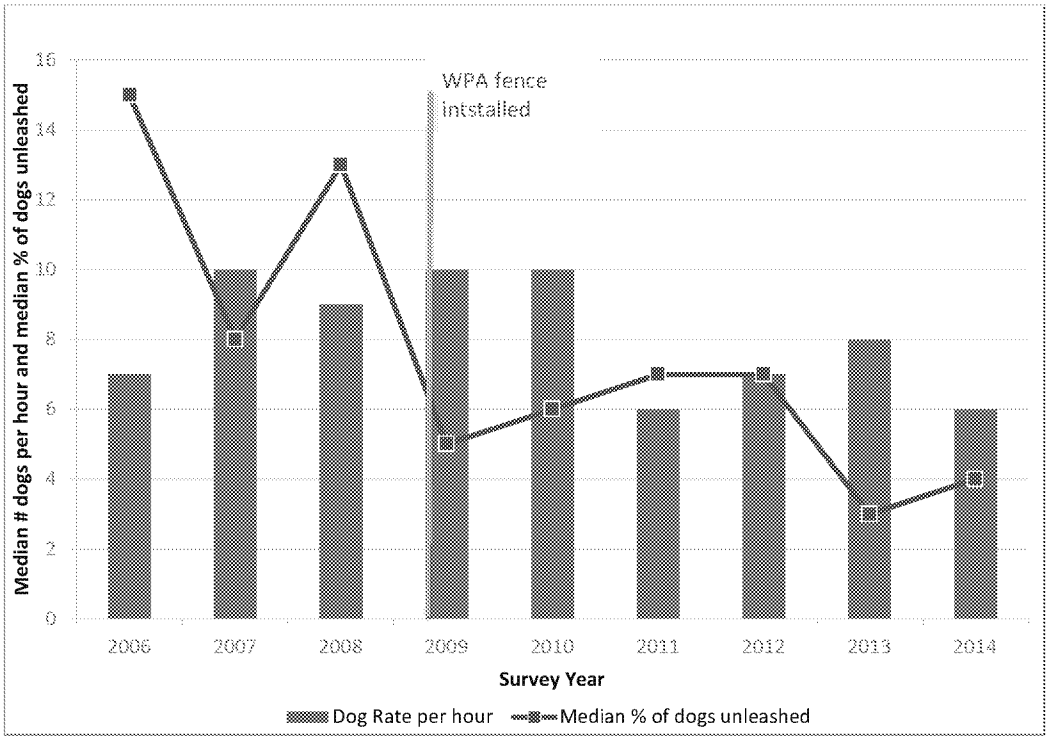


Figure 10. Median number of dogs per hour and percentage of dogs unleashed at the Crissy Field Wildlife Protection Area, 2006-2014

Discussion

Snowy plover numbers on Ocean Beach have followed a cyclical pattern, with the 2014 season seeing a return to higher numbers that hadn't been observed since having a return to Data from the snowy plover monitoring program has been used in adaptively managing these beaches to protect plovers from adverse impacts from visitors and their dogs.

Figure 8 illustrates the challenge of gaining compliance with leash restrictions; made more so by the high use of dog walkers and changing pet regulations over time. The rate of dogs per hour and percent off leash were at its highest in 1994 and 1995, but declined quickly with the start of leash regulations in 1997 and remained in the 60 percent range until 2004. The Barley rulings allowed unleashed dogs again in December 2004 and off leash numbers spiked to 78% for the 2004 and 2005 seasons. When seasonal leash requirements were put in place at Ocean Beach and the Crissy Field Protection Areas in November 2006, the percent of off leash dogs declined and reached a low of 57% in 2007. Since then, percent off leash dogs leveled off around 65% for four years and then increased to the 70 percent range in recent years.

Data collected through the snowy plover monitoring program will be important for assessing potential impacts of pending proposals for erosion control measures and nourishment of Ocean Beach that are intended to protect City of San Francisco infrastructure.

Management Activities and Recommendations

Humans and their activities, including development, land management practices, and recreation are among the significant sources of impact to the overwintering population of snowy plovers on Ocean Beach and Crissy Field. We recommend that plover monitoring surveys continue and that land managers use the data in adaptively managing these beaches to protect plovers from adverse impacts from visitors and their dogs. We encourage continued communication between land managers, maintenance crews and city officials in planning and executing maintenance and construction projects in snowy plover habitat. Information on plover locations should continue to be made available to all land managers and city planning departments. Info on dog management plan..

Literature Cited

Hatch, D. A. 1996. Western snowy plover wintering population and interaction with human activity on Ocean Beach, San Francisco, Golden Gate National Recreation Area, 1988 through 1996. Golden Gate National Recreation Area Unpublished Report, San Francisco, California.

National Park Service (NPS). 2006. Status report: Western snowy plovers and recent changes in human and dog use within the Snowy Plover Management Area at Ocean Beach and the Wildlife Protection Area at Crissy Field. Golden Gate National Recreation Area Unpublished Report, San Francisco, California.

National Park Service (NPS). 2007 Addendum: 2006 Plover monitoring season update, status report: Western snowy plovers and recent changes in human and dog use within the Snowy Plover Management Area at Ocean Beach and the Wildlife Protection Area at Crissy Field. Golden Gate National Recreation Area Unpublished Report, San Francisco, California.

National Park Service (NPS). 2008. Addendum: 2007 Plover monitoring season update, status report: Western snowy plovers and recent changes in human and dog use within the Snowy Plover Management Area at Ocean Beach and the Wildlife Protection Area at Crissy Field. Golden Gate National Recreation Area Unpublished Report, San Francisco, California.

Page, G. W., M. A. Stern, and P. W. C. Paton. 1995. [HYPERLINK "http://bna.birds.cornell.edu/bna/species/154/biblio/bib057"] Condor 97:258–262.

Press, D. T. 2005. Data management plan for the San Francisco Bay Area Network Inventory and Monitoring Program. National Park Service Unpublished Report, San Francisco, California.

Stenzel, L. E., G. W. Page, and D. Hatch. 1995. Snowy plover monitoring program volunteer handbook (includes minor revisions made in 1999). Point Reyes Bird Observatory Unpublished Report, Stinson Beach, California.

Message

From: Bennett, Susan [susie_bennett@nps.gov]
Sent: 9/10/2015 11:51:47 AM
To: Acosta, Rebecca [rebecca_acosta@partner.nps.gov]; Merkle, William [bill_merkle@nps.gov]
Subject: Re: Coyote posting at Milagra Ridge

Hi guys,

I took the windmaster down from Rancho yesterday since I finally had access to a large vehicle down there. One plastic insert is missing, and the other pretty scratched up, making it hard to read anything you slide inside it. I'm sure we could get a replacement custom cut at TAP plastics in SF [http://www.tapplastics.com/]. Or are there replacements from the vendor available? Is there any funding available for this purchase? If not, maybe we could request funds from our GGNPC grant?

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540
desk: 415 561-4967
email: susie_bennett@nps.gov

On Mon, Jun 22, 2015 at 9:19 AM, Acosta, Rebecca <rebecca_acosta@partner.nps.gov> wrote:
Hi All,

I have field work in North Marin until Wednesday, but I can head down to Rancho Thursday morning. I realize it's not ideal to wait so long, but this is currently the earliest that I can make it down there if no one else is able to before then.

Rebecca Acosta
Wildlife Monitoring Intern
Golden Gate National Recreation Area
Office: 415-289-1847
Cell: 805-341-5492

On Thu, Jun 18, 2015 at 6:36 PM, Bennett, Susan <susie_bennett@nps.gov> wrote:

Hi all--
Michelle O'Herron helped me update some signage last year. Here's the pdf for the A-frames that doesn't have any site information so it's usable at many places.

I'm going out of town for three weeks starting Sunday, but if you need an A-Frame and there aren't any left in T1111 (which is openable with an SP-2 key) then you can take our one down from Rancho Corral de Tierra and use it. I can't pick it up due to my spinal injury, so I've just left it on site. I don't think it's necessary there anymore. It's right on the bridge along Old San Pedro Mtn Road at: 37.550095, -122.508321 Even has 1 side that still has a coyote sign on it. :)

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540
desk: 415 561-4967
email: susie_bennett@nps.gov

On Thu, Jun 18, 2015 at 4:11 PM, Ruby Kwan <RKwan@parksconservancy.org> wrote:
Thanks all for working with me on this and expediting the process.

I can print out the small flyers and post at Milagra and have them up as soon as this Saturday.

Was at Milagra today and it appears that dog walkers are aware of the situation. Signs would help alert infrequent dog walkers.

Best regards,
Ruby Kwan
1-415-810-0975

Sent from my iPhone

On Jun 18, 2015, at 12:49 PM, "Christina Crooker" <CCrooker@ParksConservancy.org> wrote:

Sounds great. Thanks!

From: Merkle, William [mailto:bill_merkle@nps.gov]
Sent: Thursday, June 18, 2015 12:40 PM
To: Christina Crooker
Cc: Ruby Kwan; Georgia Vasey; Rebecca Acosta; Susie Bennett
Subject: Re: Coyote posting at Milagra Ridge

How about this:

GGNPC posts small version of 2004 flyer quickly.

We will work on getting a windmaster out with a bigger version in the next couple of work days--and leave out for say two weeks.

Thank you!!

-Bill

Bill Merkle, Ph.D.

Wildlife Ecologist

Golden Gate National Recreation Area

415-289-1843

<~WRD000.jpg>

On Thu, Jun 18, 2015 at 12:30 PM, Christina Crooker <CCrooker@parksconservancy.org> wrote:

We can get the 2004 small flyer up easily and quickly.

If you want the larger sign with the windmaster, we will be relying on you to provide it since we don't have those.

Cheers,

Christina

From: Merkle, William [mailto:bill_merkle@nps.gov]
Sent: Thursday, June 18, 2015 12:23 PM
To: Ruby Kwan
Cc: Christina Crooker; Georgia Vasey; Rebecca Acosta; Susie Bennett
Subject: Re: Coyote posting at Milagra Ridge

Ok, let's got with 2004 version.

I would say, whoever can get it up first. If Park Stewardship doesn't have capacity for this, I can see if Rebecca or Susie can handle.

Rebecca is in the field today in northern Marin. I would need to check with Susie.

As far as overall responsibility, we typically bypass the NPS sign committee and put these up on kind of "urgent/emergency" and temporary basis.

So let me know if you can't get these up by tomorrow and we can work out other way to do it.

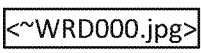
Thank you, Bill

Bill Merkle, Ph.D.

Wildlife Ecologist

Golden Gate National Recreation Area

415-289-1843



On Thu, Jun 18, 2015 at 12:03 PM, Ruby Kwan <RKwan@parksconservancy.org> wrote:

I think the one from 2004 (the one I sent you) is what the neighbors are requesting.

Bill can you please clarify who is responsible for printing out the 2004 sign, putting it in a sign master, and putting it up at Milagra?

Ruby Kwan

415-810-0975

Restoration

Park Stewardship Program

Golden Gate National Parks Conservancy

rkwan@parksconservancy.org

From: Merkle, William [mailto:bill_merkle@nps.gov]
Sent: Thursday, June 18, 2015 11:48 AM
To: Ruby Kwan
Cc: Christina Crooker; Georgia Vasey; Rebecca Acosta

Subject: Re: Coyote posting at Milagra Ridge

That is fine, just a little outdated in formatting.

I am sending a few more recent ones for Tennessee Valley:

would need to change site name

AND one of the biggest things seems to be the pet information--so we need to get that included.

I think dispatch number should be 561-5510 or 5505

It would be great to redo signage from Microsoft Publisher cause then it should be super easy to edit. If you don't have time to do that--we should just get signage posted and then we can always replace with a better version. I can see if Rebecca can work on this but she is in the field right now.

Bill Merkle, Ph.D.

Wildlife Ecologist

Golden Gate National Recreation Area

415-289-1843

<~WRD000.jpg>

On Thu, Jun 18, 2015 at 10:30 AM, Ruby Kwan <RKwan@parksconservancy.org> wrote:

I changed the U.S. Park Police Dispatch telephone number from 5510 (old) to 5656. Please let me know if this should be non-emergency 5505 instead.

Thanks.

From: Merkle, William [mailto:bill_merkle@nps.gov]
Sent: Thursday, June 18, 2015 10:25 AM
To: Ruby Kwan
Cc: Christina Crooker; Georgia Vasey
Subject: Re: Coyote posting at Milagra Ridge

Yes, please post the signage.

Can you send me the most current version you have?

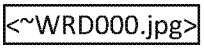
Thank you, Bill

Bill Merkle, Ph.D.

Wildlife Ecologist

Golden Gate National Recreation Area

415-289-1843



On Wed, Jun 17, 2015 at 7:16 PM, Ruby Kwan <RKwan@parksconservancy.org> wrote:

Hi Bill,

According to neighborhood dog walkers who frequent Milagra Ridge, there have been multiple incidents where they have been stalked by overly aggressive and persistent coyotes. The most recent incident occurred within this past week. There is one coyote in particular, a juvenile ~30-40 lbs, that will circle and run around a person and their dog and not back down unless an object is tossed at it and/or hits it.

One dog walker in particular, Bruce (did not catch is last name), is concerned for the safety of other dogs and people. He walks his dog at Milagra three times a day and was the one who most recently encountered the aggressive coyote. He carries an air horn with him but the coyote is not deterred. He thinks the coyote is mainly going after small dogs. It would ease his mind (and mine) if we posted a sign at the front encouraging people to keep their dog(s) on leash.

Christina mentioned that you made a coyote sign related to this matter. We have it on our end so I intend on posting that one. If you have a more recent one, can you please send it to me so that I can use it.

Bruce said he tried to get in contact with you but was unsuccessful. I gave him your email address so you may be receiving a seperate email from him regarding this matter.

Thank you,

Ruby

Message

From: Leah Bedoian [lbedoian@ParksConservancy.org]
Sent: 9/10/2015 1:59:05 PM
To: Cassidy, Lisa [lisa_cassidy@nps.gov]; Bill Merkle (bill_merkle@nps.gov) (bill_merkle@nps.gov) [bill_merkle@nps.gov]; DuBois Anthony (anthony_dubois@nps.gov) [anthony_dubois@nps.gov]; michael_r_evans@nps.gov
CC: Chasse, Michael [michael_chasse@nps.gov]; Naomi LeBeau [NLeBeau@ParksConservancy.org]; Jaimie Baxter [JBaxter@ParksConservancy.org]; corbett_robinson@nps.gov; John Anderson (p8ton.anderson@Ex. 6) [p8ton.anderson@Ex. 6]; Forrestel, Alison [Alison_Forrestel@nps.gov]; Barnaby_Fisher@nps.gov
Subject: Scheduled 10/24 RE: "dog proof" hog wire fencing at Fort Funston

Hi LC and Bill,

I wanted to let you both know that we have a volunteer group scheduled to begin removing the hog wire on the 24th of October.

Bill – Do you have input on how impactful it is to resources, i.e. Bank Swallow habitat, to remove the hog wire and replace with post and cable? Michael, Naomi, Barnaby, and I all agree that hog wire keeps the dogs at bay but is a safety concern if we can't maintain it, which we can't in this location. Let me know soon if you have any thoughts to share. I heard you are out on detail, I hope that's going well. Thanks!

LC and Anthony, (and Mike?) – I wanted to let you know this is on our work plan to begin. Let me know if you have any thoughts / concerns.

Thanks all!
Leah

Leah Bedoian
Trail and Restoration Specialist
Work schedule: Tuesday,Wednesday,Friday: Presidio Bluffs; Thursday + Saturday: Trail Stewardship

Golden Gate National Parks Conservancy
The nonprofit support partner for the Golden Gate National Parks

Building 201, Fort Mason
San Francisco, CA 94123
(518) 335 - 6969
lbedoian@parksconservancy.org

From: Leah Bedoian
Sent: Thursday, August 27, 2015 8:40 AM
To: Cassidy, Lisa
Cc: Chasse, Michael; Naomi LeBeau; Bill Merkle (bill_merkle@nps.gov) (bill_merkle@nps.gov); Jaimie Baxter; corbett_robinson@nps.gov; John Anderson (p8ton.anderson@Ex. 6); Forrestel, Alison; Barnaby_Fisher@nps.gov
Subject: RE: "dog proof" hog wire fencing at Fort Funston

Thank you for your feedback LC! Good to hear you have more folks coming on. I'll be in touch with Anthony about the work.

Leah

From: Cassidy, Lisa [lisa_cassidy@nps.gov]
Sent: Thursday, August 06, 2015 3:54 PM
To: Leah Bedoian
Cc: Chasse, Michael; Naomi LeBeau; Bill Merkle (bill_merkle@nps.gov) (bill_merkle@nps.gov); Jaimie Baxter; corbett_robinson@nps.gov; John Anderson (p8ton.anderson@g Ex. 6 ; Forrestel, Alison; Barnaby_Fisher@nps.gov
Subject: Re: "dog proof" hog wire fencing at Fort Funston

Hi all. If Michael is ok with the removal , so am I . Anthony is aware of the post and cable work that needs to be done here. It is on his radar. He is just now getting back to full time at his ocean district duties and will have a helper soon. So our labor pool is looking better and I hope by the end of the summer to be fully staffed. I will forward this to Anthony and you can correspond with him if you have any more questions on the task at hand..Thanks...LC

On Thu, Aug 6, 2015 at 2:50 PM, Leah Bedoian <lbedoian@parksconservancy.org> wrote:

Thank you for your feedback Michael and Naomi! I attached some photos of the area.

Bill,

We have been discussing removing the hog wire fencing along the Sand Ladder at Fort Funston. See this map and attached pictures. From Michael Chasse and Naomi LeBeau's stand-point, if we can't maintain it, it is best to remove the wiring but keep the post and cable. What are your thoughts on removing / maintaining this fence in regards to Bank Swallow habitat?

I added Lisa Cassidy to this email to hear if she has thoughts about this area.

Leah

Leah Bedoian

Trail and Restoration Specialist

Work schedule: Tuesday,Wednesday,Friday: Presidio Bluffs; Thursday + Saturday: Trail Stewardship

Golden Gate National Parks Conservancy

The nonprofit support partner for the Golden Gate National Parks

Building 201, Fort Mason

San Francisco, CA 94123

(518) 335 - 6969

lbedoian@parksconservancy.org

From: Chasse, Michael [mailto:michael_chasse@nps.gov]
Sent: Tuesday, July 14, 2015 8:53 AM
To: Naomi LeBeau; Leah Bedoian
Cc: Jaimie Baxter; corbett_robinson@nps.gov; John Anderson (p8ton.anderson@[redacted]); Forrestel, Alison
Subject: Re: "dog proof" hog wire fencing at Fort Funston

Ex. 6

The hog wire is effective if maintained, but the time required to maintain it is beyond our capacity. So it eventually becomes ineffective and a safety hazard.

Given this, I agree that it should be removed but keep the post & cable.

-Michael

Michael Chasse

Natural Resources

Golden Gate National Recreation Area

201 Fort Mason

San Francisco, CA 94123

415-561-2857

michael_chasse@nps.gov

On Mon, Jul 13, 2015 at 10:46 AM, Naomi LeBeau <NLeBeau@parksconservancy.org> wrote:

Hey Leah,

I don't have a problem with removing it. As long as the post and cable fences are maintained, I don't think we need hog wire at all.

I've cc'd John Anderson on this email since he helps take care of Fort Funston as well,

Naomi LeBeau

Restoration Specialist

Golden Gate National Parks Conservancy

201 Fort Mason, Third Floor

San Francisco, CA 94123

(415) 321-9668

From: Leah Bedoian
Sent: Thursday, July 09, 2015 12:50 PM
To: Michael Chasse; Naomi LeBeau
Cc: Jaimie Baxter; 'corbett_robinson@nps.gov'
Subject: A quick FOFU fencing question.

Hi all,

Another quick fencing question.

The fencing along the Fort Funston Sand Ladder was originally installed with hog wire (that gridded metal that once tried to keep dogs out of natural areas at FOFU, similar to what's installed along Chrissy Field). It is now falling down, wouldn't stop a dog, and is presenting a safety hazard.

Do you see any concern with removing it in this area?

Thanks! Sorry to not have a picture, if you'd like one I'll grab one next time we are out.

Thanks,

L

THANKS!

Leah Bedoian

Trail and Restoration Specialist

Work schedule: Tuesday,Wednesday,Friday: Presidio Bluffs; Thursday + Saturday: Trail Stewardship

Golden Gate National Parks Conservancy

The nonprofit support partner for the Golden Gate National Parks

Building 201, Fort Mason

San Francisco, CA 94123

(518) 335 - 6969

lbedoian@parksconservancy.org

--

Lisa Cassidy (LC)
Supervisor, San Francisco/San Mateo Grounds
Golden Gate National Recreation Area
office:415-561-2868
mobile: 415-471-6224

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 9/28/2015 11:34:48 AM
To: Rachel Townsend [rachel_k_townsend@partner.nps.gov]; Rebecca Acosta [rebecca_acosta@partner.nps.gov]
Subject: Fwd: Plover Blog Post Pertinent to Plovers & GGNRA

Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

---------- Forwarded message ----------
From: **Cindy Margulis** <cmargulis@goldengateaudubon.org>
Date: Mon, Sep 28, 2015 at 11:15 AM
Subject: Re: Plover Blog Post Pertinent to Plovers & GGNRA
To: "Levitt, Howard" <howard_levitt@nps.gov>
Cc: Chris Lehnertz <Chris_Lehnertz@nps.gov>, Daphne Hatch <Daphne_Hatch@nps.gov>, William Merkle <Bill_Merkle@nps.gov>

The very latest info from our longtime citizen scientist is both exciting, and nerve-wracking....
105 Snowy Plovers on Ocean Beach in four groups yesterday (Sunday, 9/27/2015).
That's an especially high count of this threatened species to be seen relatively close together post-breeding...
This may indicate that Ocean Beach is actually becoming increasingly important as a crucial migratory (and/or) overwintering site for Western Snowy Plovers. Every effort should be made to ensure these threatened birds safety on a public beach.

It therefore seems of greater importance than ever to protect these birds from dog hazards on that stretch of beach.

I would recommend, in addition, that GGNRA contemplate placing remote automatically switchable day-to-night remote security cameras on a high vantage over the plovers favored areas.
It may be possible for biologists and/or enforcement personnel to remotely discern patterns of activity that impact these birds, such as (perhaps) off-leash dogs being run in after-work hours on Ocean Beach,
or other types of disturbances to both plovers and other shorebirds needing that habitat for survival.
This population of Snowy Plovers does represent a significant number and fraction of the regional population, so it'd be advisable to remotely get a handle on what are any/all of the disturbances they face in their favored zones of Ocean Beach. By the way, these cameras which switch to night-view automatically (infrared) may also uncover
important biological information on Snowy Plovers. We've been suspecting that they're more night-active than other shorebirds but I'm not sure it's well known or well documented. You might, therefore, get

two key values out of those cameras: learning more biologically AND understanding the greatest protection priorities by detecting disturbances &/or patterns of disturbance.

Cindy

On Thu, Sep 24, 2015 at 10:06 AM, Levitt, Howard <howard_levitt@nps.gov> wrote:
Keep these great info pieces coming, Cindy - thank you so much! I'm looping in Daphne Hatch, our Chief of Nat Resources and Science and Bill Merkle, our Wildlife Biologist as well. Don't worry about inundating Chris ... as you know, she's a biologist and needs this kind of empirical information, as we all do. Gratefully, Howard

On Wed, Sep 23, 2015 at 7:04 PM, Cindy Margulis <cmargulis@goldengateaudubon.org> wrote:
Hi Howard,

I didn't want to inundate Chris, but wanted you to see our most
recent blog post, re Snowy Plovers....

http://goldengateaudubon.org/blog-posts/snowy-plovers-are-back-with-some-human-help/

Cindy

Cindy Margulis
Executive Director
Golden Gate Audubon Society
2530 San Pablo Ave., Suite G
Berkeley, CA 94702
Tel: (510) 843-9912
www.goldengateaudubon.org

Howard Levitt
Director of Communications and Partnerships
Golden Gate National Parks
howard_levitt@nps.gov

415-561-4730

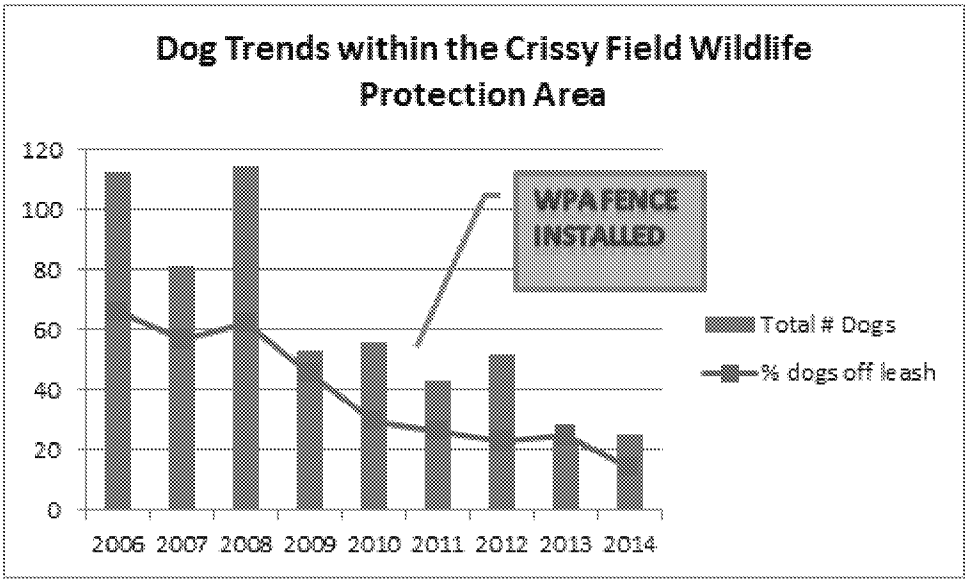
--

Cindy Margulis
Executive Director
Golden Gate Audubon Society
2530 San Pablo Ave., Suite G
Berkeley, CA 94702
Tel: (510) 843-9912
www.goldengateaudubon.org

Message

From: Townsend, Rachel [rachel_k_townsend@partner.nps.gov]
Sent: 10/5/2015 10:05:05 AM
To: William Merkle [bill_merkle@nps.gov]
Subject: off leash dog data

Here is what I've done for Crissy Field:



For Ocean Beach, would it be helpful to look at dog trends just within the protection area as well? So, sectors 4-12? Is there a year or date that the area was considered protected that I should include like I did here? I suspect we won't see such positive trends for OB. Let me know if you have any other ideas.

Rachel Townsend
Biological Technician
Golden Gate National Parks Conservancy
office:415-289-1848
cell:563-343-7707

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 10/6/2015 12:33:30 PM
To: Townsend, Rachel [rachel_k_townsend@partner.nps.gov]
Subject: Re: plover report

A couple of quick thoughts:

Can we look at dog rate? Dogs/time is what we usually look at or could be dogs/survey. I think if we just look at total dogs, the number is sensitive to how many surveys were conducted.

For OB, hopefully you only looked at data for sectors 4-12 in the SPPA.

Do we have the years right on the graph of when things were implemented? 2009 should cover July 2009 through May 2010. Did fence go in in early 2010? If so we should probably indicate it in 2009 year. Same for the OB dog on leash regulations.

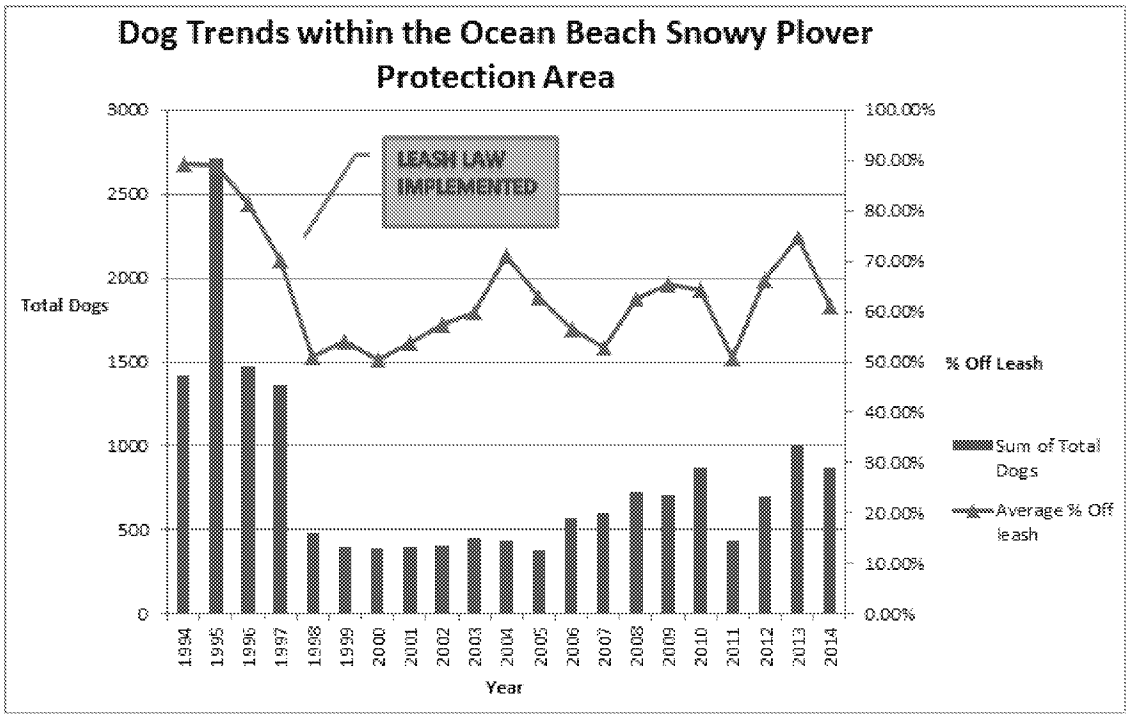
We may also note that spike in dog off leash % in 2004 was associated with ruling that we couldn't enforce on leash regs.

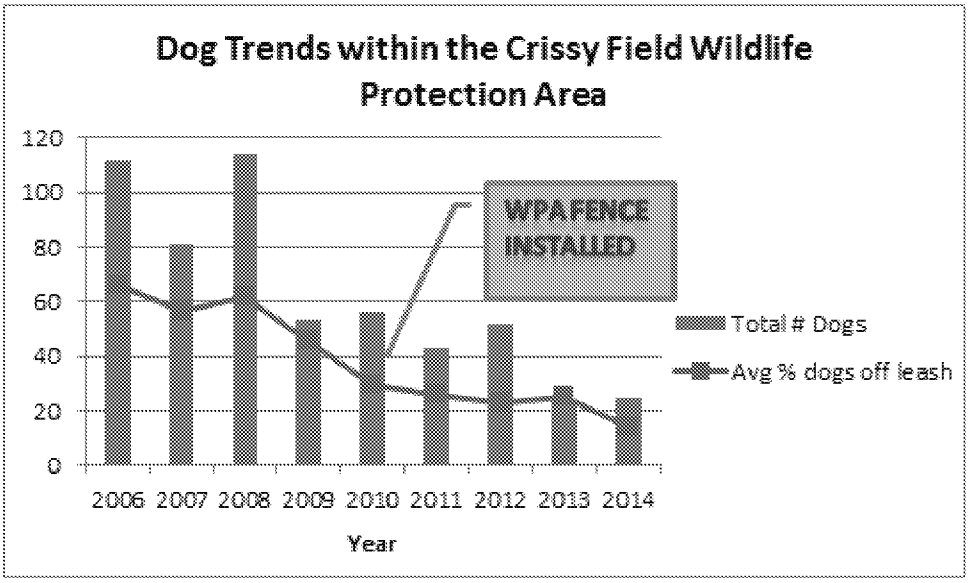
In the past we have typically reported people and dog numbers as median and not averages--as averages can be more sensitive to high count days. We may also see how numbers compared to 2007 reporting.

i'm at desk at 464-5173 today

Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

On Tue, Oct 6, 2015 at 12:17 PM, Townsend, Rachel <rachel_k_townsend@partner.nps.gov> wrote:
That's helpful, thank you. How do these look?





Rachel Townsend
Biological Technician
Golden Gate National Parks Conservancy
office:415-289-1848
cell:563-343-7707

On Tue, Oct 6, 2015 at 11:27 AM, Merkle, William <bill_merkle@nps.gov> wrote:
this has info on enforcing leash restriction on OB

Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

Message

From: Townsend, Rachel [rachel_k_townsend@partner.nps.gov]
Sent: 10/6/2015 12:51:31 PM
To: Merkle, William [bill_merkle@nps.gov]
Subject: Re: plover report

I will work on dog rate.

As for OB, yes, only sectors 4-12 were analyzed and I should edit the x axis to say Survey Year because yes, it covers July through May.

The years are correct on the graph for when things were implemented so the fence went up in the middle of the 09 season (January 2010), I will include the date on the bubble.

If an additional bubble noting the 2004 spike looks too busy, I will include it in the notes on the presentation.

I can change numbers to average...Ok, basically I will redo it all! :) The average and max snowy plover numbers I've ran match with previous reports/figures if that's what you mean?

R

Rachel Townsend
Biological Technician
Golden Gate National Parks Conservancy
office:415-289-1848
cell:563-343-7707

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We may also note that spike in dog off leash % in 2004 was associated with ruling that we couldn't enforce on leash regs.

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Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

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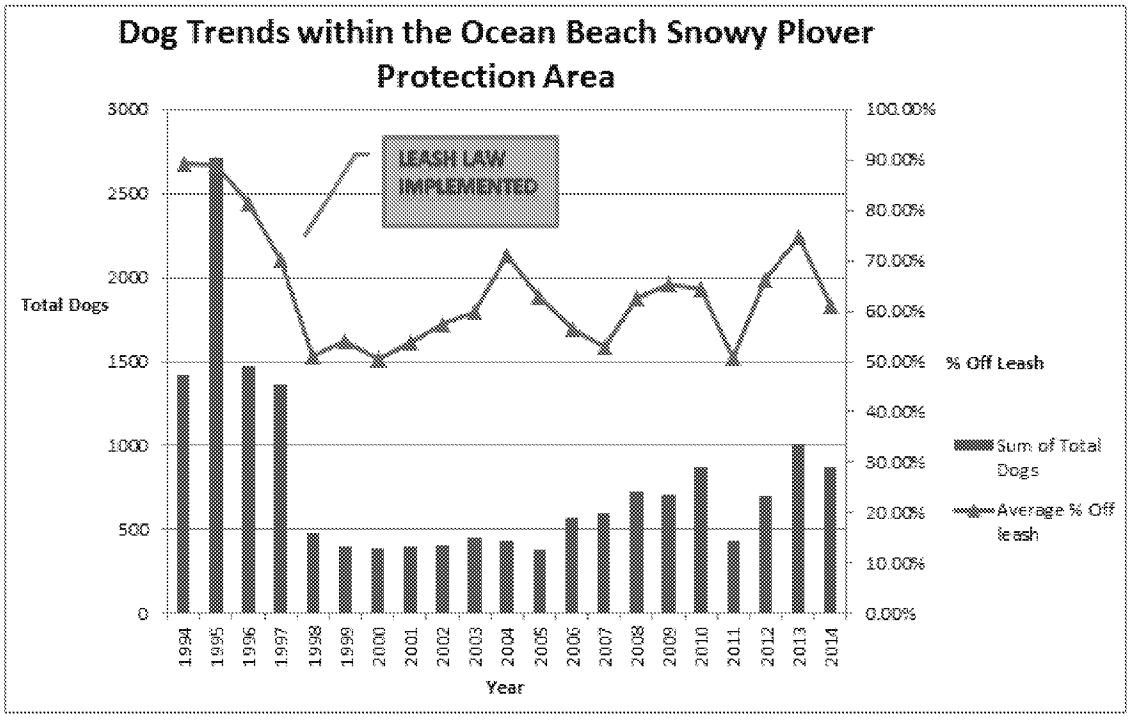
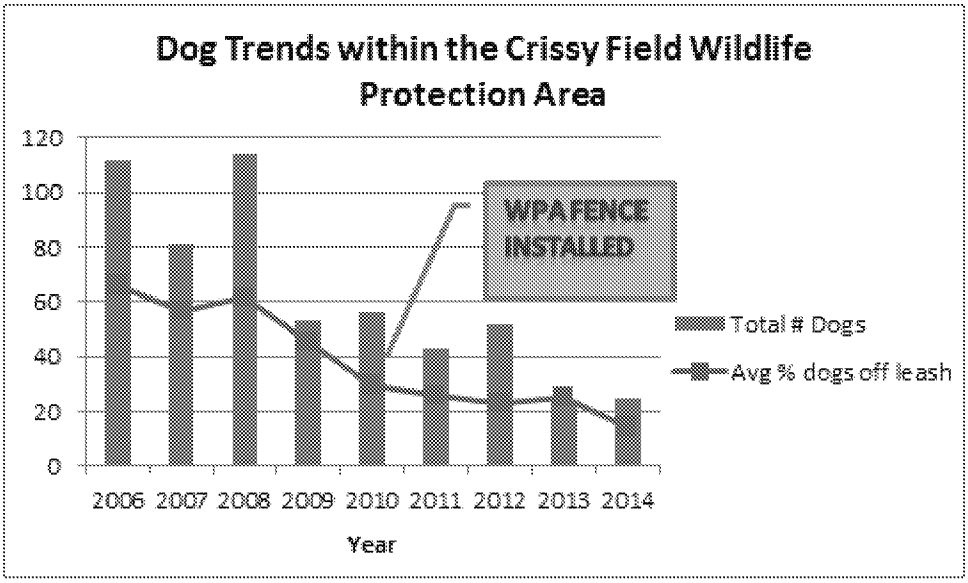
That's helpful, thank you. How do these look?





Rachel Townsend
Biological Technician
Golden Gate National Parks Conservancy
office:415-289-1848
cell:563-343-7707

On Tue, Oct 6, 2015 at 11:27 AM, Merkle, William <bill_merkle@nps.gov> wrote:
this has info on enforcing leash restriction on OB

Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

Message

From: Townsend, Rachel [rachel_k_townsend@partner.nps.gov]
Sent: 10/26/2015 2:32:23 PM
To: William Merkle [bill_merkle@nps.gov]
Subject: 2014 monitoring summary

Anything you would like to add? The snippet at the bottom involving the dog management plan is from last year, not sure if you'd like to amend. Let me know and I will send them the final copy and whether we can make it or not...

Rachel

Rachel Townsend
Biological Technician
Golden Gate National Parks Conservancy
office:415-289-1848
cell:563-343-7707

Monitoring Overwintering Snowy Plovers at Golden Gate National Recreation Area

- 2014 (July-June 2015) was an above average year for snowy plovers at Ocean Beach in GGNRA. Numbers increased dramatically from 2013 to an average of nearly 52 plovers per survey during the winter season (Figure 1).
- Max count was 74 plovers, numbers not seen since the first year monitoring began in 1994
- On a survey in August of this season (2015), observed 97 plovers, a record high since monitoring began
- Snowy plovers remained toward the northern end of the snowy plover protection area, where the beach was wider.
- We still had from 74% of dogs off leash (not following leash regulation) in the snowy plover protection area.

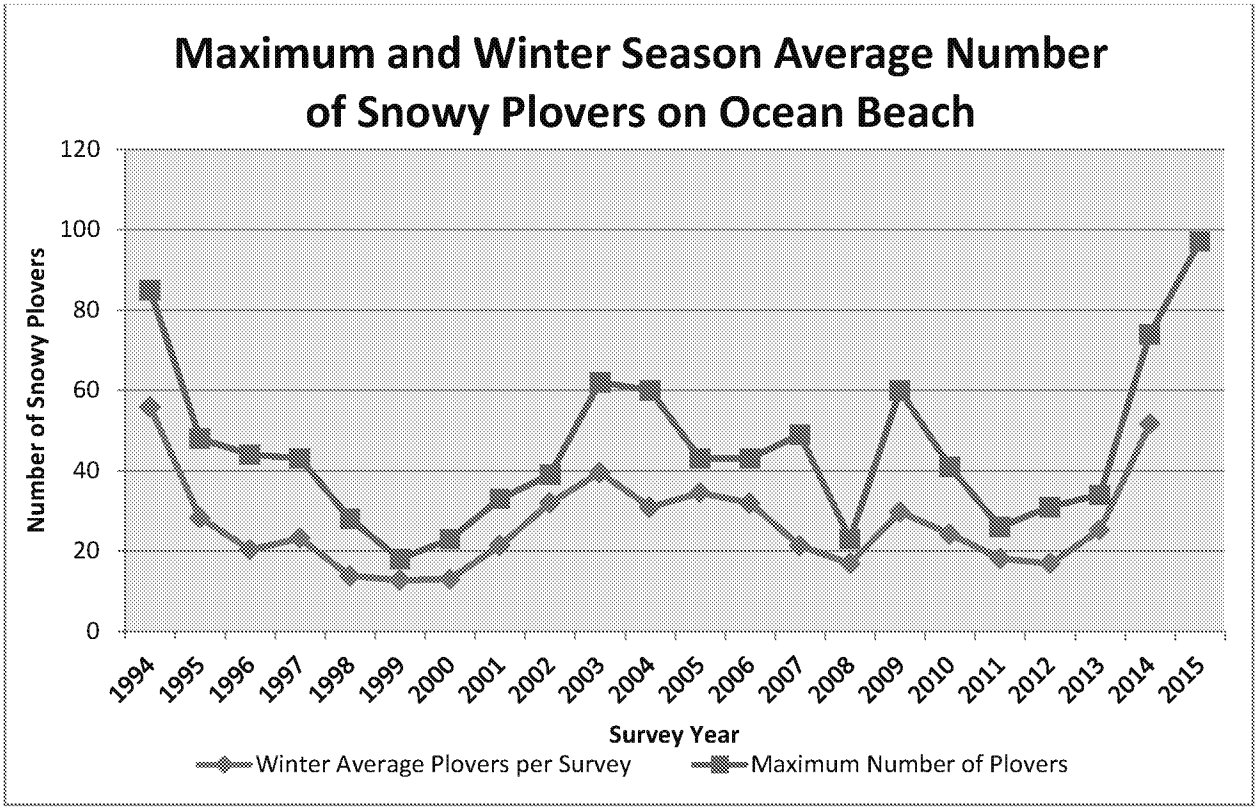


Figure 1.

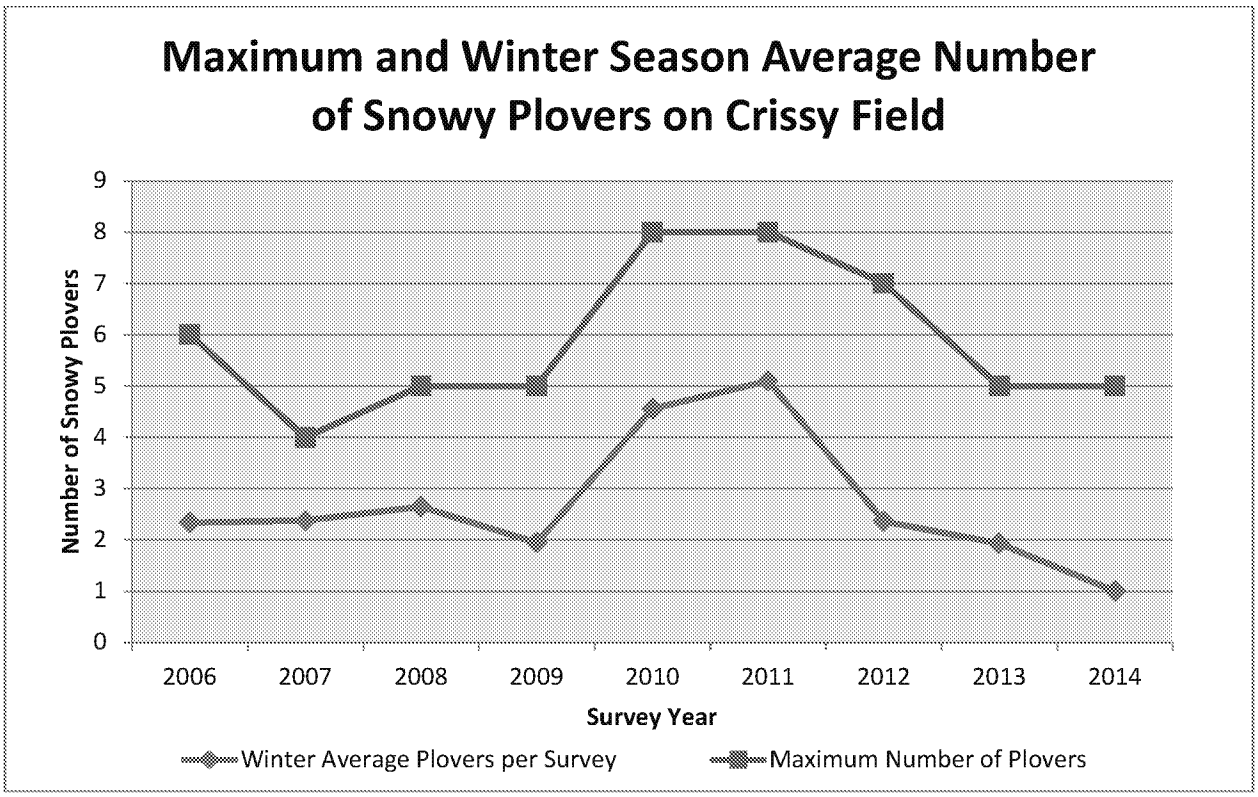


Figure 2.

Crissy Field

- In 2014, we had a maximum count of five snowy plovers at Crissy Field, with an average winter season count of one plover (Figure 2).
- Dune habitat is continuing to spread and improve at Crissy--this seems to be the result of fencing the area (many dog walkers turn around at the fence rather than leash their dogs). Only 4% median dogs off leash per hour within WPA in 2014.
- Caltrans project to extend the storm outfall on Crissy WPA beach (so that we won't have heavy equipment on the beach every time it rains) – was completed Summer 2015.

Dog Management Plan Update: We have taken final comments on our Supplemental EIS and are in the process of rulemaking to establish the regulations at each site--this will have a public comment period. This is likely about one year away from roll out. The plan establishes no dog zones for snowy plover areas at Ocean Beach and Crissy Field.

For additional information contact: Bill Merkle, 415-289-1843, bill_merkle@nps.gov

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 6/10/2013 5:31:06 PM
To: Matt Zlatunich [mbzlat@y Exemption 6
CC: SunilRajappa [sunil_rajappa@partner.nps.gov]; Corny Foster [corny.foster@ Exemption 6]; Dan Murphy [murphsf@ Exemption 6 JackDumbacher [JDumbacher@ Exemption 6
Subject: Re: Crissy WPA plover nest

Thanks Matt. I thought from the subject line that you had found a snowy plover nest!

Where is this on the beach? Is it in an area that gets much traffic?

Open to suggestions for protection. My initial thought is might be best to not draw attention to it.

The WPA will be closed for America's Cup race season--but that isn't for another 3 weeks--and it sounds like they might change schedule now.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jun 10, 2013 at 5:06 PM, Matthew Zlatunich <mbzlat@ Exemption 6 wrote:
Hi Bill,

During our monthly habitat maintenance day at the Crissy WPA one of the volunteers discovered an active Killdeer nest. We were able to observe the pair from a safe distance as they exchanged incubation duty. From our vantage point, three eggs were visible.

In the attached photo the Killdeer can be seen in the center of the pictre.

I must admit, I am a bit fearful for this nest, and I look forward to the day when dogs are no longer permitted within the Wildlife Protection Area.

Best regards,

Matt

Message

From: Ward, Kristen [kristen_ward@nps.gov]
Sent: 6/10/2013 12:28:21 PM
To: Lucas, Andrea [andrea_lucas@nps.gov]
CC: William Merkle [bill_merkle@nps.gov]
Subject: Re: URGENT final chance at Caltrans Permit in WPA

and dogs of course. they're half way between people and wildlife right?

On Mon, Jun 10, 2013 at 12:27 PM, Ward, Kristen <kristen_ward@nps.gov> wrote:
i'd say people on the promenade and wildlife/people on the beach

On Mon, Jun 10, 2013 at 12:25 PM, Lucas, Andrea <andrea_lucas@nps.gov> wrote:
Got it! and speeds will be in their safety plan. Is the accompany of the equipment to look for wildlife or for people?

On Mon, Jun 10, 2013 at 12:17 PM, Ward, Kristen <kristen_ward@nps.gov> wrote:
Hi Renny -
also one minor comment on the language about topographic surveys -

Kristen

under During Work/Topographic Survey

Change to read :Coordinate with NPS to occupy control points used for NPS surveys within area where CalTrans surveyors will be working.

On Mon, Jun 10, 2013 at 11:20 AM, Lucas, Andrea <andrea_lucas@nps.gov> wrote:
I have turned this over to Mike to dig up his notes....
we are missing your elements.
We do have:

a. COMMUNICATIONS, SCHEDULING and REVIEW

i. PRIOR TO COMMENCING WORK

1. REQUIRED CONSULTATIONS: Caltrans will conduct any required consultation with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service for the proposed in-water work.

2. GULF OF FARALLONES NMS: Provide the Gulf of the Farallones National Marine Sanctuary (GFNMS) an opportunity to review the proposed access routes and staging areas in order to avoid any conflicts with GFNMS operations and potential impacts to GFNMS visitors.

3. SURVEY COORDINATION: Coordinate with NPS PM to ensure that the proposed hydrological, topographic and other survey data collection is compatible with NPS needs where possible.

i. DURING WORK

1. Update progress with daily report to NPS PM via email to andrea_lucas@nps.gov.

2. Conduct a field meeting with NPS Facility Management Representative each morning to identify undertaking for that day, ensure that their work is done in an authorized area, and is in accordance with the workplan and safety plan

3. Topographic survey- coordinate with NPS datum and set permanent markers in two locations

4. Conduct utility location surveys in coordination with NPS PM, Presidio Trust, and utility location services (per industry standards), before finalizing boring locations.

ii. AFTER COLLECTING DATA AND PREPARING REPORTS

1. Caltrans shall provide NPS a copy of:

   a. Completed consultations with the U.S. Fish and Wildlife Service and/or National Marine Fisheries Service

2. Results of surveys, data collection and hazardous materials investigations and any recommended remediation actions within 30 days

On Mon, Jun 10, 2013 at 10:49 AM, Ward, Kristen <kristen_ward@nps.gov> wrote:
Hi Renny -
Based on the conversation Bill and I had with Mike Savidge last week this looks like a lot is missing or maybe got a bit twisted up. Is there anything else? for example, some of the info in there doesn't really apply to the WPA and beach so much as the dunes. And I don't see anything about further coordination with NPS/NMFS if they end up needing to do any borings offshore.

We'd also suggested some safety language about driving speeds on the promenade and having a person walking in front (escorting) the equipment down the promenade and onto the beach. Also, some language about maintaining safe boat speeds during water surveys, avoiding wildlife and being aware of recreational users on the beach and in the water.

can you tell me if you got any of that from Mike before I start any wordsmithing.

thanks!
Kristen

On Mon, Jun 10, 2013 at 10:26 AM, Lucas, Andrea <andrea_lucas@nps.gov> wrote:
Hi ho Bill and Kristen
any words you would like to add?

a.
b. ENVIRONMENTAL

i. Caltrans PM will ensure all vehicles and equipment used by contractors are washed and weed free before entering Crissy Field.

The following conditions refer to the Crissy Field Wildlife Protection Area and beach (WPA): [Project Review sez: Bill Merkle, NPS Wildlife Ecologist, will provide the final set of conditions to be incorporated into SUP] for work in the WPA. The measures to minimize impacts will include provisions for: /

Biological monitoring and bird nesting surveys if any exceptional access to WPA is granted during the restrictive periods.

Caltrans staff, contractors and their subcontractors who will be entering the WPA must attend a one-time Environmental Sensitivity Training presented by NPS.

/Work dates, access restrictions, and access routes shall be submitted and approved prior to commencing work in the WPA.

If any work needs to occur in the WPA after July 1, Caltrans PM will notify NPS PM who will coordinate consultation with the appropriate NPS Natural Resources staff.

moochas gracias!--

Andrea Lucas
Landscape Architect

Golden Gate National Recreation Area
National Park Service
Building 201 Fort Mason
San Francisco, CA 94123

415/561-4931

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Landscape Architect

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San Francisco, CA 94123

415/561-4931

Message

From: Matthew Zlatunich [mbzlat@y Exemption 6
Sent: 6/11/2013 2:25:18 PM
To: WilliamMerkle [bill_merkle@nps.gov]
CC: SunilRajappa [sunil_rajappa@partner.nps.gov]; Corny Foster [corny.foster@s Exemption 6]; Dan Murphy [murphsf@ Exemption 6 ackDumbacher [JDumbacher@calacademy.org]
Subject: Re: Crissy WPA plover nest

Yes, I figured the byline would pique your interest. Though the plover in question is not a Snowy, I'd like to posit that it deserves equal consideration being that the nest site is within a Wildlife Protection Area.

The nest is in the s 54 USC Section 100707
54 USC 100707 I know that most traffic is along the shoreline, but being as the entire beach is open to people and off-leash-dogs the nest could, by chance, be subject to disturbance.

I think not drawing attention is a good idea.What other protective options are available to the NPS at this time?

Matt

--- On **Mon, 6/10/13, Merkle, William *<bill_merkle@nps.gov>*** wrote:

From: Merkle, William <bill_merkle@nps.gov>
Subject: Re: Crissy WPA plover nest
To: "Matt Zlatunich" <mbzlat Exemption 6
Cc: "SunilRajappa" <sunil_rajappa@partner.nps.gov>, "Corny Foster" <corny.foster@ Exemption 6 "Dan Murphy" <murphsf@ Exemption 6 "JackDumbacher" <JDumbacher@calacademy.org>
Date: Monday, June 10, 2013, 5:31 PM
Thanks Matt. I thought from the subject line that you had found a snowy plover nest!

Where is this on the beach? Is it in an area that gets much traffic?

Open to suggestions for protection. My initial thought is might be best to not draw attention to it.

The WPA will be closed for America's Cup race season--but that isn't for another 3 weeks--and it sounds like they might change schedule now.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jun 10, 2013 at 5:06 PM, Matthew Zlatunich <mbzlat@ Exemption 6 > wrote:
Hi Bill,

During our monthly habitat maintenance day at the Crissy WPA one of the volunteers discovered an active Killdeer nest. We were able to observe the pair from a safe distance as they exchanged incubation duty. From our vantage point, three eggs were visible.

In the attached photo the Killdeer can be seen in the center of the pictre.

I must admit, I am a bit fearful for this nest, and I look forward to the day when dogs are no longer permitted within the Wildlife Protection Area.

Best regards,

Matt

Message

From: Eric Klein [EKlein@ParksConservancy.org]
Sent: 6/11/2013 1:41:03 PM
To: 'Merkle, William' [bill_merkle@nps.gov]
Subject: RE: Larval migrans in GOGA gophers?

Hi Bill, thanks for your response.

As I mentioned, I saw three of these gophers, all within the first two weeks of May. Two of them were at Lands End, and one was in the Presidio. I just heard from an intern today that there was one this weekend running around near the intern housing (Towers) in the Presidio. Is there a desire on your end for any live specimens to be captured by staff/interns?

If you have any other questions from us in the field, don't hesitate to ask. And if you want help spreading the news about anything, I'll be happy to help with that.

Thanks again for your response, and I hope to run into you soon,
Eric

Eric Klein
Park Stewardship Program
Golden Gate National Parks Conservancy
Building 201, Fort Mason
San Francisco, CA 94123
tel: (415) 341-3066
www.parksconservancy.org

The nonprofit support partner for the Golden Gate National Parks

Please note: I work a Tuesday through Saturday work week. Also, now that spring has arrived, I spend more time in the field than I do at my desk, so I apologize for delays in responding to your emails while the weeding season is in full swing.

From: Merkle, William [mailto:bill_merkle@nps.gov]
Sent: Friday, May 31, 2013 11:44 AM
To: Eric Klein
Subject: Re: Larval migrans in GOGA gophers?

Hi Eric,

How frequently are you observing this? Not sure if Cal Academy has confirmed this is going on, but we could help if you find fresh dead specimens.

It appears that most of the urban raccoons on the west coast are infected with the roundworm that causes larval migrans.

This is not something we would be able to do much about--or that NPS would likely take on. These gophers just become part of the food chain--and there is selection for gophers that do not eat raccoon feces. Not sure if there are secondary infections from other animals feeding on these gophers.

I think the 2 places where intervention is warranted is:
1.) Like you were saying to educate the public and other staff on what is going on
2.) We may have to move some of the delirious gophers out public areas or where they may be eaten by dogs.

I'd be happy to discuss this more with you.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Wed, May 29, 2013 at 10:04 AM, Eric Klein <EKlein@parksconservancy.org> wrote:

Good morning Bill,

I'm not sure that we've ever officially met: I'm the restoration specialist for Park Stewardship in our San Francisco sites (Fort Funston, Lands End, Presidio Coastal Bluffs). I've been seeing some unusual gopher activity at Lands End and also in the Presidio in the past month, and I figured I should pass this observation over to you. They walk around in circles, stumbling, mostly on pavement rather than soil, and don't spend much time hiding in their holes. They seem to not have any fear of predators, and will walk right up to people's feet without hesitation (they're such an easy target that ravens have called them dinner). I've recently been told that NPS maintenance was called in to protect a gopher at Lands End, and they brought it down to Fort Funston, where it would be harassed by fewer people.

I came across this Cal Academy blog post from 2011 about Golden Gate Park gophers eating raccoon feces and thus coming down with the gross and unfortunate *larval migrans*, which I assume is what's happening here. I thought it would be worth passing on to you to get any insight you may have into this matter, and if there's anything we can be doing as resource managers to help out or educate.

Thanks, and I look forward to meeting you in person at some point,

Eric

Eric Klein

Park Stewardship Program

Golden Gate National Parks Conservancy

Building 201, Fort Mason

San Francisco, CA 94123

tel: (415) 341-3066

www.parksconservancy.org

The nonprofit support partner for the Golden Gate National Parks

Please note: I work a Tuesday through Saturday work week. Also, now that spring has arrived, I spend more time in the field than I do at my desk, so I apologize for delays in responding to your emails while the weeding season is in full swing.

Message

From: Rajappa, Sunil [sunil_rajappa@partner.nps.gov]
Sent: 6/17/2013 5:21:09 PM
To: William Merkle [bill_merkle@nps.gov]
Subject: Killdeer chicks @ EX. 3 54 USC 100707

Bill,

I checked out the parking lot at 11am and 4pm today. The parents and chicks were hanging out on EX. 3 54 USC 100707 EX. 3 54 USC 100707

I counted 3 chicks in the morning, and luckily 3 in the afternoon. I also observed the chicks crossing the road with a parent 3 times.

Foot traffic is not too heavy there, but there is the occasional pedestrian and dog.

Sunil

Sunil Rajappa
Wildlife Intern
Golden Gate National Recreation Area

Office: 415.289.1848
Cell: 916.276.6342

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 6/18/2013 9:45:17 AM
To: Rajappa, Sunil [sunil_rajappa@partner.nps.gov]
Subject: Re: Killdeer chicks @ EX. 3 54 USC 100707

what do you think? What are they attracted to right there?

do you have any time to look today?

We could just plan to go ahead and set up the SLOW sign.

I am heading in now.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jun 17, 2013 at 5:21 PM, Rajappa, Sunil <sunil_rajappa@partner.nps.gov> wrote:
Bill,

I checked out the parking lot at 11am and 4pm today. The parents and chicks were hanging out on EX. 3 54 USC 100707
EX. 3 54 USC 100707

I counted 3 chicks in the morning, and luckily 3 in the afternoon. I also observed the chicks crossing the road with a parent 3 times.

Foot traffic is not too heavy there, but there is the occasional pedestrian and dog.

Sunil

Sunil Rajappa
Wildlife Intern
Golden Gate National Recreation Area

Office: 415.289.1848
Cell: 916.276.6342

Message

From: Megan Isadore [megan.isadore@ Exemption 6
Sent: 6/24/2013 1:36:21 PM
To: Merkle, William [bill_merkle@nps.gov]
Subject: Re: otter cams

I don't think you need to fence the path; you were mentioning that you were going to fence the south side anyway, right? I just thought if you were going to do it in July, why not do it now. As for fencing that northwest beach, I don't know that you need to necessarily, the beach is one latrine site, which I'm sure they use at night when people aren't around. We also saw scat on the north side beach, right by the road, and there is scat under the car bridge between the lagoon and the pond. The otters are totally capable of getting away from people, and the pups appear to remain on the south, less-accessible side of the lagoon, except when they don't. If fencing is not a good idea, I don't think we need to at this point. Maybe if lots of people start using that beach, but it is fairly revolting with all the otter scat. :-)

My only concern is when dogs run loose, which I realize is legal, but as we know, nobody controls their dogs so if they got a pup it would suck. But dogs won't obey fencing anyway, so it is kind of a moot point.

On Jun 24, 2013, at 1:26 PM, Merkle, William wrote:

Is this something we need to fence?

-b

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jun 24, 2013 at 12:48 PM, Megan Isadore <megan.isadore@ Exemption 6 wrote:
Hi, their hang-out spot where there's a trail into the grass is this one (coords below). There is a large latrine site on the beach west and slightly north of this spot, which is the other camera coordinate I sent. We've seen the adults on this beach, but judging from the latrine site, it's used a lot and likely the pups are there too. Andrea has hidden the camera there very well, so it's hard to find, but we are still picking it up during the day to avoid theft.

Andrea saw the one pup hanging by the pedestrian bridge last night, so that's another hang-out!

But if anything is fenced off, I'd say the best place to fence is that south side where the otter trail leads from the lagoon into the grasses, then to the heavy brush. Perfect for otter pups.

Make sense? If not, let's talk by phone.

On Jun 24, 2013, at 12:11 PM, Merkle, William wrote:

Hey,

Can you confirm this is where pups are hanging?

Daphne doesn't want orange fence. I am looking at other options.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jun 24, 2013 at 10:24 AM, William Merkle <bill_merkle@nps.gov> wrote:
Great with camera location.

Sent from my iPhone

On Jun 24, 2013, at 9:54 AM, Megan Isadore <megan.isadore Exemption 6 wrote:
Hi Bill,

Andrea saw both pups again last night. Interestingly, one was over by the pedestrian bridge snoozing on the bank, and the other was with the mom way over on the south side! The solo pup didn't appear particularly concerned, though did a bit of peeping. Andrea left for her shift at TMMC, but returned after an hour to see if the pup was okay, and s/he was back over with mom for a happy ending.

We'd like to place another camera at the path where the otter slide to the water is, coords: N 37*49'45.8" W 122*31'56.6". This is not an area where people go, so we could leave it up. Okay with you? We're excited about this spot, as there are a couple of preyed-upon cormorants right there, and Andrea saw the mom and pup chewing on them last night.

Cheers, M

Megan Isadore, Co-Founder
Director of Outreach and Education
River Otter Ecology Project
415/342-7956 cell
www.riverotterecology.org
and Facebook

<PastedGraphic-5.pdf>

<Otter pups rodeo.jpg>

Message

From: mary355@c Exemption 6 [mary355@c Exemption 6
Sent: 6/28/2013 9:46:24 PM
To: Susie Bennett [Susie_Bennett@nps.gov]
CC: Bill Merkle [Bill_Merkle@nps.gov]; Darren Fong [Darren_Fong@nps.gov]
Subject: Fw: Mori pet flyer

Hi Susie,
Attached is the revised text for the Mori pet flyer with many of the great suggestions from Bill and Darren. (Thank you! I have responded to your comments below in **bold** to give you an understanding of the changes.) I think it would be great if Michelle could work her magic again in re-cutting and pasting this (with your new picture too, Suz.) Then perhaps we could release this to the last group for final edits so that I have this all in hand soon for my door-to-door duty.
Thanks again,
Mary
p.s. I had to rework the first paragraph due to the deletion of those environmental hazards. I also tried to make it more inspiring for Bill. AACK - I don't think I succeeded, sorry! – but I'm sure someone will change it anyway. haha

From: Susie Bennett
Sent: Tuesday, June 04, 2013 3:55 PM
To: Merkle, William
Cc: mary355@ Exemption 6
Subject: Re: Mori pet flyer

Hi--
Thanks for working on these! Mary, I know you wanted to take a stab at these before handing edits over to Michelle to incorporate into the formatted version. Let us know when you've done that and I'll send revisions over to Michelle.

As for documentation of the hawks picking up cats, I've personally seen it twice. (Once during the project at Mori--several construction guys and biomonitors saw it too. The more recent time was Christina and me. I can't recall what we were doing specifically, but we were too flabbergasted to take a photo or anything formal.)

-Susie

On Fri, May 31, 2013 at 11:24 AM, Merkle, William <bill_merkle@nps.gov> wrote:

Hi,

Darren was timely in getting his comments to me--and I am just getting back to this.

Title:

what about "Your pet(s) in National Parks" **Could be construed as a guide for bringing your pet to the park.**

Predators:

1st paragraph: Coyotes, bobcats, and mtn. lions all will prey on cats and dogs—foxes may take small cats or kittens. Think general message is that domesticated animals are easy (pickings) prey for these predators. **Yes – I included foxes b/c people see and know of at least one around here so it's more real.**

Outdoor feeding has its own suite of problems. Primarily attracting wild animals and food conditioning/habituation. Outdoor feeding attracts coyotes, foxes, raccoons, skunks, opossums, ravens, crows, and even rats. **Thanks, I couldn't add them all, but just saw a rat running along a neighbor's fence the other day, so put that in.**

For the coyote example: coyotes will eat cats and dogs even without feeding. Feeding does attract them to an area—so probably makes it more likely of a pet getting attacked. Loss of fear is fine—think this is also related to increased chance of an encounter near house and because animal may be regularly checking and expecting to find food. **O.K.**

I would move hawk paragraph up to second, then follow with what to do when approached by threatening animal. **O.K.**

> Darren wanted to make sure we had documentation of hawks snatching up cats—that we weren't going to be accused of sensationalizing this. Pretty sure that we do have this. **See Susie's note above.**

I think another issue is that outdoor cats are frequently injured in fights with other outdoor cats. **O.K. emphasized in "Abandoned Pets"**

Diseases:

Think we should italicize Toxoplasma. **O.K.**

We suggest dropping the title and sentence on Environmental hazards. **O.K... changed to Abandoned Pets and dropped environmental hazards**

Retitle: Don't Release Pets in National Parks **Changed to Abandoned Pets**

Lead in with Regulations prohibit release of pets into the park. Then keep info about release of pets. **Already have regulation for removal of pets in parks...think that's more important for this flyer.**

Threats to Wildlife

Predators

Do we want to say Even well fed cats will follow their instincts … **Yes! Thank you.**

Off-leash dogs can disturb (through chasing), displace, and even hunt wildlife. **O.K.**

Animals such as, pet turtles and fish….upset the delicate balance of nature as they feed upon or compete with native wildlife. Our park provides important habitat for many rare, threatened and endangered wildlife: pets can adversely impact them. **O.K. partially changed :)**

Diseases

For first sentence, Darren suggests that you may need to generalize. Chytrid already present and example too specific for the public. **O.K.**

Who is the contact number? **That's Jennifer Greene-Ringold. I think her title is Community Engagement Manager. Bless her!**

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Text Revisions for Pet Flyer, June 2013

Title: **Threats to Pets and Wildlife in National Parks** (May delete "Threats to")

FRONT PAGE – Intro.

Living near a national park means there's protected wildlife just beyond your back door. However, this privilege carries an important responsibility in the care of your pet. When a pet roams wildlife habitat, it is exposed to many risks and may endanger wildlife. Help keep your pet safe and protect the wildlife of these treasured park lands -- keeping them alive with the natural wonders of our world.

Threats to Pets

Predators

Coyotes, bobcats, foxes, mountain lions and hawks are just a few of the animals that make their homes and hunt within the park. Hawks usually prey on small birds, reptiles, and mammals, but have been seen carrying off house cats found on their park hunting grounds.

Coyotes eating cat food and scraps left out near people's homes can lose their instinctual fear and become more aggressive. This has led to attacks on pets and people.

If you are approached by a threatening animal, do not run and trigger their predatory instinct. Instead, pick up small children or dogs and shout loudly. Make yourself big and throw something to scare the animal away. Keep dogs on-leash; be aware of your surroundings and respect the park's wildlife.

Diseases

Cats in the outdoors are at greater risk for feline leukemia, FIV (feline immunodeficiency virus), and *Toxoplasma* parasites spread primarily by other cats they encounter. Other diseases can be carried by ticks or from eating infected rodents. Pet cats live much longer, healthier lives when kept indoors.

Abandoned Pets

People who release their unwanted pet fish, frog, turtle or cat into the park may be sentencing them to death in a hostile or unhealthy environment. Outdoor cats are often injured in fights with other cats. Contact your local Humane Society or reputable pet store to find a new home for them.

BACK PAGE

Threats to Wildlife

Predators

Even well-fed cats will follow their instincts and stalk and kill birds, frogs, snakes, mice and other wildlife in the park. Bells and special electronic collars do not work well. Off-leash dogs may chase, displace, and even hunt wildlife. Pet turtles and fish released into creeks or ponds can upset the delicate balance of nature as they feed upon or compete with native wildlife. In the habitat of rare, threatened, and endangered wildlife, the loss of any creature is even more tragic.

National Park regulations allow for the removal of roaming pets that are a threat to wildlife. (36 CFR 2.15)

Diseases

Pet frogs (or tank water) dumped into the park can spread diseases and wipe out native frog populations. Any pets roaming through natural areas may transmit a disease that could have devastating consequences. Wildlife do not get vaccinations.

Feeding Stations

When people feed feral cats, other animals like raccoons, skunks, rats and coyotes are attracted to the food. They lose their natural fear of humans -- an instinct that protects both you and them. They can transmit diseases or become a nuisance or a threat to pets and people. Contact your local Humane Society to get help for homeless pets. Their goal is to find permanent loving homes.

Even wild birds can be harmed by good intentions. Baby birds are more susceptible to deformities at birth when their parent bird has been eating "junk food" or items not in their natural diet. *Please do not feed any animals in the park.*

Wildlife needs to remain wild for their health and for the greater good of the intricate natural world in which they belong.

For more information, contact (415) 561-3054.

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 7/1/2013 6:00:45 PM
To: Susie Bennett [srbennett@nps.gov]
CC: Mary Petrili [mary355[Exemption 6]; Darren Fong [Darren_Fong@nps.gov]
Subject: Re: Fw: Mori pet flyer

I made two small comments on attached.

And want to think through use of "wipe out" for the native frog example--think it is ok--but trying to channel Darren while he is out too.

Good job!
-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jul 1, 2013 at 1:13 PM, Susie Bennett <srbennett@nps.gov> wrote:
Thanks, Mary! Michelle is super busy right now, but I'll see what I can do to get these edits back into the flier format.

FYI--we're going to create a straight-to-voicemail hotline for this with the NPS IT department and I think I'll probably be checking that.
-Susie

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540
email: susie_bennett@nps.gov

On Fri, Jun 28, 2013 at 9:46 PM, <mary355[Exemption 6] wrote:
Hi Susie,
Attached is the revised text for the Mori pet flyer with many of the great suggestions from Bill and Darren. (Thank you! I have responded to your comments below in **bold** to give you an understanding of the changes.) I think it would be great if Michelle could work her magic again in re-cutting and pasting this (with your new picture too, Suz.) Then perhaps we could release this to the last group for final edits so that I have this all in hand soon for my door-to-door duty.
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Do we want to say Even well fed cats will follow their instincts … **Yes! Thank you.**

Off-leash dogs can disturb (through chasing), displace, and even hunt wildlife. **O.K.**

Animals such as, pet turtles and fish….upset the delicate balance of nature as they feed upon or compete with native wildlife. Our park provides important habitat for many rare, threatened and endangered wildlife: pets can adversely impact them. **O.K. partially changed :)**

Diseases

For first sentence, Darren suggests that you may need to generalize. Chytrid already present and example too specific for the public. **O.K.**

Who is the contact number? **That's Jennifer Greene-Ringold. I think her title is Community Engagement Manager. Bless her!**

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Text Revisions for Pet Flyer, June 2013

Title: **Threats to Pets and Wildlife in National Parks** (May delete "Threats to")

FRONT PAGE – Intro.

Living near a national park means there's protected wildlife just beyond your back door. However, this privilege carries an important responsibility in the care of your pet. When a pet roams wildlife habitat, it is exposed to many risks and may endanger wildlife. Help keep your pet safe and protect the wildlife of these treasured park lands -- keeping them alive with the natural wonders of our world.

Comment [WWM1]: Consider different word here. I feel like endanger(ed) wildlife is a loaded term.

Threats to Pets

Predators

Coyotes, bobcats, foxes, mountain lions and hawks are just a few of the animals that make their homes and hunt within the park. Hawks usually prey on small birds, reptiles, and mammals, but have been seen carrying off house cats found on their park hunting grounds.

Coyotes eating cat food and scraps left out near people's homes can lose their instinctual fear and become more aggressive. This has led to attacks on pets and people.

If you are approached by a threatening animal, do not run and trigger their predatory instinct. Instead, pick up small children or dogs and shout loudly. Make yourself big and throw something to scare the animal away. Keep dogs on-leash; be aware of your surroundings and respect the park's wildlife.

Diseases

Cats in the outdoors are at greater risk for feline leukemia, FIV (feline immunodeficiency virus), and *Toxoplasma* parasites spread primarily by other cats they encounter. Other diseases can be carried by ticks or from eating infected rodents. Pet cats live much longer, healthier lives when kept indoors.

Abandoned Pets

People who release their unwanted pet fish, frog, turtle or cat into the park may be sentencing them to death in a hostile or unhealthy environment. Outdoor cats are often injured in fights with other cats. Contact your local Humane Society or reputable pet store to find a new home for them.

Comment [WWM2]: Can this sentence fit with above paragraph? If we change title?? It is not just about Abandoned pets.

BACK PAGE

Threats to Wildlife

Predators

Even well-fed cats will follow their instincts and stalk and kill birds, frogs, snakes, mice and other wildlife in the park. Bells and special electronic collars do not work well. Off-leash dogs may chase, displace, and even hunt wildlife. Pet turtles and fish released into creeks or ponds can upset the delicate balance of nature as they feed upon or compete with native wildlife. In the habitat of rare, threatened, and endangered wildlife, the loss of any creature is even more tragic.

National Park regulations allow for the removal of roaming pets that are a threat to wildlife. (36 CFR 2.15)

Diseases

Pet frogs (or tank water) dumped into the park can spread diseases and wipe out native frog populations. Any pets roaming through natural areas may transmit a disease that could have devastating consequences. Wildlife do not get vaccinations.

Feeding Stations

When people feed feral cats, other animals like raccoons, skunks, rats and coyotes are attracted to the food. They lose their natural fear of humans -- an instinct that protects both you and them. They can transmit diseases or become a nuisance or a threat to pets and people. Contact your local Humane Society to get help for homeless pets. Their goal is to find permanent loving homes.

Even wild birds can be harmed by good intentions. Baby birds are more susceptible to deformities at birth when their parent bird has been eating "junk food" or items not in their natural diet. *Please do not feed any animals in the park.*

Wildlife needs to remain wild for their health and for the greater good of the intricate natural world in which they belong.

For more information, contact (415) 561-3054.

Message

From: mary355@c Exemption 6 [mary355@c Exemption 6]
Sent: 7/12/2013 8:05:18 PM
To: Merkle, William [bill_merkle@nps.gov]; Susie Bennett [srbennett@nps.gov]
CC: Darren Fong [Darren_Fong@nps.gov]
Subject: Re: Mori pet flyer

Attached are comments on your comments...
If you're ready to let this go, Bill, then Susie and Michelle can get this out to a few more folks for their comments.
Mary

p.s. Hey, if "wipe out" is too much drama, how about "devastate?" I didn't want to water it down (ugh, no pun intended)
too much – and "harm" used already, "significantly reduce" too boring, etc...I do worry about bullfrogs being dropped over that bridge and people are still dumping stuff there. Makes me crazy.

From: Merkle, William
Sent: Monday, July 01, 2013 6:00 PM
To: Susie Bennett
Cc: Mary Petrili ; Darren Fong
Subject: Re: Fw: Mori pet flyer

I made two small comments on attached.

And want to think through use of "wipe out" for the native frog example--think it is ok--but trying to channel Darren while he is out too.

Good job!
-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jul 1, 2013 at 1:13 PM, Susie Bennett <srbennett@nps.gov> wrote:
Thanks, Mary! Michelle is super busy right now, but I'll see what I can do to get these edits back into the flier format.

FYI--we're going to create a straight-to-voicemail hotline for this with the NPS IT department and I think I'll probably be checking that.
-Susie

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540

email: susie_bennett@nps.gov

On Fri, Jun 28, 2013 at 9:46 PM, <mary355@ Exemption 6 > wrote:
Hi Susie,
Attached is the revised text for the Mori pet flyer with many of the great suggestions from Bill and Darren. (Thank you! I have responded to your comments below in **bold** to give you an understanding of the changes.) I think it would be great if Michelle could work her magic again in re-cutting and pasting this (with your new picture too, Suz.) Then perhaps we could release this to the last group for final edits so that I have this all in hand soon for my door-to-door duty.
Thanks again,
Mary
p.s. I had to rework the first paragraph due to the deletion of those environmental hazards. I also tried to make it more inspiring for Bill. AACK - I don't think I succeeded, sorry! – but I'm sure someone will change it anyway. haha

From: Susie Bennett
Sent: Tuesday, June 04, 2013 3:55 PM
To: Merkle, William
Cc: mary355@ **Exemption 6**
Subject: Re: Mori pet flyer

Hi--
Thanks for working on these! Mary, I know you wanted to take a stab at these before handing edits over to Michelle to incorporate into the formatted version. Let us know when you've done that and I'll send revisions over to Michelle.

As for documentation of the hawks picking up cats, I've personally seen it twice. (Once during the project at Mori--several construction guys and biomonitors saw it too. The more recent time was Christina and me. I can't recall what we were doing specifically, but we were too flabbergasted to take a photo or anything formal.)

-Susie

On Fri, May 31, 2013 at 11:24 AM, Merkle, William <bill_merkle@nps.gov> wrote:

Hi,

Darren was timely in getting his comments to me--and I am just getting back to this.

Title:

what about "Your pet(s) in National Parks" **Could be construed as a guide for bringing your pet to the park.**

Predators:

1st paragraph: Coyotes, bobcats, and mtn. lions all will prey on cats and dogs—foxes may take small cats or kittens. Think general message is that domesticated animals are easy (pickings) prey for these predators. **Yes – I included foxes b/c people see and know of at least one around here so it's more real.**

Outdoor feeding has its own suite of problems. Primarily attracting wild animals and food conditioning/habituation. Outdoor feeding attracts coyotes, foxes, raccoons, skunks, opossums, ravens, crows, and even rats. **Thanks, I couldn't add them all, but just saw a rat running along a neighbor's fence the other day, so put that in.**

For the coyote example: coyotes will eat cats and dogs even without feeding. Feeding does attract them to an area—so probably makes it more likely of a pet getting attacked. Loss of fear is fine—think this is also related to increased chance of an encounter near house and because animal may be regularly checking and expecting to find food. **O.K.**

I would move hawk paragraph up to second, then follow with what to do when approached by threatening animal. **O.K.**

> Darren wanted to make sure we had documentation of hawks snatching up cats—that we weren't going to be accused of sensationalizing this. Pretty sure that we do have this. **See Susie's note above.**

I think another issue is that outdoor cats are frequently injured in fights with other outdoor cats. **O.K. emphasized in "Abandoned Pets"**

Diseases:

Think we should italicize Toxoplasma. **O.K.**

We suggest dropping the title and sentence on Environmental hazards. **O.K... changed to Abandoned Pets and dropped environmental hazards**

Retitle: Don't Release Pets in National Parks **Changed to Abandoned Pets**

Lead in with Regulations prohibit release of pets into the park. Then keep info about release of pets. **Already have regulation for removal of pets in parks...think that's more important for this flyer.**

Threats to Wildlife

Predators

Do we want to say Even well fed cats will follow their instincts … **Yes! Thank you.**

Off-leash dogs can disturb (through chasing), displace, and even hunt wildlife. **O.K.**

Animals such as, pet turtles and fish….upset the delicate balance of nature as they feed upon or compete with native wildlife. Our park provides important habitat for many rare, threatened and endangered wildlife: pets can adversely impact them. **O.K. partially changed :)**

Diseases

For first sentence, Darren suggests that you may need to generalize. Chytrid already present and example too specific for the public. **O.K.**

Who is the contact number? **That's Jennifer Greene-Ringold. I think her title is Community Engagement Manager. Bless her!**

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Text Revisions for Pet Flyer, June 2013

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FRONT PAGE – Intro.

Living near a national park means there's protected wildlife just beyond your back door. However, this privilege carries an important responsibility in the care of your pet. Free-roaming pets are exposed to many risks and may harm wildlife. Help keep your pet safe and protect the wildlife of these treasured park lands -- keeping them alive with the natural wonders of our world.

Comment [MP1]: Okay, changed to harm and used "free-roaming" term which I liked in the following flyer: [HYPERLINK "http://www.paws.org/pets-wildlife.html"]

Comment [WWM2]: Consider different word here. I feel like endanger(ed) wildlife is a loaded term.

Threats to Pets

Predators

Coyotes, bobcats, foxes, mountain lions and hawks are just a few of the animals that make their homes and hunt within the park. Hawks usually prey on small birds, reptiles, and mammals, but have been seen carrying off house cats found on their park hunting grounds.

Coyotes eating cat food and scraps left out near people's homes can lose their instinctual fear and become more aggressive. This has led to attacks on pets and people.

If you are approached by a threatening animal, do not run and trigger their predatory instinct. Instead, pick up small children or dogs and shout loudly. Make yourself big and throw something to scare the animal away. Keep dogs on-leash; be aware of your surroundings and respect the park's wildlife.

Diseases

Cats in the outdoors are at greater risk for feline leukemia, FIV (feline immunodeficiency virus), and *Toxoplasma* parasites spread primarily by other cats they encounter. Other diseases can be carried by ticks or from eating infected rodents. Pet cats live much longer, healthier lives when kept indoors.

Abandoned Pets

People who release their unwanted pet fish, frog, turtle or cat into the park may be sentencing them to death in a hostile or unhealthy environment. Outdoor cats are often injured in fights with other cats. Contact your local Humane Society or reputable pet store to find a new home for them.

Comment [MP3]: I know what you mean, however it fits with the hostile environment in the previous sentence. (Also, to my thinking, when people let their pets wander, they might as well be abandoned.) May we leave this for now and see what happens after the other editors get their turn?

Comment [WWM4]: Can this sentence fit with above paragraph? If we change title?? It is not just about Abandoned pets.

BACK PAGE

Threats to Wildlife

Predators

Even well-fed cats will follow their instincts and stalk and kill birds, frogs, snakes, mice and other wildlife in the park. Bells and special electronic collars do not work well. Off-leash dogs may chase, displace, and even hunt wildlife. Pet turtles and fish released into creeks or ponds can upset the delicate balance of nature as they feed upon or compete with native wildlife. In the habitat of rare, threatened, and endangered wildlife, the loss of any creature is even more tragic.

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Even wild birds can be harmed by good intentions. Baby birds are more susceptible to deformities at birth when their parent bird has been eating "junk food" or items not in their natural diet. *Please do not feed any animals in the park.*

Wildlife needs to remain wild for their health and for the greater good of the intricate natural world in which they belong.

For more information, contact (415) 561-3054.

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 7/18/2013 4:48:09 PM
To: Maria Alvarez [henry75@s Exemption 6
Subject: Fwd: NEED input on Rodeo Fence project

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

---------- Forwarded message ----------
From: **Merkle, William** <bill_merkle@nps.gov>
Date: Thu, Jul 18, 2013 at 4:47 PM
Subject: NEED input on Rodeo Fence project
To: "Alvarez, Maria" <maria_alvarez@nps.gov>
Cc: Alison Forrestel <Alison_Forrestel@nps.gov>, Stephen Skartvedt <stephen_skartvedt@nps.gov>

Hi Maria,

We have money to put in fence on west side of Rodeo Lagoon this year.

I was just checking alignment with Daphne. The yellow dotted line is what I walked with Stephen S. the other day--roughly where we had envisioned this fence 3-4 yrs. ago.

Daphne thought fence was too far out--that we want hikers to have that experience to see and be relatively close to Lagoon edge. See close in fence line.

The primary reason for the fence was to keep dogs out of the Lagoon--and to keep them from disturbing waterbirds, primarily at sand spit area near where is says Otter Pups?

We wanted to discuss the value of the dunes in this area with you and Alison. How sensitive do you feel the dunes are and how much value should we put on pulling fence out to protect them?

Note that once dog plan is finished Rodeo Beach will be only designated off-leash area in Marin--so use could increase. Don't think we see big impact of dogs on dune vegetation right now with off-leash activity (?).

Another option is to put fence kind of inbetween and run it through the dunes. I am guessing that people will create a trail on west edge of fencing.

I am bringing this to project review on Wednesday and need feedback.

Thank you, Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843


N
Otter pups?
© 2013 Google
Google earth
Imagery Date: 5/6/2012 37°49'48.16" N 122°32'07.24" W elev 16 ft eye alt 959 ft

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 7/19/2013 9:15:05 AM
To: Shirwin Smith [Shirwin_Smith@nps.gov]
Subject: rodeo lagoon fence language

Hi Shirwin,

Can you verifty that this is best I am going to do? I did see map too.

I found this in the alt. descriptions:

Rodeo Beach/South Rodeo Beach
Dog walking under voice and sight control would be allowed within a ROLA at Rodeo Beach, bounded on the inland edge by the proposed fence (to be installed as part of a separate park project) along Rodeo Lagoon and by the ridge to the south. The Rodeo Beach ROLA would allow for dogs to be under voice and sight control in an area that historically has had relatively few conflicts between dog walkers and other users. The Rodeo Beach area is not heavily used by migrating and wintering shorebirds, so disturbance from chasing by dogs would be expected to be minimal. By limiting the ROLA to only the main beach, alternative C also would provide for the protection of South Rodeo Beach, which is adjacent to Bird Island, where seabirds such as brown pelicans, common murres (Uria aalge), and Brandt's cormorants (Phalacrocorax penicillatus) are found. On-leash dog walking would be allowed on the footbridge to the beach. Lastly, opportunities for visitors to experience the area without the presence of dogs would be available on trails and beach areas outside the ROLA.

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Message

From: Smith, Shirwin [shirwin_smith@nps.gov]
Sent: 7/19/2013 10:58:37 AM
To: Merkle, William [bill_merkle@nps.gov]
Subject: Re: rodeo lagoon fence language

Perfect.

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

On Fri, Jul 19, 2013 at 10:52 AM, Merkle, William <bill_merkle@nps.gov> wrote:
No, I just want to make sure we are not adjusting what we have in dog plan--actually we may be moving fence closer toward Lagoon.

Just wanted to confirm that text is somewhat vague on where fence is located.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Fri, Jul 19, 2013 at 10:49 AM, Smith, Shirwin <shirwin_smith@nps.gov> wrote:
Bill - are you going to use the entire text? If so, best to reflect the preferred alt, but when is this going out and will it be public? We're still on hold with the SEIS...

In any case, edited a little.

SES

Dog walking under voice and sight control would be allowed within a ROLA at Rodeo Beach, which would be bounded on the inland edge by the proposed fence (to be installed as part of a separate park project) along Rodeo Lagoon. The Rodeo Beach ROLA would allow for dogs to be under voice and sight control in an area that historically has had relatively few conflicts between dog walkers and other users. The Rodeo Beach area is not heavily used by migrating and wintering shorebirds, so disturbance from chasing by dogs would be expected to be minimal. By limiting the ROLA to only the main beach, the preferred alternative also would provide for the protection of South Rodeo Beach, which is adjacent to Bird Island, where seabirds such as brown pelicans, common murres (Uria aalge), and Brandt's cormorants (Phalacrocorax penicillatus) are found. On-leash dog walking would be allowed on the

footbridge to the beach. Lastly, opportunities for visitors to experience the area without the presence of dogs would be available on South Rodeo Beach and other Marin Headlands beaches.

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

On Fri, Jul 19, 2013 at 9:15 AM, Merkle, William <bill_merkle@nps.gov> wrote:
Hi Shirwin,

Can you verifty that this is best I am going to do? I did see map too.

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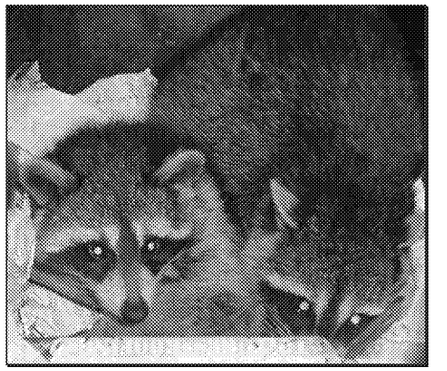
Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Did you know ...

- Raccoons can open coolers with their super-flexible hands!
- Raccoons eat almost anything, including worms, berries, rodents, bird eggs, fish, carrion, and your lunch!
- Raccoons and other wildlife can rip into tents and packs if they smell a treat.
- Raccoons can drop 30 – 40 ft without harm.
- Their scientific name (*Procyon lotor*) means "little washing dog", although contrary to popular belief, raccoons generally do not wash their food
- Most raccoons live on tropical islands. Only one of 7 species lives in the U.S.

PLEASE DO NOT FEED ME!!



Keep all your food, trash, and scented products in the food locker. Wildlife will seek out and eat your food, drinks, wrappers, and other scented products.

Raccoons and other wildlife in the Marin Headlands are naturally curious, and almost always eager for a snack. With access to human food, trash, or scented toiletries, they quickly learn to associate the area and people with food. These animals can become aggressive, and possibly dangerous to you and other visitors.

Help us keep our wildlife healthy, and our visitors safe. **You are responsible for knowing and following the guidelines inside this brochure**.

RACCOON ADVISORY

Raccoons in this area may be aggressive when searching for food. For your safety follow these guidelines:

Do	Don't
• Use food locker or car trunk to store food, coolers, cooking equipment, and scented personal products. If your car does not have a trunk, cover any food or coolers left in your car. • Keep car windows, doors and trunks closed at all times. • Keep you site clean and no food traces are left. • Clean cookware at least 200 yards from a campsite and dispose of water in toilets. • Place all trash in a secured dumpster. If full, pack trash out with you. • Trash facilities are limited in the campsite. Minimize the packaging and material brought with you from home.	• Do not feed or approach wildlife. • Never leave food unattended including on grills, in tents, back-packs and coolers. • Do not use fire pit to dispose of food scraps. • Do not cook, eat, or store food or scented products in your tent. 

Report aggressive wildlife to park rangers at (415) 561 - 5510

Message

From: William Merkle [bill_merkle@nps.gov]
Sent: 7/22/2013 3:27:39 PM
To: Alison Forrestel [Alison_Forrestel@nps.gov]
Subject: Fwd: NEED input on Rodeo Fence project

I would like to see what Michael thinks.

Sent from my iPhone

Begin forwarded message:
From: "Alvarez, Maria" <maria_alvarez@nps.gov>
Date: July 22, 2013, 11:57:07 AM PDT
To: "Merkle, William" <bill_merkle@nps.gov>
Cc: Alison Forrestel <Alison_Forrestel@nps.gov>, Stephen Skartvedt <stephen_skartvedt@nps.gov>
Subject: Re: NEED input on Rodeo Fence project
Hi Bill,

Exemption 5 - future policy deliberation

Exemption 5 Visitation only increases and the trampling eliminates habitat for more sensitive plants like annuals as well as seedlings of perennial dune plants.We also removed ice plant from this habitat to improve it in the late 1990's.

Exemption 5 - future policy deliberation

Exemption 5 - future policy deliberation Stinson has mainly rear dune vegetation with a very low occurrence of fore-dune species

Do the killdeer need somewhere protected to nest? They are also migratory. I see them at Fort Cronkhite often.

Sandy beach tiger beetle
Cicindela hirticollis gravida
Federal Species of Concern
Inhabits broad tidal beaches. If present fencing will
provide improved habitat conditions for this species

The Kent Island management plan includes this species.

On Thu, Jul 18, 2013 at 4:47 PM, Merkle, William <bill_merkle@nps.gov> wrote:
Hi Maria,

We have money to put in fence on west side of Rodeo Lagoon this year.

I was just checking alignment with Daphne. The yellow dotted line is what I walked with Stephen S. the other day--roughly where we had envisioned this fence 3-4 yrs. ago.

Exemption 5 - future policy deliberation

The primary reason for the fence was to keep dogs out of the Lagoon--and to keep them from disturbing waterbirds, primarily at sand spit area near where is says Otter Pups?

We wanted to discuss the value of the dunes in this area with you and Alison. How sensitive do you feel the dunes are and how much value should we put on pulling fence out to protect them?

Note that once dog plan is finished Rodeo Beach will be only designated off-leash area in Marin--so use could increase. Don't think we see big impact of dogs on dune vegetation right now with off-leash activity (?).

Exemption 5 - future policy deliberation

I am bringing this to project review on Wednesday and need feedback.

Thank you, Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 7/22/2013 9:24:59 AM
To: Shirwin Smith [Shirwin_Smith@nps.gov]
Subject: rodeo

Are we anticipating increased dog use of Rodeo after dog plan?

that is what did we put in the plan

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 7/23/2013 2:36:50 PM
To: Sunil Rajappa [sunil_rajappa@partner.nps.gov]
Subject: Fwd: Monthly updates for July due 7/23

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

---------- Forwarded message ----------
From: **Merkle, William** <bill_merkle@nps.gov>
Date: Tue, Jul 23, 2013 at 2:36 PM
Subject: Re: Monthly updates for July due 7/23
To: Michelle O'Herron <moherron@parksconservancy.org>

GGNRA Snowy Plover.

GGNRA has started our annual monitoring for western snowy plovers at Ocean Beach and Crissy Field. So far we have not observed snowy plovers at either site. Dog are required to be on-leash from July 1--May 15 at the Snowy Plover Protection Area (Stairway 21 to Sloat Blvd.) at Ocean Beach and in the Wildlife Protection Area at Crissy Field. Note that the Wildlife Protection Area beach has been closed to all use during the America's Cup 34 race season (July 4-September 22).

I can send some photos if u would like.

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Wed, Jul 10, 2013 at 9:20 AM, Michelle O'Herron <moherron@parksconservancy.org> wrote:
Thank you!

The California red-legged frog is the Species of the Year for 2013!
Check out www.sfnps.org/species<http://www.sfnps.org/species> to learn more, find out about upcoming events, and get your calendar and coloring book!

Michelle O'Herron
National Park Service/Golden Gate National Parks Conservancy
Fort Mason, Building 201, 3rd Floor
San Francisco, CA 94123

Ft. Mason (415) 561-3526
Ft. Cronkhite (415) 289-1855 *Note: new number

Message

From: Michelle O'Herron [moherron@parksconservancy.org]
Sent: 7/25/2013 4:45:00 PM
To: Bill Merkle [Bill_Merkle@nps.gov]
Subject: Monthly updates, please review by Tuesday

Thanks for all the great info! Do these look OK?

Nesting Bank Swallows Back at Ft. Funston
The monitoring season for this state-listed threatened species is wrapping up as the birds prepare to depart for their overwintering grounds in South America. Fort Funston is one of three known remaining coastal breeding sites for this species in California. As in past years, swallows nested in the bluffs above the rock revetment that the San Francisco installed to protect city infrastructure at the site. The maximum count of 115 burrows in 2013 is within the range nest numbers seen over the last several years. Contact Bill_Merkle@nps.gov for additional details.

Golden Gate Snowy Plover Monitoring Begins

Annual monitoring for Western Snowy Plovers at Ocean Beach and Crissy Field has begun, but so far none have been seen at either site. Dogs must be on-leash from July 1–May 15 in the Snowy Plover Protection Area on Ocean Beach (Stairway 21 to Sloat Blvd.) and in the Wildlife Protection Area at Crissy Field. The Wildlife Protection Area has also been closed during the America's Cup 34 race season (July 4–September 22). For more information contact Bill_Merkle@nps.gov.

Buoys Installed for Alcatraz Resource Protection

Golden Gate has implemented a marine closure around Alcatraz to protect nesting seabirds during the 2013 America's Cup 34 race season. Three new buoys delineate the closed area, and the park is evaluating options to keep them in place once the races are over. Three other buoys off shore from the Wildlife Protection Area at Crissy Field delineate an additional marine closure aimed at protecting rafting waterbirds and shorebirds like the threatened Western Snowy Plover. So far, the buoys seem to be working to keep boats outside the closed areas. This project is the result considerable assistance from the Conservancy, U.S. Coast Guard, U.S. Army Corps of Engineers, NPS Regional Office, and U.S. Fish and Wildlife Service. Learn more on the U.S. Coast Guard's website (link:http://www.uscgnews.com/go/doc/4007/1827807/Coast-Guard-works-with-the-National-Park-Service-to-protect-local-birds).

Michelle O'Herron

The California red-legged frog is the Species of the Year for 2013!
Learn more at www.sfnps.org/species

Science Communications Specialist
Sign Program Coordinator
National Park Service/Golden Gate National Parks Conservancy
Fort Mason, Building 201, 3rd Floor

San Francisco, CA 94123

Ft. Mason (415) 561-3526
Fax (415) 561-3033
Ft. Cronkhite (415) 289-1855 **NEW NUMBER

Message

From: Sage Tezak - NOAA Affiliate [sage.tezak@noaa.gov]
Sent: 7/25/2013 8:25:59 PM
To: Bill Merkle [Bill_Merkle@nps.gov]
Subject: Survey results

Hi Bill,

Attached you will find some of the results from the survey. My thought was that if you can fit it in, you can present on people's responses to dogs off leash.

Let me know what you think, and I understand if it doesn't work.

--
Sage Tezak
Manager, Seabird Protection Network
Gulf of the Farallones National Marine Sanctuary
991 Marine Dr.
The Presidio
San Francisco, CA 94129
415.970.5243

Question 8: In your opinion, which of the following human activities could harm seabirds, shorebirds or waterfowl.

Number of responses by perceived harm/no harm/unsure for each type of disturbance:

Answer Options	Yes	No	Maybe
Loud noise	46	1	8
Close approach causing a bird to fly from its resting place	49	2	4
Feeding	46	0	9
Spotlights or other bright lights	48	1	6
Boat wakes (speed)	42	3	10
Close approach causing a bird to leave its nest and egg	52	0	3
Dogs off leash	51	1	3

Question 9: Using the same list of human activities, indicate the level of impact you believe each activity may have on seabirds, shorebirds or waterfowl: 1) Little to no impact on wildlife; 2) Moderate impact (i.e. temporarily or permanently altering wildlife location); Severe impact (i.e. direct injury or death to wildlife or offspring).

Number of responses by perceived impact for each type of disturbance:

Answer Options	Impact level: Little to No	Moderate	Severe
Loud noise	10	29	16
Close approach causing a bird to fly from its resting place	3	26	26
Feeding	4	25	26
Spotlights or other bright lights	2	26	27
Boat wakes (speed)	9	27	19
Close approach causing a bird to leave its nest and egg	0	4	51
Dogs off leash	2	6	47

Message

From: Sage Tezak - NOAA Affiliate [sage.tezak@noaa.gov]
Sent: 7/26/2013 8:18:18 AM
To: Merkle, William [bill_merkle@nps.gov]
Subject: Re: Survey results

did you see my email from this morning...

On Fri, Jul 26, 2013 at 8:07 AM, Merkle, William <bill_merkle@nps.gov> wrote:
Hi Sage,

I should be able to fit this in.

Somewhat surprising that large numbers seem to think dogs do have impact and that impact can be severe or moderate.

-b

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Thu, Jul 25, 2013 at 8:25 PM, Sage Tezak - NOAA Affiliate <sage.tezak@noaa.gov> wrote:
Hi Bill,

Attached you will find some of the results from the survey. My thought was that if you can fit it in, you can present on people's responses to dogs off leash.

Let me know what you think, and I understand if it doesn't work.

--
Sage Tezak
Manager, Seabird Protection Network
Gulf of the Farallones National Marine Sanctuary
991 Marine Dr.
The Presidio
San Francisco, CA 94129
415.970.5243

--
Sage Tezak
Manager, Seabird Protection Network

Gulf of the Farallones National Marine Sanctuary
991 Marine Dr.
The Presidio
San Francisco, CA 94129
415.970.5243

Message

From: Rajappa, Sunil [sunil_rajappa@partner.nps.gov]
Sent: 7/26/2013 1:26:05 PM
To: William Merkle [bill_merkle@nps.gov]
Subject: Plover Signs

Here's couple more. Still looking

Sunil Rajappa
Wildlife Intern
Golden Gate National Recreation Area

Office: 415.289.1848
Cell: 916.276.6342

GGNRA192054

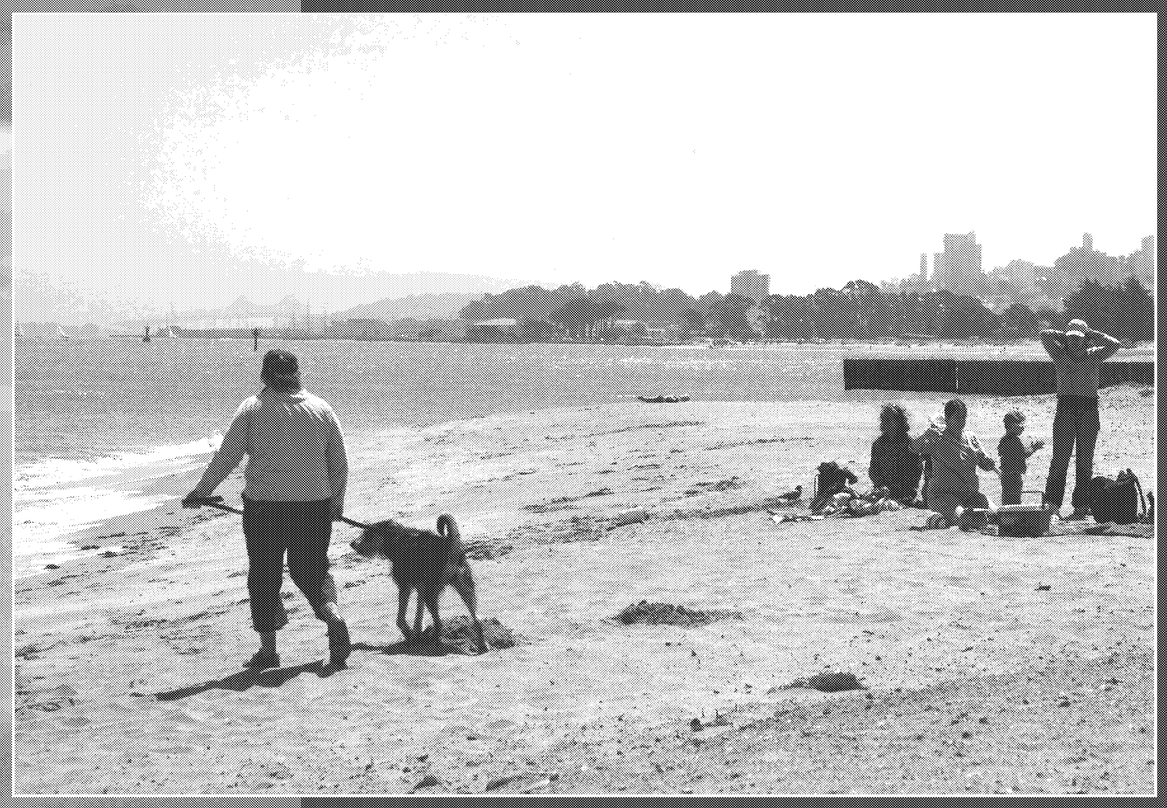
Help Protect Plovers

Plovers in Jeopardy

Due to urban development and intense recreational use, the Western Snowy Plover was listed as a federally threatened species in 1993. Only about 2,000 Western Plovers remain from Washington to Baja. Plovers are faithful, returning to the same wide, flat, beaches each year.

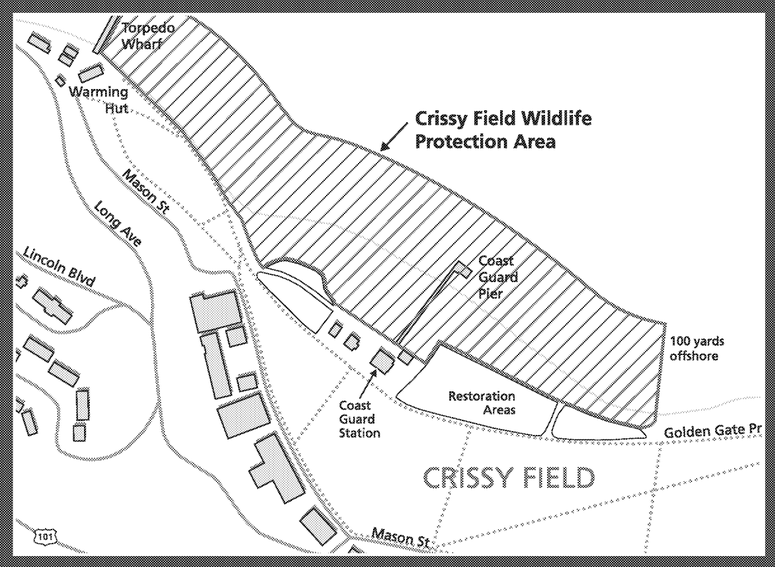
Plovers on Park Beaches

Snowy Plovers use two sandy beaches in Golden Gate National Recreation Area, Crissy Field and Ocean Beach. From early July through the end of April, Plovers rest and eat—fun for us, but serious work for this tiny bird that must gather critical reserves for travel and breeding.



Visitors are welcome to use the beach area close to the water, away from the upper section of the beach where plovers rest.

Plover camouflaged above the tide line.



Aerial illustration of Wildlife Protection Area.

In the Wildlife Protection Area at Crissy Field you SHOULD:

- Walk your dogs ON LEASH during the seasonal restriction from July until May.
- Recreate on the wet sand away from the upper parts of the beach during Plover season or use other beaches nearby.
- Pick up pet litter immediately and dispose of trash properly to avoid attracting predators such as crows and raccoons.
- Call Park Dispatch at (415) 561-5505 if you notice any threats to the Snowy Plover.

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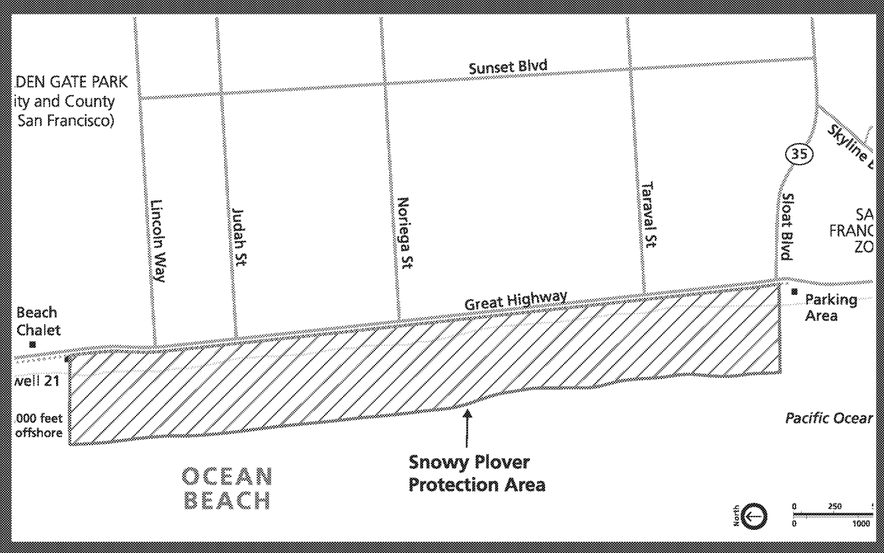

Aerial illustration of Wildlife Protection Area.

Plover camouflaged above the tide line.

In the Snowy Plover Protection Area at Ocean Beach you SHOULD:

- Walk your dogs ON LEASH during the seasonal restriction from July until May.
- Recreate on the wet sand away from the upper parts of the beach during Plover season or use other beaches nearby.
- Pick up pet litter immediately and dispose of trash properly to avoid attracting predators such as crows and raccoons.
- Call Park Dispatch at (415) 561-5505 if you notice any threats to the Snowy Plover.

Message

From: Michelle O'Herron [moherron@parksconservancy.org]
Sent: 7/31/2013 10:28:55 AM
To: Bill Merkle [Bill_Merkle@nps.gov]
CC: George Su [George_Su@nps.gov]
Subject: FW: From NPS.gov: Cayotes

Hi Bill,

This one's for you. ☺

Could you please respond to this person's question (submitted through the contact us link on the nps website)?

Michelle O'Herron

The California red-legged frog is the Species of the Year for 2013!
Learn more at www.sfnps.org/species

Science Communications Specialist
Sign Program Coordinator
National Park Service/Golden Gate National Parks Conservancy
Fort Mason, Building 201, 3rd Floor
San Francisco, CA 94123

Ft. Mason (415) 561-3526
Fax (415) 561-3033
Ft. Cronkhite (415) 289-1855 **NEW NUMBER

From: Su, George [mailto:george_su@nps.gov]
Sent: Tuesday, July 30, 2013 9:11 AM
To: Michelle O'Herron
Subject: Fwd: From NPS.gov: Cayotes

Thanks. :o)

Sincerely,

George Su :o)
Multimedia Specialist / Park Web Administrator
Multimedia Volunteer Coordinator
Division of Interpretation & Education

Golden Gate National Recreation Area, Muir Woods National Monument, & Fort Point National Historic Site

Fort Mason, Building 201
San Francisco, CA 94123

phone (415) 561-4758

Twitter
@RangerBenyBison
@GoldenGateNPS
@FortPointNPS
@MuirWoodsNPS

email: george_su@nps.gov
web: www.nps.gov/goga
www.nps.gov/fopo
www.nps.gov/muwo

The National Park Service cares for special places saved by the American people so that all may experience our heritage.

EXPERIENCE YOUR AMERICA

---------- Forwarded message ----------
From: <Toddg@legaltec.com>
Date: Mon, Jul 29, 2013 at 7:00 PM
Subject: From NPS.gov: Cayotes
To: george_su@nps.gov

Email submitted from: Toddg@legaltec.com at /prsf/contacts.htm

Mailing Address:
Todd gerstein
339 14th ave
Sf, Ca 94118

I have run into big cayotes (70 pound est) on wedemeyer near 14th ave gate and behind camp rob hill new trail. Scared me and my dog. The population of cayotes seems to be rapidly growing because i keep spoting them. This is going to end badly unless you remove them from the park. What is your policy on cayotes?

Message

From: Fong, Darren [darren_fong@nps.gov]
Sent: 8/9/2013 2:25:05 PM
To: William Merkle [bill_merkle@nps.gov]
Subject: Informal consultation

Bill, I just looked at the 1994 memo from the FWS to GOGA. Like you thought, It isn't a NLAA memo, just a guidance doc and it actually suggested that we provide a written request to FWS for informal and formal consultations as needed. They also have guidance for assessing take associated with habitat degradation. I can include the work windows that you had suggested, but was hoping that you could look at whether we should include some language re:

Exemption 5

Also, for snowy plover, I saw the mix of mitigation measures and operations you edited in the next steps document. I've attached the marked-up pdf from Kim Squires. She had some comments re: Beach Mngt activities. Could you edit the language that is in the draft BA?- The most recent Word doc is on the network if you want to edit in track changes mode:
W:\Natural Resources\Natural_&_Social_Sciences (N)\N16-Management_of_ Natural_Resources_and_Areas\N1621-Threatened and Endangered Species\N1621-TE_species_Sec7\USFWS-Sec7\Operational\GOGA_ParkOps_BA_draft_v6.docx
Let me know if proposed beach management actions plus their conservation measures would keep the effects determination at the NLAA or if some might kick it into formal consultation.

I'll be around next week if you want to chat about this. I'm hoping to have a final draft in 2 weeks. Thanks! D

Darren Fong
Aquatic Ecologist
Golden Gate National Recreation Area
Bldg 1061, Fort Cronkhite
Sausalito, CA 94965
415-289-1838 (phone)
415-331-0851 (fax)

DRAFT

BIOLOGICAL ASSESSMENT

regarding

General Park Operations for Golden Gate National Recreation Area (excluding areas managed by Point Reyes National Seashore)

DECEMBER 3, 2012

Prepared by

National Park Service
Golden Gate National Recreation Area
Division of Natural Resource Management and Science

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I. EXECUTIVE SUMMARY

The Golden Gate National Recreation Area (GOGA) has authority over a variety of activities that may affect listed species and their habitats. The purpose of this document is to evaluate and document the potential effects of routine GGNRA operations on Federally listed threatened and endangered species under the authority of the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS). In addition, effects of GGNRA activities on designated critical habitat are evaluated as well. The intent of this process is to provide a streamlined, predictable and standardized framework for developing and implementing projects that minimize impacts on listed species and their habitats. This document represents consideration of the best available information regarding the current distribution and abundance of listed species within the GGNRA and known and reasonably expected management activities in GGNRA lands.

Exemption 5

We believe our actions (including proposed mitigation) fall within the following categories: Exemption 5 - draft comment

- NO EFFECT
- IS NOT LIKELY TO ADVERSELY EFFECT—BENEFICIAL EFFECT
- IS NOT LIKELY TO ADVERSELY EFFECT—INSIGNIFICANT EFFECT
- IS LIKELY TO ADVERSELY EFFECT

To ensure "no-net loss of habitat," restoration actions have been identified to offset impacts associated with routine GGNRA operations. GOGA will also institute an internal review process that will review projects annually to determine consistency with the guidelines described herein and to provide annual accounting to the USFWS-Sacramento Field Office.

II. INTRODUCTION

The Golden Gate National Recreation (GOGA) is a National Park Service unit that includes a diversity of lands and waters within the San Francisco Bay region. It harbors a variety of threatened and endangered species and their associated habitats.

The purpose of this biological assessment (BA) is to evaluate and document the potential effects of routine GGNRA actions "on listed and proposed species and designated and proposed critical habitat and determine whether any such species or habitat are likely to be adversely affected by the action and is used in determining whether formal consultation or a conference is necessary" (50 CFR 402.12(a)). GGNRA actions would be those under the jurisdiction of GOGA and adopts the definition in 50 CFR Part 402.02 and includes: actions intended to conserve listed species or their habitat; the promulgation of regulations; the granting of licenses, contracts, leases, easements, rights-of-way, permits, or grants-in-aid; or actions directly or indirectly causing modifications to the land, water, or air.

The expected outcome is to provide a more streamlined process that would reduce the overall number of consultations between GGNRA and USFWS and provide better accountability for activities. It is also expected that this process would provide a predictable and standardized framework within GGNRA for developing and implementing projects that minimize adverse impacts on listed species and their habitats.

This document represents consideration of the best available information regarding the current distribution and abundance of coho and steelhead and known and reasonably expected management actions in GGNRA lands.

A. LIST OF SPECIES/DESIGNATED CRITICAL HABITAT

The scope of this BA covers the following federally-listed species and designated critical habitat (CH) in GOGA:

USFWS

ANIMALS

- Spotted owl (*Strix occidentalis caurina*)
- Western snowy plover (*Charadrius alexandrinus nivosus*)
- Marbled murrelet (*Brachyramphus marmoratus)*
- Mission blue butterfly (*Icaricia icarioides missionensis*)
- San Bruno elfin (*Callophrys mossii bayensis*)
- California red-legged frog (*Rana draytonii*) (CH, Figure 1)
- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*)

- Tidewater goby (*Eucyclogobius newberryi*) (CH, Figure 2)

PLANTS

- Franciscan manzanita (*Arctostaphulos franciscana*)
- Presidio manzanita (*Arctostaphylos hookeri ravenii*)
- Marsh sandwort (*Arenaria paludicola*)
- Presidio clarkia (*Clarkia franciscana*)
- Marin dwarf flax (*Hesperolinon congestum*)
- San Francisco lessingia (*Lessingia germanorum*)
- Hickman's potentilla (*Potentilla hickmanii*)
- California seablite (*Suaeda californica*)

NMFS

- Coho salmon, Central California Coast Evolutionarily Significant Unit (*Oncorhynchus kisutch*) (CH, Figure 3)
- Steelhead, Central California Coast Distinct Population Segment (*O. mykiss*) (CH, Figure 4)

The selection of these species is based on an evaluation of the official species list from the U.S. Fish and Wildlife Service generated for the counties of Marin, San Francisco, and San Mateo Counties (Attachment 1), recent information from the California Natural Diversity Database (July 2012 output), and field surveys conducted by and for GOGA. An evaluation of other listed species and their potential for occurrence within GOGA is provided in Attachment 2.

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B. ENDANGERED SPECIES REQUIREMENTS

Section 7(a)(1) of the Endangered Species Act (Act) directs Federal agencies to further the purposes the Act by carrying out conservation programs for listed species. Section 7(a)(2) of the Endangered Species Act requires every Federal agency to insure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or results in the destruction or adverse modification of critical habitat. Section 7(a)(4) of the Act requires Federal agencies to confer with the Secretary on any action that is likely to jeopardize the continued existence of proposed species or result in the destruction or adverse modification of proposed critical habitat.

C. OTHER GUIDANCE DOCUMENTS

All routine GGNRA operations would be consistent with the mission of the National Park Service to preserve "unimpaired the natural and cultural resources and values of the

national park system for the enjoyment, education, and inspiration of this and future generations." Current and future GGNRA operations are also being guided by the mission goals established in the National Park Service Strategic Plan in order to meet the Government Performance Results Act responsibilities. With respect to GGNRA resources, Mission Goal I requires that "Natural and cultural resources and associated values are protected, restored and maintained in good condition and managed within their broader ecosystem and cultural context (NPS-Pacific West Region 1998)." Long-term goals specific to endangered species require improved status from current conditions. NPS Management Policies also parallel Sec 7(a)(1) of the Act by requiring NPS to "identify and promote the conservation of all federally listed threatened, endangered, or candidate species within GGNRA boundaries and their critical habitats."

D. DESCRIPTION OF THE GOLDEN GATE NATIONAL RECREATION AREA

The Golden Gate National Recreation Area comprises approximately 75,000 acres of coastal lands in the San Francisco Bay Area including the mouth of San Francisco Bay. This long, narrow park is divided by the Golden Gate entrance to San Francisco Bay, which separates the northern Marin County lands from the southern San Francisco and San Mateo County lands. The GGNRA was established in 1972 (PL 92-589) as part of the "parks to people" program, and the enabling legislation stated that the lands were founded "in order to preserve for public use and enjoyment certain areas of possessing outstanding natural, historic, scenic and recreational values" The legislated boundary encompasses Marin Headlands north of and ocean shoreline south of the Golden Gate, Alcatraz Island, and all of the coastal watershed south and east of Point Reyes National Seashore including Muir Woods National Monument and Mt. Tamalpais State Park.

E. GEOGRAPHIC SCOPE OF BIOLOGICAL ASSESSMENT

This document is only intended to cover areas managed by GOGA. Portions of GOGA lands near Tomales Bay and Bolinas Lagoon that are part of the Lagunitas and Pine Gulch Creek watersheds are managed by Point Reyes National Seashore (PORE). Areas within the administrative boundaries but not managed by GOGA, such as Mt. Tamalpais State Park and Area B of the Presidio, are also not included. Included in the geographic scope are lands and waters likely to be added in the near future. Figures 5a&b illustrate the area currently managed by GOGA and those expected in the near future (Figure 6, NPS 2011).

III. DESCRIPTION OF THE PROPOSED ACTION

III. A. CONSULTATION TO DATE

There have been several email exchanges with U.S. Fish and Wildlife Service-Sacramento Field Office (Ryan Olah and Kim Squires) in early 2012 that culminated in a field and office meeting. The timeline is summarized below:

- June 12, 2012 meeting to describe the scope and consultation process for GGNRA operations.
- August 31, 2012 USFWS autogenerated species list for GGNRA general GGNRA operations

Prior to these discussions, GGNRA has consulted both informally and formally on various projects and programs that affect listed species. These projects are provided in Attachment 3.

III. B. SCOPE OF PROPOSED ACTIONS

The scope of the consultation includes those routine GGNRA actions within the geographic area as described in Section II.E. Exemption 5

Exemption 5

Exemption 5 Non-federal activities such as unauthorized flights and illegal actions or emergency situations (natural disasters or other calamities) are not addressed in this BA. Emergency situations involving an act of God, disasters, causalities, national defenses or security emergencies, etc. including response activities that must be taken to prevent imminent loss of human life or property will be consulted on separately utilizing the emergency consultation procedures.

Exemption 5 - draft comment

1. Reinitiation of Formal Section 7 Consultation for the Trails, Special Events, Resource Management, and Raptor Programs, Marin County, Golden Gate National Recreation Area, California (1-1-91-F-25R, November 6, 1991)

2. Formal Endangered Species Consultation and Conference on the National Park Service's Proposed Recreational and Resource Management Activities in the Golden Gate National Recreation Area, San Mateo Counties, California (1-1-95-F-31, March 15, 1995)
3. Formal Consultation and Conference on the Marin Headlands/Fort Baker Transportation Management Plan and the Coastal Corridor Enhancement Plan for the Golden Gate National Recreation Area in Marin County, California (1-1-06-F-0163, April 17, 2007)
4. Formal Consultation on the Mori Point Restoration and Trail Plan in the Golden Gate National Recreation Area in the City of Pacifica, San Mateo County, California (1-1-06-F-1575, July 13, 2006)
5. Formal Section 7 consultation on the proposed sand excavation project at Ocean Beach, San Francisco, California (1-1-96-F-11, November 20, 1995)
6. Draft snowy plover management plan for Ocean Beach, San Francisco County, California (1-1-97-I-2344, December 10, 1997)

III. C. PLANNING AND COMPLIANCE PROCESS

Currently, the GGNRA managers, planners, and specialists review all proposed "actions" within the park to obtaincompliance with a variety of federal laws (e.g., National Environmental Policy Act of 1969, Uniform Federal Accessibility Standards, etc.). The NEPA review process has been standardized across all NPS units nationwide through NPS Director's Order 12 and includes a nationwide, online database (PEPC) that facilitates review, and tracks compliance status of all projects.

GGNRA is comprised of different functional divisions (e.g., a Maintenance Division subdivided into Building and Utilities, Roads, Trails, etc.) with varying responsibilities. Some of the routine activities performed by these divisions have the potential to affect listed species or their habitat. A common thread is that each division is required to develop annual workplans that are reviewed through the GGNRA's NEPA process.

Exemption 5 - draft comment

Training

1. Natural Resource and Planning/Compliance staff involved with the NEPA review would be required to take training on Endangered Species Act Section 7 consultation procedures.

GGNRA Operations Planning Support

1. GGNRA Natural Resources staff will update and provide of T&E species and habitat maps to GGNRA divisions and outside interests for planning purposes.
2. GGNRA Natural Resources staff will conduct meetings with division program managers including project managers that oversee contracts to provide overview of T&E requirements as they affect operations.
3. GGNRA Natural Resources and planning/compliance staff will organize annual workplan meetings with GGNRA divisions and outside interests to determine proposed work items for the upcoming year and to provide natural resource feedback on proposed work items.

NPS NEPA Review

1. Completion of PEPC form by the applicant that includes description of project, map of proposed actions, assessment of impacts, mitigation measures, and environmental screening form.
2. Purpose and need review by Planning and Compliance staff.
3. Document consistency determination with scope and conditions of operational BO (GOGA NR and compliance staff). The determination process is detailed in Attachment 4.

T&E Compliance Reporting

1. Project compliance reporting to USFWS (See General Conservation Measure Section VII.A.5)
2. Operational Program reporting (See Section VIII.C.)

III.D. PROPOSED ACTIONS

III.D.1. *EDUCATION/INTERPRETATION PROGRAMS*

The mission goal for the GGNRA is to ensure that park visitors and the general public understand and appreciate the preservation of parks and their resources for this and future generations (NPS-Pacific West Region 1998). Satisfactory visitor experiences result in support of the natural and cultural resources, both regionally and within parks, and values associated with those resources.

ACTIVITIES:

The GGNRA has and may develop additional educational programs for students or park visitors that may involve "hands-on" activities within or adjacent to habitat for listed species. These activities may involve collection of water samples, shoreline sampling of aquatic life with nets, sediment sampling, visual observation of fish and other aquatic life, and sampling of riparian habitats. The majority of the activities will involve three GGNRA partners (YMCA, NatureBridge, and Golden Gate National Parks Conservancy) which provide environmental education experiences for students and targeting diverse communities that may lack exposure to the outdoors.

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Dip nets, plankton nets
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Compliance Report (5a)
- California red-legged frog (19)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

1) Instructors will be required to inform students about the sensitivity of GGNRA natural resources and listed species.

3) GOGA NR staff will review all education programs through internal NEPA process and/or require a **Exemption 5 - draft comment**

4) Terms and conditions from the BO will be explicitly included as specific conditions or restrictions of any issued NPS research and collecting permit

Species Specific

CA red-legged frog

1) Any collected tadpole life stages need to be maintained in water from collection site and not further handled by students or instructors and must be

released at site of capture.
2) No adults or juveniles would be collected.

Tidewater goby
1) Any collected gobies would be immediately released at the collection site

III.D.2. *Research, Inventory and Monitoring (NPS and outside)*

NPS Management Policies (NPS 2006) encourage appropriately reviewed natural resource studies whenever they are consistent with applicable laws and policies. These studies support the NPS mission by providing the Service, the scientific community, and the public with an understanding of GGNRA resources, processes, values, and uses.

Inventory and monitoring activities directly associated with listed species are covered by Section 10 permits held either by GOGA or individual researchers. However, there may be other research, inventory, and monitoring activities that may affect listed species or their habitat. These include activities such as installation of scientific measuring devices, topographic surveys, habitat and species surveys. These actions have been separated from activities associated with the GGNRA's interpretation and education programs.

Exemption 5

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Various
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Compliance Report (5a)
- California red-legged frog (19, 22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

Exemption 5

III.D.3. *Aquatic and Wetland Restoration Activities*

Biological or physical processes altered in the past by human activities may need to be actively managed to restore them to a natural condition or to maintain the closest apporimation of the natural condition when a truly natural system is no longer attainable (NPS 2006).

ACTIVITIES:

Restoration site preparation. Many sites that are proposed for restoration activities require clearing and grubbing to prepare the site for work. In addition, in areas where restoration actions are distant from roads, a temporary access route may be needed. Depending upon the sensitivity of the resource, clearing activities may be conducted using hand equipment such as machetes, weed whips, brushcutters, lopers and chainsaws. In disturbed areas with low resource values, heavy equipment including mowers and bulldozers may be used.

Addition of woody materials. In the past, woody materials from many of our riparian areas, streams and wetlands have been removed. We propose to place suitably sized woody materials in locations where field surveys indicate that they would provide habitat value. Exemption 5 - draft comment

Exemption 5 - draft comment

Minor bank and channel alteration for restoration (project length <300 m). Many streams bearing coho or steelhead have had historic bank or channel alterations. On Easkoot, Olema and Redwood Creeks, earthen berms have been constructed to confine floodflows within the channel. In some areas, small tributaries have had small sections filled in or drastically rerouted. Upon completion of site restoration plan by qualified biologist or hydrologist, the GGNRA's restoration program may use hand labor and heavy equipment to recreate historic channels or reshape natural banks. Restoration activities related to this may include temporary dewatering through the installation of instream cofferdams and installation of temporary crossings across creeks or wetlands.

Removal of flood and bank protection or abandoned structures. Many areas along GGNRA creeks contain hardened structures to protect floodplain and/or channel banks. These sites lack the undercut banks and riparian vegetation that provide important rearing habitat for fish and other aquatic life. In many instances, the need for bank protection has changed where nearstream trails or structures have been removed or abandoned. Hardened structures may be removed from areas that are not culturally significant and would provide long-term benefits for the aquatic habitat. Similarly, abandoned structures such as pumps, waterlines, etc. that may be located in creek or wetland areas may be removed. These restoration activities may also require temporary dewatering through the installation of instream cofferdams and installation of temporary crossings across creeks or wetlands.

Modification of unnatural barriers to fish passage. There may be sites that pose unnatural passage barriers to fish. Many are associated with transportation corridors that have culverts or bridges perched high above the downstream creek areas. Holding pools at upstream and downstream ends of these bridges or culverts are absent. In addition, water depths in the culverts are typically shallow.

Design alternatives will always explore removal of passage barriers where possible. For areas where roads crossing coho and steelhead streams are no longer needed, culverts or other passage barriers would be removed and the natural channel configuration will be restored. In areas where this is not feasible, modifications to both culverts/bridges and channel would be initiated. Typical bridge or culvert modifications will include installation of properly sized, new culvert or bridge with natural bottom and/or creation of defined low flow channel. Modifications at the downstream or upstream ends of culverts may involve the creation of artificial pools through logs, boulders, or other structures as appropriate. These restoration activities may also require temporary dewatering through the installation of instream cofferdams and installation of temporary crossings across creeks or wetlands.

LOCALE: All watersheds
TIMING: No work below bankfull channel height or ordinary high water except during the dry season (July 1 to November 15).
EQUIPMENT: Various.
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevent (7a-d)
- Noise Control (9)
- Vegetation Management (10a,b)
- California red-legged frog (11- 22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

III.D.4. *TERRESTRIAL HABITAT RESTORATION ACTIVITIES*

Invasive non-native plant management: In order to maintain native ecosystems and biodiversity, the GGNRA employs an IPM strategy to manage invasive non-native plants. The species we manage include, but are not limited to, the following: *Acacia melanoxylon, Ageratina adenophora, Carduus pycnocephalus, Centaurea*

Solstitialis Cirsium vulgare, Conium maculatum, Cortaderia jubata, Cortaderia selloana, Cotoneaster spp., Cytisus scoparius, Delairea odorata, Dipsacus spp.,Echium candicans, Ehrharta erecta, Eucalyptus globulus, Festuca arundinacea, Foeniculum vulgare, Genista monspessulana, Hedera helix, Holcus lanatus, Leucanthemum vulgare, Phalaris aquatica, Rhamnus alaternus, Spartium junceum and Vinca major.

In most cases, invasive plant removal would be done by manual or mechanical removal methods. These methods include, but are not limited to, hand pulling and use of tools such as weed wrenches, pulaskis, loppers,hand picks, and shovels. In some cases, powered equipment such as chainsaws and brushcutters would be used to remove invasive plants. Other removal methods include heavy equipment and hyromechanical obliteration. Hydromechanical obliteration involves the use of a thin stream of water at high pressure to cut and macerate targeted plants.

Limited chemical treatment would primarily use herbicides in both aquatic and terrestrial formulations of glyphosate (Aquamaster® and Roundup®), triclopyr (Garlon® 3A and 4) and aminopyralid (Milestone®). Table 1 summarizes herbicides and specific use details related to the proposed action. Table 2 summarizes the proposed buffer distances from wetland and riparian areas by herbicide. Non-ionic surfactants would be used. All herbicides would be used in accordance with label directions and California law and under the supervision of licensed applicators approved by the California Department of Pesticide Regulations.

Additional herbicides may be used under the guidance of the GGNRA IPM coordinator in accordance with label directions and conservation measures described here. All herbicide use is administered through the GGNRA's IPM coordinator and must occur under the supervision of California Department of Pesticide Regulations approved personnel. All herbicide use is reported monthly to the IPM coordinator.

Herbicide application methods would include cut stump, foliar and spot spray, low-volume, injection, frill, basal bark, thin line, and wick or wiper. All applications would be done using hand bottles, backpack sprayers, or vehicle mounted power sprayer with low-drift methods (*e.g.*, a course drip nozzle). A registered, non-toxic dye may be added to the mixture within all sprayer tank types in order to improve detection and avoid overspray. In addition, spraying would occur as stated on label directions, when wind speeds are between 2-10 miles per hour and away from the active waterway, to avoid both inversion and drift during windy conditions. No spraying would occur during rain or within 24 hours of predicted precipitation.

Table 1. Proposed Herbicides

Herbicide brand (active ingredient)	Application	Mixture concentrations

Roundup Pro Max® (glyphosate)	Foliar	up to 8% solution
Roundup Pro Max® (glyphosate)	Cut Stump	50-100%
Aquamaster® (glyphosate)	Foliar	up to 5% solution
Aquamaster® (glyphosate)	Cut Stump	50-100%
Garlon® 4 (triclopyr BEE)	Foliar	1-8 quarts/acre depending on species treated
Garlon® 4 (triclopyr BEE)	Cut Stump	20-30%
Garlon® 4 (triclopyr BEE)	Low Volume	up to 20%
Garlon® 4 (triclopyr BEE)	Thin Line	100%
Garlon® 3A (triclopyr BEE)	Foliar	1-8 quarts/acre depending on species treated
Garlon® 3A (triclopyr BEE)	Cut Stump	up to 100%
Milestone® (aminopyralid)	Foliar	3-7 ounces/acre depending on species treated

Table 2. Proposed Buffer Distances from Aquatic Habitat

Herbicide	Spray Application	Direct Application (cut stump, basal bark, wick, wiper, etc)
Aquamaster	25 ft no-use buffer around aquatic habitat supporting listed species	60 ft no-use buffer around aquatic habitat supporting listed species
Round Up Pro Max	25 ft no-use buffer around aquatic habitat supporting listed species	60 ft no-use buffer around aquatic habitat supporting listed species
Garlon 4	300 ft no-use buffer around aquatic habitat	300 ft no-use buffer around aquatic
Garlon 3A	25 ft no-use buffer around aquatic habitat supporting listed species	60 ft no-use buffer around aquatic habitat supporting listed species
Milestone	25 ft no-use buffer around aquatic habitat supporting listed species	NA

Revegetation: Following invasive plant removal and other ground disturbing activities, the GGNRA actively revegetates. Revegetation efforts use only native plants from local genetic stock. **Exemption 5**

LOCALE: All watersheds
TIMING: Year-round

EQUIPMENT: Various
EXISTING CONSERVATION MEASURES:

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevention (7a-d)
- Dust Control (8c,d)
- California red-legged frog (11-22)
- Vegetation Management (10.a.vi)

ADDITIONAL CONSERVATION MEASURES:
General

1. Only apply herbicide when wind speeds are less than 10 mph.
2. Do not apply herbicide when precipitation is predicted (defined as greater than 30% chance of rain or showers) in the next 24 hours.
3. For Garlon 4, do not apply herbicide when precipitation is predicted in the next 48 hours.
4. Only apply herbicides when target plant surfaces are dry.

California red-legged frog, coho salmon, steelhead trout, San Francisco garter snake and marsh sandwort

1. Use buffer distances described in Table 2 above for herbicide application adjacent to aquatic areas.
2. No herbicide foliar spraying or direct stump applications will be allowed in non-aquatic riparian or wetland areas containing the habitat of the San Francisco garter snake or the California red-legged frog except during the dry season. Areas with riparian or wetland vegetation may be treated in the dry season, provided that the ground is found to be dry at the time of application and that the site is manually checked for presence of both of these two listed species before application. This term does not apply to the painting of stems and trunks or wick application to leaves at least two feet above ground with an NPS-approved herbicide (cite MP BO).

Mission blue butterfly, San Bruno elfin and Hickman's potentilla (from MHFBTMP BO)

1. Herbicide application will not be conducted during the mission blue butterfly and San Bruno elfin flight period within 100 feet of existing patches of butterfly host plants.
2. Restoration activities performed outside of the butterfly flight period would occur under the following guidelines:

a. Where deemed appropriate by natural resources staff, all host and nectar plant patches and Hickman's potentilla individuals within 100 feet of herbicide application will be demarcated with temporary protective flagging or fencing during herbicide application.
b. All herbicide application within 100 feet of host plants or Hickman's potentilla individuals would be conducted under the supervision of staff trained and familiar with listed plant and butterfly species and host plants. Prior to invasive plant control activities, trained staff would review all removal actions with contractors, staff and volunteers to ensure no vegetation material would be placed on host plants or inadvertent trampling could occur.
c. All herbicide application to invasive non-native plant species located within 100 feet of host plants or Hickman's potentilla individuals would be applied using methods to reduce drift (including low volume, large droplet size, wick or wipe application). Additional protective measures such as protective shielding or other practices also would be employed.

III.D.5. *SPECIAL PARK USES*

ACTIVITIES:

The GGNRA issues special park use permits for large events or commercial activities that are interested in using the GGNRA. Typical activities in the past have been weddings, fun runs, organized sporting events (e.g., surf contests at Ocean Beach), and commercial television and films. Routine annual events near sensitive habitats and listed species have included Fleet Week, Fourth of July, and California Coastal Clean-up Day. During these annual events, large numbers of people may congregate near sensitive habitat in order to view ongoing festivities (e.g., fireworks displays for Fourth of July, parade of boats and Blue Angels for Fleet Week).

The GGNRA is involved with cultural activities by native American groups that may occur in listed species habitat. As an example, the Federated Indians of Graton Rancheria have been using the restored wetlands and creek at Muir Beach for the hand collection of native wetland plants (e.g., sedges, tules, and cattails) for Traditional Ecological Knowledge activities.

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Various
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)

- Compliance Report (5a)
- California red-legged frog (13,19)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

General

Any large event that may result in trampling impacts to listed species habitat (e.g., Mission Blue host plants) or disturbances to species, public information personnel would be present during the event to ensure the public stays outside sensitive areas. Temporary signage and fencing may be used as necessary to prevent access into sensitive areas.

Exemption 5

The purpose of the utility maintenance program is to maintain the utility systems in good condition in accordance with applicable health, life, and safety codes. The GGNRA's utility inventory includes five sewer systems and water distribution systems, electrical power distribution system, radio/cellular communication, and telephone system. Generally, these utility systems are in a developed corridor. For instance, most of the water and sewer lines are generally within the road corridor

Exemption 5 - draft comment

In most cases, maintenance activities would be conducted during the dry season. However, utilities may become damaged in the wet season and require emergency repairs. Repairs must be made as soon as possible in many cases to restore power, water, or open sewer lines, for example.

Site preparation. Many sites that are proposed for utility maintenance activities require clearing and grubbing to prepare the site for work. In addition, in areas where repairs are not within a developed corridor, a temporary access route may be needed through open space areas. Depending upon the sensitivity of the resource, clearing activities may be conducted using hand equipment such as machetes, weed whips, brushcutters, lopers and chainsaws. In disturbed areas with low resource values, heavy equipment including mowers and bulldozers may be used.

Repair/Replace Water Lines and Water System Components: The water delivery system varies depending upon location. The most complicated system is in the Marin Headlands where in addition to waterlines, the water delivery system includes three above ground reservoirs, pump system, and fire hydrants. Damaged or deteriorated exterior water lines are repaired or replaced to restore normal water distribution services. This includes the disinfecting and flushing of dewatered lines prior to restoring

normal service.

Sewer System Maintenance: Because of possibility of sewer overflows, the Park is required to have a Sewer System Management Plan by the California State Water Resources Control Board (SWRCB) Order No. 2006-0003, Statewide General Discharge Requirements for Sanitary Sewer Systems. The SWRCB Order No. 2006-0003. This order requires all publically operated sewer systems containing one mile or more of sewer pipes to create an individual SSMP for each system. GGNRA manages three systems that meet this requirement; Muir Woods, Marin Headlands and Fort Mason. The goal of the SSMP is to provide a plan and schedule to properly manage, operate, and maintain all parts of the sanitary sewer system. This will help reduce and prevent sewer system overflows (SSOs), as well as mitigate any SSOs that do occur. These plans are under development (Holladay Engineering Co., 2012).

The recommended actions in the SSMP include completing and updating of facility maps, implementing routine preventative operations and maintenance actions (including inspection and cleaning), and implementing overflow response plan (including notification, sampling, and control actions). Control actions could include prevention or reduction of flow into surface waters through installation of pumps, piping, and temporary berms (Holladay Engineering Co., 2012).

Radio and Telephone System Maintenance:

The GGNRA has a communication system that includes overhead and underground communications cable, wireless communication system, and a GGNRA radio system comprised of repeater stations, base stations, and towers. The communication systems are generally located in "developed" areas and repair actions may occur year-round. Most repair actions outside of developed areas occur during the dry season. Winter storms may damage communication system components. Emergency repairs may be needed during these periods to restore communication service.

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Various
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a-d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a- c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevention (7a-e)
- Dust Control (8a-d)

- Noise Control (9a)
- Vegetation Management (10a,b)
- California red-legged frog (11-22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

III.D.7. ***Equestrian Operations (San Mateo)***

The GGNRA recognizes that horseback riding is a popular means of recreation and that it expands the variety of visitor experiences available in the GGNRA. The GGNRA desires to increase the public benefit and extend this opportunity to a greater number of visitors while improving protection of the historic and natural resources in the vicinity of the stables (Marin Equestrian Plan, NPS 2011.) In 2011, the GGNRA completed an Equestrian Plan for Marin County, and since that time, land that supports four separate equestrian operations have been incorporated into the GGNRA. The GGNRA's most current Draft General Management Plan (GMP DEIS, NPS 2011) mandates that existing land uses (including equestrian parcels) in San Mateo county will continue to be managed to support those land uses. Though the exact scope and site location may be modified in future planning efforts, current management (10/2/2012) is structured to support four operations (two of which are co-owned and managed.) Each operation leases a certain acreage to support a capped number of horses and other livestock, as shown below in Table 3.

Table 3. San Mateo County Equestrian Operations

Operation Name	Acreage	Maximum # Horses Boarded
Renegade Ranch	18.4	15
Moss Beach Ranch	55.7	76
Ember Ridge	33.1	85
Ocean View Farms	17.4	30

ACTIVITIES:
Equestrian operators manage each operation as a for-profit venture, providing boarding facilities and some programmatic components such as trainings and tours. General operations include maintenance of existing infrastructure (fences, stalls, barns, living quarters for on-site staff, and roads) and supporting the horses that reside there (providing food, providing exercise, cleaning stalls and pastures, and managing manure). Typically, all animal enclosures are placed at least approximately 25 feet from the tops of banks of creeks that are adjacent to operations (San Vicente Creek and Martini Creek). Operators have installed some water management technologies (including drains, gutters, swales, and berms) to redirect storm water toward vegetated buffers before entering the creek, though some problem areas still exist. Equestrian operations

are limited to existing disturbed areas where operators are less likely to encounter wildlife.

LOCALE: Rancho Corral de Tierra (Martini Creek and San Vicente watersheds)
TIMING: Year-round
EQUIPMENT: Variable.
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a-d)
- Resource Sensitivity Training (2a)
- Avoidance Zones (4a,b,c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevention (7a-e)
- Noise Control (9a)
- Vegetation Management (10a,b)
- California red-legged frog (11-22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

III.D.8. *Windfall/Hazard Tree Management*

The purpose of the Park's hazard tree program is to maintain safe conditions for visitors. A hazard tree is one that, because of a recognizable mechanical flaw, poses a threat to people or property (NPS 1991). **Exemption 5 - draft comment** **Exemption 5 - draft comment** rees are generally left in place to provide large woody habitat.

LOCALE: All
TIMING: No work below bankfull channel height or ordinary high water except during the dry season (July 1 to November 15).
EQUIPMENT: Saws, winches, cable
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a-d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6i)
- Pollution Prevention (7a-e)
- Noise Control (9a)
- California red-legged frog (11-22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

1) To the extent practicable, woody materials from hazard trees in the riparian area would be placed on banks or within the adjacent creek to improve existing habitat conditions.
2) Tree removal activities and placement of wood as habitat in riparian areas or within the channel will occur between August 1 and November 15.
3. If emergency situations require removal/placement outside this period, materials may be temporarily stockpiled in riparian areas for later placement or placement of woody materials away from spawning gravels.

Exemption 5 - draft edit

The park contains various visitor amenities including comfort stations, toilets, picnic areas, and parking lots. In addition, the park contains 814 structures ranging in size and character from small wood frame agricultural outbuildings in the Olema Valley to the massive pier and warehouse buildings at Fort Mason. Many of these structures are either on or eligible for the National Register of Historic Places. In addition, there are 45 historic military fortifications and five visitor centers.

Many of these structures are located in sensitive habitat and due to absence of maintenance, have been used by listed species. For example, at the Hawk Hill gun battery, the absence of drainage work has resulted in the presence of seasonal wetland conditions that has resulted in the presence of California red-legged frog during the non-breeding season.

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Various

EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,c,d)
- Resource Sensitivity Training (2a)
- Avoidance Zones (4a,b,c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevention (7a-e)
- Dust Control (8c,d)
- Noise Control (9a)
- Vegetation Management (10a,b)
- California red-legged frog (11-22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

III.D.10. *TRAILS ACTIVITIES*

The purpose of the trail maintenance program at Golden Gate National Recreation Area (GGNRA) is to ensure visitor safety and enjoyment, engage the community through volunteerism, and to promote resource protection by encouraging visitors to use designated, well maintained, sustainable trails (Stegall 2012).

Currently Golden Gate National Recreation Area's Trails Program annually maintains over 65 miles of trail throughout Golden Gate National Recreation Area (GOGA), Muir Woods National Monument (MUWO), Presidio (PRES), and Fort Point National Historic Site (FOPO).

The GOGA has a trail maintenance plan that breaks maintenance activities into two categories; (1) Preventative / Recurring / Cyclic Trail Maintenance, and (2) Deferred Trail Maintenance. The two categories are differentiated based on scale and complexity with Category 1 activities (e.g., preventative trail) being small in scale, minor, and routine. The proposed actions are always implemented with the intent of minimizing resource impacts while achieving main goals of visitor safety and enjoyment.

Proposed activities include: maintaining, repairing, and rebuilding damaged/deteriorated walls, trail tread, drainage structures, and other structural elements; rebuilding and repairing trail bridges including decking, railings, approaches, abutments, and stringers; removing fallen trees and rocks and debris from the trail corridor; repairing sections where erosion and other landscape processes have compromised trail integrity; creating barriers to discourage trail shortcutting, trail widening, and use of social trails; restoring landscape damage from abandoned trail segments; and maintaining/repairing asphalt paths and multi-use trails. Proposed actions also include the maintenance and repairs to stairs, railings and other trail features; repair and replacement of benches; repair, maintenance, and replacement of fences, repair and replacement of signs, kiosks, and wayside exhibits located along park trails and the construction of minor structures (i.e. steps, waterbars, checks, retaining walls, etc.) in "previously disturbed areas or developed areas" and in-kind replacement of minor structures with little or no change in location, capacity or appearance. Previously disturbed or developed areas are defined as development zones with clear evidence of recent human disturbance; such as trail corridors, parking lots, visitor centers, overlooks, etc. The width of maintenance corridors is typically 3 feet from the trail shoulder.

Exemption 5

Exemption 5

Examples include, but are not limited to: reconstructing trails around or through landslides and similar events that render the existing trail impassable, rerouting trails where erosion and ongoing trail or resource damage cannot be controlled through hardening in the existing alignment, taking

preventative measures to ensure further erosion impact is alleviated or controlled, replacing existing wet stream crossings with footbridge, and relocating a small section of a trail for resource or visitor protection. The construction zone corridor for minor reroutes is the width of the trail tread plus 25 feet (K.Stegall, Trails Supervisor, pers. comm., 2012). The disturbance footprint may be unbalanced if the trail is not level (e.g., greater width on one side over another).

MAINTENANCE ACTIVITIES

- *Repair/Replace Check/Steps* **(Figure 9)**
- *Repair/Replace Waterbar*
- *Repair/Replace Staircase*
- *Repair/Replace Retaining Wall*
- *Repair/Replace Boardwalk*
- *Footbridge Maintenance*
- *Repair/Replace Sand Ladder*
- *Repair/Replace Culvert*
- *Repair/Replace Causeway* **(Figure 8)**
- *Repair/Replace Turnpike*
- *Repair/Replace Hand Rails*
- *Repair Tread Surface*
- *Repair/Replace Fencing*
- *Close/Rehabilitate Social Trail*
- *Brush Trail Corridor*
- *Remove Berm*
- *Remove Down Trees*
- *Clean Drainages*
- *Remove Debris (i.e. sand, sticks, rocks, etc.)*
- *Narrow Trail Tread*

MINOR NEW TRAIL CONSTRUCTION

- *Footbridge and abutment* **(Figure 10)**

A more detailed description of each of these maintenance activities is provided in the GOGA Trail Maintenance Plan which is supplemented by annual workplans. The plan also includes details on the acceptable materials that can be used in the GGNRA (e.g., types of treated lumber and appropriate handling procedures).

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Hand and Power Tools, and Small Equipment (including mini-excavator, bobcat, SWECO)

EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevent (7a-d)
- Dust Control (8c,d)

- Noise Control (9)
- Vegetation Management (10a,b)
- California red-legged frog (11- 22)

ADDITIONAL CONSERVATION MEASURES: Exemption 5

III.D.11. *ROAD ACTIVITIES*

The GGNRA Roads Division is responsible for routine maintenance activities along unpaved and paved roads in the GGNRA. There are XX miles of paved and XX miles of unpaved roads (Figure 11). The types of routine maintenance activities include:

- Repair of asphalt surfaces (including chip/sealing)
- Grade and resurface unpaved surfaces/roads
- Shoulder maintenance
- Removal of trees, limbs, rocks, and materials obstructing or threatening roads.
- Maintain adequate line of sight along roads through routine clearing of vegetation and dead brush to provide adequate lateral and vertical clearance on roads (including hand and tractor mowing).
- Cleaning, reshaping and repair of drainage ditches to ensure adequate drainage.
- Maintenance, replacement, and installation of drainage structures.
- Litter removal (including road sweeping)
- Signage repair and installation
- Repair of road bridge surfaces, piers, abutments, or related bank protection

Most activities would be conducted during the dry season and would follow the typical BMPs for construction (e.g., erosion, pollution, and noise control) described in General Conservation Measures section.

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Various
EXISTING CONSERVATION MEASURES: Exemption 5

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)

- Pollution Prevent (7a-d)
- Dust Control (8c,d)
- Noise Control (9)
- Vegetation Management (10a,b)
- California red-legged frog (11- 22)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

III.D.12. *BEACH MANAGEMENT ACTIVITIES*

The GGNRA has eight beaches in Marin and San Francisco Counties that provide recreational opportunities for the public as well as important habitat for wildlife and plants. In Marin County, these beaches include Stinson Beach, Muir Beach, Tennessee Cove Beach, and Rodeo Beach. In San Francisco County, these beaches include Crissy Field, Baker Beach, China Beach, and Ocean Beach. Two of these beaches, Crissy Field and Ocean Beach, provide non-breeding habitat for the western snowy plover (Figure 12).

There have been several activities at have been identified as having the potential for impacts to western snowy plover including:

- Unleashed Pets (covered in the Dog Management Plan EIS and related documents)
- Campfires (GGNRA 2012)
- Horse and Bicycles
- Kite flying, kiteboarding and model airplanes
- Extreme visitation
- Sand maintenance activities
    - The removal of sand from various locations, transit of dump trucks, and re-distribution back on the beach, adjacent eroding cliffs, or stabilization structures
- Off-road vehicle operations
    - routine driving of all-terrain vehicle, off-road motorbike, 4-wheel drive vehicle by NPS resource protection rangers and maintenance staff during daylight hours as well as other law enforcement agencies (CDFG, City of San Francisco).
- Resource management, monitoring and research activities (vehicles)
    - Routine driving of research all-terrain vehicle on the beach for topographic data
- Interpretive activities
- Heavy equipment operation
    - use of D6 caterpillar (and other heavy equipment as needed) for sand movement and carcass burial,

  - Beach cleanup using mechanical beach cleaner and use of heavy equipment for removal and burial of large marine mammal carcasses
- Emergency Operations
  - use of emergency vehicle on the beach, nearshore rescue boats, and Coast Guard helicopters overhead
- Boat salvage
  - vehicles and heavy equipment utilized to remove wreckage and cleanup debris
- Beach cleanup
  - Volunteer groups and GGNRA staff conducting frequent hand removal of trash
- Spill cleanup
- Special events

Exemption 5

Exemption 5 Although it focuses on GGNRA activities at Ocean Beach, the same types of activities would occur at Crissy Field. Exemption 5

Exemption 5 Exemption 5 The specific areas covered by beach management activities are illustrated in Figure 12.

LOCALE: specific sections of Crissy Beach, Ocean Beach (San Francisco County)
TIMING: Year-round
EQUIPMENT: Hand tools, beach cleaner, patrol and emergency rescue vehicles, nearshore rescue boats, D6 caterpillar or similar

EXISTING CONSERVATION MEASURES: Exemption 5

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevent (7a-d)
- Dust Control (8c,d)
- Noise Control (9)
- Vegetation Management (10.a.iv)

ADDITIONAL CONSERVATION MEASURES: **Exemption 5**

Species Specific

Western snowy plover

1. *No gathering, cutting or scavenging of firewood or kindling is permitted (GGNRA 2012)*
2. *Fires permitted only in fire rings provided by GGNRA between stairwell #15-20 (Figure 13, GGNRA 2012).*
3. *Beach fires with groups over 25 people require a permit (GGNRA2012)*
4. *Through traffic of heavy equipment and vehicles between Stairwell 21 and Sloat Boulevard will be minimized to the greatest possible extent to prevent disturbance to snowy plovers (Hatch 1998)*
5. *Limit daytime through passage of heavy equipment at less than 10 mpH, in Snowy Plover Management Area. Travel corridor is wet sand zone. No re-fueling on beach (Hatch 1998)*
6. *Use of mechanical beach cleaner outside Snowy Plover management area*
7. *Collection of only manmade debris during beach cleanups*
8. *Sand movement activities outside the snowy plover management zone/Crissy Field wildlife protection area*
9. *Sand movement activities within the snowy plover management zone/Crissy Field wildlife protection area*

III.D.13. *Integrated Pest Management (not associated with restoration actions)*

The GGNRA conducts an integrated pest management (IPM) program to reduce risks to the public, park resources, and the environment from pests and pest-related management strategies (NPS 2006). Proposed pest management activities would be conducted according to the IPM process prescribed in Director's Order #77-7:Integrated Pest Management (NPS 2006). The type of activities include:

Mosquito management. Aquatic or wetland features may support breeding populations of mosquitos. In situations where there is a public health risk, management actions will include mosquito monitoring (risk assessment), provision of appropriate information to the public, and treatment. Monitoring for larval mosquitoes will occur when surface water is present. Public information would be provided to visitors and residents on how to reduce exposure to mosquitoes (e.g., wearing long-sleeved shirts). Should numbers be present at levels sufficient to pose public health risks, the GGNRA's IPM coordinator or local Mosquito Abatement District will treat the ponded areas with a biological control agent (*Bacillus thuringensis*), which is commonly used and does not impact other aquatic life. In the long term, colonization of the created wetland habitat by predatory insects should also assist with reducing the risk posed by mosquitoes. In situations where long-term control of mosquitos is required, habitat modifications could include

Exemption 5

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Various

EXISTING CONSERVATION MEASURES: Exemption 5

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Pollution Prevent (7a-d)
- California red-legged frog (19)

ADDITIONAL CONSERVATION MEASURES:

Exemption 5

Exemption 5

Much of GOGA is a developed landscape with many facilities associated with past land-uses (e.g., U.S. Army) that included operations of underground storage tank, fuel distribution systems, fill sites, shooting ranges, and motor pools. These uses have left environmental conditions that require investigation and potential future remediation. The scope of the investigation and remediation actions are intended to cover small scale projects that are limited in geographic scope (e.g., <1 acre) and have a finished condition that allows for natural processes. Excluded from this include remediation actions that require impermeable caps that preclude native vegetation and drainage features preventing full attainment of natural resource values and in situ bioremediation.

ACTIVITIES:

Investigation and Monitoring
Environmental investigations would typically involve subsurface investigation and environmental sampling of water and/or soil media. When tracked or wheeled equipment is needed to access sites not adjacent to existing roads or trails, access routes would be identified with GGNRA NR staff that minimizes resource impacts.

Remote Sensing
Subsurface investigation typically involves use of a ground penetrating radar (GPR) and/or use of a small backhoe for excavation of small trenches (usually no deeper than 4 feet). GPR produces an underground, cross-sectional, two-dimensional image scan of the soils and subsurface features. GPR surveys can be shallow or deep. Applications for a shallow ground penetrating radar survey are to locate pipelines and utilities, locate underground storage tanks (USTs) and drums, inspect concrete and detect rebar, locate unmarked gravesites, and conduct archaeological studies. Applications for deep ground penetrating radar include landfill and burial trench delineation, geology and bedrock depth studies, and karst and sinkhole location.
Shallow ground penetrating radar surveys are conducted by one person, hand-towing or ATV-towing the antenna. Deep ground penetrating radar underground scanning surveys are conducted in a similar manner as in shallow studies but with a low frequency GPR antenna. Trenching surveys are usually conducted to evaluate fill sites. In general, upon evaluation of each trench, backfill operations happen immediately.

Water Sample Collection
Water sampling generally involves collection of surface grab samples or collection of groundwater samples. Groundwater sample collection is performed using either existing groundwater wells or may require use of a direct push system (DPS). DPS technology can also be used to collect deep soil samples. DPS uses hydraulic pressure to

advance sampling devices and geotechnical and analytical sensors into the subsurface. The weight of the truck in combination with a hydraulic ram or hammer is used to push the tool string into the ground. In some instances, vibration is added to hydraulic pressure to better advance the tools. DPS technology can also be used in the installation of sampling/monitoring wells.

Soil Sample Collection

Soil sampling generally involves the use of DPS as outlined above, manual collection, and drilling. Manual collection of soil samples involves use of hand auger systems, sampling trowels, sampling spatulas, and core samplers. Drilling usually employs hollow stem anger technology which can also be used in collection of groundwater samples and installation of groundwater sampling wells. In all cases, the intent is to collect sufficient data while minimizing the extent of surface disturbance.

Clean Up End Points

Hazardous materials remediation would typically include removal of contaminated soils that meet Preliminary Remediation Goals (PRGs) established for the Presidio of San Francisco (*Development of Presidio-Wide Clean Up Levels for Soil, Sediment, Groundwater, and Surface Water, Presidio of San Francisco, California, rev. May 2006*). PRGs for petroleum and petroleum related constituents have been approved by the California State Water resources Board Order No. R2-2003-0080. The clean-up levels document is attached in Appendix X.

PRGs are risk based and have been established for a wide variety of contaminants such as petroleum hydrocarbons and their related constituents, metals, volatile and semi volatile organic compounds, pesticides, herbicides, polychlorinated biphenyls, dioxins, and furans.

Land use for each site dictates which PRGs are used as the cleanup end point and include human health receptors, ecological receptors (consists of soil and fauna PRGs, wildlife PRGs which includes terrestrial and freshwater/saltwater aquatic organisms, and special status species PRGs) and protection of surface and groundwater PRGs. PRGs for metals have been corrected for different types of native soils found within the Presidio of San Francisco. In those cases where native soils at the site are different from what is found within the Presidio, site specific PRGs for metals are typically developed to ensure that the site is remediated to background metal concentrations. The development of site specific would generally follow the guidance developed by the California Department of Toxic Substances Control ("Selecting Inorganic Constituents as Chemicals of Potential Concern at Risk Assessments at Hazardous Waste Sites and Permitted Facilities" dated February 1997).

Remediation

Early coordination with GGNRA NR staff would be used to the type of remediation

actions (if any) are warranted given the sensitivity of the existing resources. Final remediation actions would approved through NPS NEPA compliance process. Irrespective of the thresholds, routine remediation steps are generally similar. Contaminated areas with vegetation would be brushed if extensive vegetation is present. Heavy equipment would be used to remove and transport contaminated materials outside the project area to an appropriate off-site disposal site. Implementation of the following plans would be carried out: decontamination plan, transportation plan, dust control plan, sampling and analysis plan, quality control plan, and health and safety plan. The disturbed area would be backfilled with clean material and the site would be top-dressed with erosion control materials. Depending upon the extent and location of the remediation site, GOGA NR staff may require development and implementation of a revegetation plan.

LOCALE: All watersheds
TIMING: Year-round
EQUIPMENT: Investigation work will include power/hand augers, cores, and excavator/backhoe. Remediation work would involve brush cutting gear, excavator/backhoe, dump truck.
EXISTING CONSERVATION MEASURES: **Exemption 5**

- Process (1a,b,d)
- Resource Sensitivity Training (2a)
- Biological Monitor (3a-c)
- Avoidance Zones (4a-c)
- Compliance Report (5a)
- Erosion Control (6a-k)
- Pollution Prevent (7a-d)
- Dust Control (8c,d)
- Noise Control (9)
- Vegetation Management (10a,b)
- California red-legged frog (11- 22)

ADDITIONAL CONSERVATION MEASURES:
[to complete]

III.D.15. *PRIOR CONSULTATIONS* Exemption 5

Exemption 5

IV. STATUS OF THE SPECIES WITHIN PROJECT AREA

IV.A. HICKMAN'S POTENTILLA

Species Description. *Potentilla hickmanii* is a small perennial herb in the rose family (Rosaceae) that dies back to a woody taproot each year. Individuals can live up to 25 years. The annually produced leaves are pinnately compound into generally six paired, palmately cleft leaflets that are 2 to 8 millimeters (0.1 to 0.3 inch) long and 1 to 3 millimeters (0.04 to 0.12 inch) wide. Several reclining stems 5 to 45 centimeters (2 to 16 inches) long support 2 to 4 branched cymes, each of which has fewer than 10 flowers. The flowers consist of 5 yellow obcordate petals 6 to 10 millimeters (0.2 to 0.4 inch) long an 5 millimeters (0.2 inch) wide, typically with 20 stamens and about 10 styles (USFWS Recovery Plan 2004).

Status and Distribution in the Project Area. This federally endangered plant currently occurs in only 3 locations: 40 individuals at Indian Village in Monterey, CA, 56 introduced individuals at Point Lobos State Reserve, in Monterey, CA, and about 3500-4000 individuals at Rancho Corral de Tierra (RCDT) in Montara, CA, a recently acquired (December 2011) addition to the Golden Gate National Recreation Area (GGNRA). This population was discovered in 1995 by biologists from California Department of Transportation surveying for a highway project (Figure HIPO-1, USFWS Recovery Plan 2004).

Since its discovery, monitoring of the species at the property was performed by several individuals at irregular intervals using slightly different methodologies, so overall trends are hard to discern. However, we can definitively state that there are 9 known patches where this plant was recently seen or is currently visible. Three small patches (3-20 invidividuals each) observed in 2008 were not re-found during 2011 and 2012 surveys, suggesting those patches have been replaced by the current ground cover (invasive annual grasses or barren, eroded soils). (These areas will be re-visited during on-going monitoring at the site in case conditions change.) These 9 patches are disconnected by steep topography, thick scrub, or patches of non-native invasive vegetation and scattered over approximately 27 acres of open space. Much of this open space is unsuitable due to vegetation type, including native scrub and invasive perennial and annual grasses.

IV.B. MARSH SANDWORT Exemption 5

Figure ARPA-1

IV.C. MISSION BLUE BUTTERFLY

Species Description. The mission blue butterfly (*Icaricia icaroides missionensis*) is a

small, delicate butterfly in the Lycaenidae (gossamer-winged butterfly) family. Wingspan is about 1 to 1.5 inch. The mission blue butterfly was listed as endangered in 1976 (Service 1976). The mission blue butterfly was described by Hovanitz in 1937 based on specimens collected at Twin Peaks in San Francisco. The butterfly inhabits grasslands and coastal shrub in southern Marin, San Francisco, and San Mateo counties in California that contain one or all three of its larvae foodplants (*Lupinus albifrons*, *L. formosus*, and *L. variicolor*).

The adult flight season extends from as early as mid-February to as late as mid-July, depending on the location and microclimatic conditions, though typically at our monitored sites, adults emerge between mid-March and early June. Individuals adults live for only 7-10 days and do not wander far from lupine (*Lupinus albifrons*, *L. formosus* and *L. variicolor*), the larval food plant. Adults feed on nectar from numerous plants, though they may prefer wild buckwheat (*Eriogonum latifolium*), golden aster (*Heterotheca sessiflora*), blue dicks (*Dichelostemma capitatum*), and Ithuriel's spear (*Triteleia laxa*) (Lambert 2001). Females lay eggs throughout the flight season. The eggs are laid singly on leaves, stems, flowers and seed pods of lupine species. Eggs hatch in 4-7 days after being deposited on the larval food plant. Young larvae feed on the inner tissues of the host plant leaves. After feeding, the small second instar larvae (caterpillars that have shed their skin once) enter diapause (a dormant stage) in the litter at the base of the host plant. Larvae emerge from diapause and resume feeding the following spring. One generation of butterflies is produced each year.

Status and Distribution in the Project Area. Biologists routinely monitor three primary areas where mission blue butterflies are known to occur (Milagra Ridge, Oakwood Valley, and the Southern Marin Headlands) and perform occasional presence/absence surveys in areas of potential habitat where future work is expected to occur. This type of monitoring has informed our understanding of butterfly distribution in a less-than-systematic way; however, we can confidently state that mission blue butterflies occur at Oakwood Valley, the Southern Marin Headlands (Slacker Ridge, Fort Baker, Fort Barry Rifle Range, etc.), Miwok Trail, Milagra Ridge (the Quarry and Lupine Ridge), and Sweeney Ridge (Figures MBB 1-4). It is highly likely that these butterflies exist elsewhere within the GGNRA and have not been confirmed due to current monitoring strategies and low detectability rates. Because of this uncertainty, GGNRA land managers treat all grasslands within the range of the Mission blue that support larval food plants and adult nectaring plants as potential habitat. Park managers have developed a GIS-based model to predict locations within hostplants and butterflies are likely to occur, and these data are both ground-truthed and amended based on field observations in particular areas of interest.

Routine monitoring at Oakwood Valley, Milagra Ridge, and the Southern Marin

Headlands consists of surveying static linear transects in good habitat using standard Pollard techniques. Each lycenid butterfly seen within 5 meters in either direction of the 50- or 100-meter transect is counted and its sex and activity is noted. The transects are walked every seven to ten days during the flight season, thereby giving an index of abundance in these monitored areas which can be compared among years.

The two sites that have been monitored since 1994 (Milagra Ridge and Southern Marin Headlands) have shown precipitous declines since monitoring began. Indices of abundance at Milagra have been variable, with an abrupt decline in 1999 following a fungal pathogen outbreak in 1998 that decimated host plant abundance throughout all monitored areas of the GGNRA and reappeared in 2010. Numbers have continued to decline since that time. Only two butterflies (compared to 60 butterflies in the pre-pathogen monitoring) were seen on transect in 2012, and these butterflies were found on opposite ends of the 240- acre property. A similar, though slower trend, has been observed in the Southern Marin Headlands, where surveyed areas are grouped into five clusters. Two of these clusters no longer support mission blues and all others have shown general declines over time. Overall, mission blue numbers over the past several years have been considerably lower (13-67 between 1999 and 2012) than pre-pathogen monitoring (43-187 between 1994 and 1998). For the past 6 years, numbers have reached the lowest on record, with indices routinely wavering between 13 and 48. Despite restoration efforts at both these areas focused on removal of invasive plant species, the numbers at both these sites are disturbingly low, and biologists have predicted that the species is at risk of extirpation there.

Conversely, monitoring at Oakwood Valley began in 2003, and numbers have been high and increasing in this region, spanning 50 and 303 over the ten years of monitoring. Park biologists suspect that the difference in abundance trajectory between Oakwood Valley and the other monitored sites may be that Oakwood Valley is dominated by the species of host plant, *L. formosus*, which appears to be most resistant to the fungal pathogen that broke out in 1998 and 2010.

IV.D. SAN BRUNO ELFIN BUTTERFLY

Species Description.

The San Bruno elfin (*Callophrys mossii bayensis*) is a small butterfly with a wingspan of 2.0 to 2.4 centimeters. In adults of both sexes, the wings are brown on the upperside, and reddish brown on the underside with a whitish, irregular median line. The adult flight period is late February to mid-April. Eggs are laid in small clusters or strings on the upper or lower surface of the larval hostplant, *Sedum spathulifolium* (stonecrop). Typical habitat is coastal grassland and low scrub of north-facing slopes within the fog belt where the larval host plant grows. All known locations are restricted to San Mateo County, California, where several scattered populations are known from San Bruno

Mountain, Milagra Ridge, and the Montara Mountain area, including parts of the San Francisco Public Utilities Works land (USFWS 2010).

Status and Distribution in the Project Area.

San Bruno elfin butterflies are known to occur in two areas within the Golden Gate National Recreation Area. They were first discovered at Milagra Ridge, in the early 1980s; and this population was opportunistically monitored by park staff until 1999 when land managers decided to initiate a formal monitoring regimine at the site. They selected seven fifty-foot diameter circles surrounding rebar stakes, which are surveyed every seven to ten days for San Bruno elfin larvae. Surveys has been performed annually (except for 2008) since that time and have indicated that numbers can greatly fluctuate over time. Observations of larval San Bruno elfins have ranged from zero in 2007 to 60 in 2011, with distribution among the seven monitored areas typically being limited to two points (60% and 26% of all historical observations.) The remaining five sites have contributed somewhat uniformly low numbers to overall abundance. Three of these monitoring sites have been retired over time due to low numbers and difficult access. Overall, at Milagra Ridge, land managers currently feel that the species' abundance appears to be increasing or stable after multiple years of disconcertingly low observations.

The second known population of San Bruno elfin butterflies within the GGNRA occurs on Montara Mountain, at a parcel acquired from the Penninsula Open Space Trust in December 2011 called Rancho Corral de tierra (RCDT). Montara Mountain is parceled into several properties, most of which are publicly protected: GGNRA (3800 acres), San Pedro Valley County Park (1150 acres), McNee Ranch State Park (625 acres), and San Francisco Public Works (23,000 acres). San Bruno Elfin butterflies have been known to occur in the Montara Mountain area since 1984 or earlier; however, they have not been consistently monitored on the mountain to determine abundance or trends. In May 2012, GGNRA biologists searched for and confirmed the presence of these butterflies on one of the four peaks of Montara Mountain (Peak Mountain). GGNRA owns 2 additional peaks of Montara Mountain and intends to develop a presence/absence monitoring regime for the site to better capture SBE distribution throughout known suitable habitat. These data will be useful for long-term trend analysis and to inform future park planning efforts.

IV.E. COHO SALMON **Exemption 5**

Species Description. **Coho salmon** (*Oncorhynchus kisutch*) Central California Coast Evolutionarily Significant Unit was listed as federally endangered on June 28, 2005. The Central California Coast ESU extends from Punta Gorda south to the San Lorenzo River (Santa Cruz County).

Status and Distribution in the Project Area. GGNRA has conducted literature review, review of CNDDB database, and several field studies to determine presence/not found status of the salmonids within GGNRA. In addition, GGNRA conducts an intensive monitoring program for salmonids that includes adult spawner and redd surveys, smolt trapping, and basinwide juvenile surveys (snorkel and electrofishing). Within GGNRA, coho salmon are found in Redwood Creek (Marin County). Anecdotal accounts from long-time residents indicate that coho were present in Easkoot Creek (Marin County), although only one cohort has been observed in recent years. In GGNRA managed lands in San Mateo County, coho salmon were historically present in Denniston Creek as late as 1941 (Rancho Corral de Tierra) (Becker and Reining 2008). However, no coho have been observed in recent surveys by CDFG and GGNRA (Nelson 2006, Fong and Bennett 2012). Many of the streams within GGNRA have had prior land-uses that have reduced the suitability of the habitat for coho. These include passage barriers, historic channel revetment and floodplain disconnection, and water diversions.

At Redwood Creek, adult escapement estimates for all three year classes are well short of targets identified in the draft coho recovery plan. Since 1997, the largest escapement occurred in Winter 2004/2005 where almost 90 redds were recorded (Figure CO-1). However, this same year class crashed in Winter 2007/2008 where no redds were observed. It was suspected that the poor returns in Winter 2007/2008 and 2008/2009 were associated with poor rearing conditions in the ocean. Similar temporal patterns were seen elsewhere in this ESU.

IV.F. STEELHEAD TROUT

Species Description. Steelhead trout (*Oncorhynchus mykiss*) Central California Coast Distinct Population Segment was listed as a federally threatened species on August 18, 1997. Steelhead spend anywhere from one to five years in saltwater and may spawn multiple times before dying, in contrast to other species of the *Oncorhynchus* genus (NOAA, April 23, 2003). Steelhead adults enter freshwater streams generally in mid-winter through early spring. Fry typically emerge from the gravel two to three weeks after hatching (Barnhart 1986). Upon emerging from the gravel, fry rear in edgewater habitats and move gradually into pools and riffles as they grow larger (NOAA, April 23, 2003). Cover is an important habitat component for juvenile steelhead both as velocity refuge and as a means of avoiding predation (Shirvell 1990, Meehan and Bjornn 1991). Steelhead however, tend to use riffles and other habitats not strongly associated with cover during summer rearing more than other salmonids (NOAA, April 23, 2003).

Status and Distribution in the Project Area. **Exemption 5**

Steelhead occur in several creeks within the planning area. Steelhead are found in Redwood and Easkoot Creeks in Marin County, as well as in the drainages to Bolinas Lagoon and Rodeo Lagoon. In San Mateo County, steelhead are found in West Union Creek, a tributary to San Francisquito Creek. For most drainages within the project area,

presence/absence salmonid surveys have been conducted, and in Redwood Creek and Easkoot Creek Watersheds, abundance data has been collected for both coho salmon and steelhead from the GOGA/PORE long-term monitoring program for stream fish community. Snorkel surveys and multiple-pass electrofishing sampling are used to determine juvenile salmonid abundance in the summer. Spawner and redd surveys are conducted during the winter within these watersheds, and were first initiated in Redwood Creek in 1994. Results in indicate that:

Redwood Creek (Marin Co.) – Both coho and steelhead have been observed in Redwood Creek. When water is present, the reach supports young-of-the-year (YOY) and 1+ coho and steelhead throughout the year, although abundance may vary substantially from year to year (Smith 1998, 2000, 2001). Sampling at five sites within the creek in 1998, 2000 and 2001 showed averages of 119 coho (YOY) per 100 feet and 200 steelhead (YOY and 1+/2+) per 100 feet (Smith 1998, 2000, 2001). Coho juveniles were collected in four of 11 sampling events in Redwood Creek adjacent to Pacific Way since 1992 (Smith 1998, 2001). A site in Muir Woods with perennial flows and high quality pool habitats had nine out of 10 sampling events with coho juveniles since 1992 (Fong and Vick 2002). Following peak flow events, juvenile salmonids were observed in secondary channels below the Pacific Way Bridge in 2002, and YOY coho and steelhead were removed from isolated secondary channels at this location in May 2002 (Fong and Vick 2002).

Easkoot Creek (Marin Co.) – Steelhead inhabit this creek in relatively low densities. GGNRA surveys conducted in 1997, 1998 and 2000 within a 500-linear foot section of the lower creek found about .4 steelhead per square meter, .1 steelhead per square meter, and 1.7 steelhead per square meter respectively. In 1999 only 2 juvenile steelhead were found in this area. In 2002, GGNRA surveys found coho salmon as well as steelhead within lower Easkoot Creek and upstream in Laurel Creek. Since then, no other cohort has been observed. Restoration activities were initiated in 2002 to increase scour pools for summer rearing habitat, increase availability of floodplain as winter high flow refugia, and restore the native riparian plant community. It is expected that such actions will increase production of steelhead trout as well as other aquatic animals. Pine Gulch Creek, which also drains into Bolinas Lagoon, also supported coho salmon during the survey period.

Other Bolinas Lagoon Tributaries (Marin Co.) – Limited presence/not found surveys have been conducted on other Bolinas Lagoon tributaries. Steelhead juveniles have been found at Mckinnan Gulch, Morse Gulch, and Stinson Gulch at low densities. It is possible that a high percentage of the fish may be resident. Because of the short stream length and intermittent flow conditions at the lower ends of these tributaries, steelhead production is limited in these streams. No coho have been documented in these tributaries.

Tennessee Valley (Marin Co.) – No anadromous salmonids have been documented in this drainage. A dam and hanging culvert is present near the confluence of Tennessee Valley Creek and the Pacific Ocean which effectively precludes anadromous fish usage. Past presence/not found electrofishing surveys have not documented any salmonids in the stream.

Rodeo Lagoon Watershed (Marin Co.) – Small numbers of steelhead trout have been identified during snorkel and electrofishing surveys. No coho have been detected. Overall steelhead densities are low. It is unclear whether the fish are anadromous and naturally occurring. Past historical records have indicated that Rodeo Lake was stocked by California Department of Fish and Game under U.S. Army management of the Marin Headlands. In addition, Rodeo Lagoon is closed for much of the year, open from a few weeks to a couple months during the winter and late spring.

West Union Creek (San Mateo Co.) – Small numbers of steelhead trout have also been identified during snorkel and electrofishing surveys. No coho have been detected. The portion of West Union Creek within Phleger Estate becomes dry during drought year conditions. As a consequence, the fish assemblage is restricted to steelhead.

Martini, Denniston, and San Vicente Creeks (Rancho Corral de Tierra, San Mateo Co.)— All three streams have been substantially altered by the construction of Highway One near the streams' confluence with the Pacific Ocean, agriculture activities, and numerous water diversions. Historic records indicate the presence of anadromous steelhead trout at both Martini and Denniston Creeks (Becker and Reining 2008). Currently, there are partial or complete passage barriers associated with the intersection of Highway One and Martini and San Vicente Creeks. In addition, an impassable water supply reservoir is present on lower Denniston Creek, effectively blocking any upstream movements of salmonids. Snorkel and habitat surveys in upper Denniston Creek (above Denniston Reservoir) indicate the persistence of resident rainbow trout under suboptimal habitat conditions (Fong and Bennett 2012).

IV.G. TIDEWATER GOBY

Species Description. The tidewater goby (*Eucyclogobius newberryi*), a member of the Gobiidae family, is the only species in the genus *Eucyclogobius*. It is a small, translucent benthic fish, rarely exceeding 2 inches in length, and is characterized by large pectoral fins, a blunt elongate tail, and a ventral sucker-like disk formed by the complete fusion of the pelvic fins. Small crustaceans, aquatic insects and mollusks are its primary diet. Reproduction occurs year-round although distinct peaks in spawning, often in April and May, do occur. When breeding, males dig vertical burrows for females to deposit eggs. Larvae emerge within nine to ten days and are planktonic.

Status and Distribution in the Project Area. The tidewater goby is a small benthic fish

that occurs in the upper end of California coastal lagoons in salinities less than 10 parts per thousand (USFWS 1994b). Within the project area, the tidewater goby is known only from Rodeo Lagoon in the Marin Headlands (Figure TW-1). Fish surveys have been conducted by GGNRA staff and consultants in other potentially suitable habitats including the lagoons at Muir Beach and Tennessee Cove. Historic records indicate that within the GGNRA, tidewater gobies were found at the Sutro Baths/Cliff House area in San Francisco in 1874 prior to their construction (USFWS 2005).

Monitoring activities for the tidewater goby have been conducted between 1995 and present by GGNRA and at intermittent intervals prior to 1995 by Dr. Johnson Wang. Monitoring activities were conducted using single pass beach seines during the fall. Rodeo Lagoon tidewater goby mean densities are variable with fall densities ranging from 3 to 65 individuals per square meter (1995-2011) (Figure TW-2, Fong 2012). These densities are slightly higher than the range reported for other coastal lagoons. Moyle (2002) indicated that tidewater goby populations in other coastal lagoons generally average 5-30 individuals per m^2. Seasonal sampling by GGNRA found that densities of gobies are typically highest during the fall and lowest during the winter, especially near the mouth of the lagoon.

IV.H. CALIFORNIA RED-LEGGED FROG

Species Description. The California red-legged frog (*Rana aurora draytonii*) is the largest native frog in the western United States, ranging from 1.5 to 5 inches in length. The California red-legged frog was listed as a threatened species on May 23, 1996 (Service 1996). Critical habitat was re-designated for this species on March 17, 2010 (Service 2010) and a recovery plan published on September 12, 2002 (Service 2002). Within GGNRA, critical habitat has been designated for areas within San Mateo County (Unit SNM-1) that includes Rancho Corral de Tierra, Pedro Point, and Sweeney Ridge (Figure 1).

Breeding adults are closely associated with deep (>0.7 meter or 2.3 feet), still, or slow-moving water (Hayes and Jennings 1988). Breeding occurs from November through March with earlier breeding records occurring in southern localities (Storer 1925). Female frogs deposit egg masses on emergent vegetation so that the egg mass floats on the surface of the water (Hayes and Miyamoto 1984).

During non-breeding periods, frogs have been found in a variety of different habitats. Non-breeding habitat includes nearly any area within 1-2 miles of a breeding site that stays moist and cool through the summer (Fellers 2005). According to Fellers (2005), this can include vegetated areas with coyote bush (*Baccharis pilularis*), California blackberry thickets (*Rubus ursinus*), and root masses associated with willow (*Salix* spp.) and California bay trees (*Umbellularis californica*). Sometimes the non-breeding habitat used by red-legged frogs is extremely limited in size. For example, non-breeding red-

legged frogs have been found in a 6-foot wide coyote bush thicket growing along a tiny intermittent creek surrounded by heavily grazed grassland (Fellers 2005).

The diet of California red-legged frogs is highly variable. Larvae probably eat algae. Invertebrates are the most common food items of adult frogs. Vertebrates, such as Pacific tree frogs (*Hyla regilla*) and California mice (*Peromyscus californicus*), are frequently eaten by larger frogs. Recent diet investigations in GOGA indicate that a large percentage of diet items may be of terrestrial origin (Bishop 2010). Juvenile frogs are active both during the day and at night, whereas adult frogs are largely nocturnal. Feeding activity likely occurs along the shoreline and on the surface of the water.

Status and Distribution in the Project Area.

GOGA has conducted literature review, review of CNDDB database, and several field studies to determine presence/not found status of the red-legged frog within GGNRA by park staff and others (Ely 1993a-b, Fellers and Guscio 2004, Fong 2000, Fong 2004, Fong and Campo 2006, Fong et al. 2010, Koo et al. 2007, Wood Wood 2004, 2005a- b, 2006a-b, 2007a). Field surveys have utilized various methods generally following protocols described by the USFWS including night eyeshine surveys and daytime visual encounter surveys (USFWS 2005) as well as with techniques authorized by our Sec 10(a)1(A) permit including dipnet surveys and traps (TE-036449). They are found in GGNRA-managed areas within Marin and San Mateo Counties. In Marin County, they are present at a wetland south of Bolinas-Fairfax road, Muir Beach/lower Redwood Creek, Green Gulch Farm, Tennessee Valley, and Rodeo Lagoon watershed (Figures CRLF 2-4). In San Mateo County, they are found at Milagra Ridge, Mori Point, Sweeney Ridge, West Union Creek, and Rancho Corral de Tierra (Figures CRLF 5-7). Two historic collection records prior to 1906 indicate the presence of California red-legged frog at the Presidio (San Francisco County) and specifically at Mountain Lake Park (Koo et al. 2007). However, no current observations of red-legged frogs are known from GOGA lands in San Francisco (Ely 1993a,b).

GGNRA has been monitoring long-term trends of red-legged frogs at known breeding locales with the GGNRA. Annual egg mass surveys indicate the presence of a large breeding population at Mori Point and Milagra Ridge (San Mateo) and much smaller breeding populations at Rancho Corral de Tierra (San Mateo), Rodeo Valley (Marin Co.), and Redwood Creek (Marin Co.) (Figure CRLF-8). Intermittent breeding has occurred at Tennessee Valley and Bolinas Lagoon watersheds (Marin Co.).

The 2010 critical habitat designation defines the specific primary constituent elements based on detailed descriptions of the biological and physical characteristics of aquatic breeding habitat, non-breeding aquatic and riparian habitat, upland habitat, and dispersal habitat (USFWS 2010). While the final rule provides a good generalized description of the habitat features, recent studies and observations specific to our area

offer a more specific picture of how red-legged frogs use non-breeding aquatic and riparian habitat and upland habitat.

Non-breeding habitat studies using radio-telemetry have been specifically conducted in GOGA for lower Redwood Creek, Tennessee Valley, Rodeo Valley, and Mori Point (Fellers and Guscio 2004, Fellers et al. 2012, Wood 2005b). Three studies initiated by USGS-BRD provide good information about use of habitats within our GGNRA. The studies indicate that red-legged frogs in our coastal environments were closely associated with aquatic and wetland features. In 2002-2003, night and daytime visual surveys and a companion radiotelemetry study (9 adult frogs) were completed at Muir Beach, Marin County, CA (Fellers and Guscio 2004). From December through May, frogs were found in the vicinity of the breeding site either in marsh vegetation or in the breeding pond proper. During the non-breeding period, frogs were also found using an adjoining creek and riparian area that had water (Fellers and Guscio 2004). At Mori Point (San Mateo County), 32 red-legged frogs were caught at breeding ponds and fitted with radio-transmitters and followed from February through May 2012 (Fellers *et al.* 2012). Twenty-six individuals (81%) stayed within the footprint of the ponds they were originally captured. Two individuals travelled up to 640 m while the other four frogs travelled on average, 50 m from their ponds. So, 94% of the frogs stayed within 50 m of breeding ponds through May when the study ended (early part of the non-breeding season).

Also, our incidental field data from construction monitoring and other species monitoring programs indicate that most red-legged frogs outside breeding season were found using non-breeding aquatic and riparian habitat (*sensu* USFWS (2010)). These included breeding sites, perennial streams and associated riparian habitat, brackish coastal lagoon, and perennial ponds (Ely 1993b, Fellers and Guscio 2004, Fellers *et al.* 2012, Fong 2000, Fong and Campo 2006, Fong et al. 2010, Wood 2004, 2005a- b, 2006a-b, 2007a). Upland habitats (*sensu* USFWS (2010)) are also used, with the intensity of use associated with proximity to non-breeding aquatic and riparian habitat. These upland features have included downed wood cover (artificial or natural), rodent burrows, adjacent coastal scrub, and isolated wetland features (both artificial and natural). Generally, observations of individual frogs and these upland habitat features have been within 1 mile of breeding locations (Figures CRLF 2-7). The few individual frogs found outside the 1 mile radius were associated with small wetland features (e.g. flooded historic gun pit in the Marin Headlands, Figure CRLF-4). The observations of red-legged frogs also closely matches the distribution of modeled "high and moderate probability" wetland habitats within GOGA, where high is >67% and moderate is 33-67% probability of being an actual Cowardin freshwater wetland in the field (Castellini et al. 2006) (Figures CRLF 2-7).

IV.I. SAN FRANCISCO GARTER SNAKE

Species Description. The San Francisco garter snake is a slender, colorful snake with a

an orange head, greenish-yellow dorsal stripe, and a distinct belly color that that varies from greenish-blue to blue. Large adults can reach 36 inches or more in length. Females give live birth from June through September, with litters averaging 16 newborn (Stebbins 2003).

In general, this species requires open-water habitat, typically ponds and wetlands, surrounded by open grassy uplands with a scrub component that together provide both cover from predators and permits thermoregulation (USFWS 2006). The essential habitat components critical to sustaining San Francisco garter snake breeding populations include open grassy uplands, freshwater marshlands, emergent wetland vegetation, suitable amphibian prey base, an appropriate grassland/shrub matrix, open waters, shallow shoreline waters, basking habitat (terrestrial and aquatic), southern/western slope exposure and hibernacula (USFWS 2006).

Adult snakes feed primarily on California red-legged frogs and Pacific treefrog. Adult San Francisco garter snakes are known to gorge on tadpoles of both species, when ponds dry prior to metamorphosis (McGinnis 1989). Newborn and juvenile San Francisco garter snakes depend heavily upon juvenile Pacific treefrogs as prey. If newly metamorphosed Pacific treefrogs are not available, the young snakes may not survive, although small earthworms and young-of-year slender salamanders, which are found in leaf litter and decomposing vegetation, may provide a temporary food source (McGinnis 1989, Larsen 1994).

Status and Distribution in the Project Area. **Exemption 5** Historically, the San Francisco garter snake occurred in scatted wetland areas on the San Francisco peninsula in portions of San Mateo and Santa Cruz Counties (USFWS 2006). Currently, the 1985 Recovery Plan identified six significant populations of the San Francisco garter snake. These were the West-of-Bayshore (San Francisco Airport), San Francisco State Fish and Game Refuge (San Francisco Water Department), Laguna Salada (Pacifica), Pescadero Marsh Natural Preserve (Pescadero) and Año Nuevo State Reserve (Año Nuevo) populations, and an isolated population north of Half Moon Bay. Of the six populations existing in 1985, none are considered stable. All of the monitored populations of the species have declined since listing.

We conducted literature review, review of CNDDB database, and several field studies to determine presence/not found status of the San Francisco garter snake within GGNRA by park staff and others (Figure SFGS-1; Ely 1993b, Barry 19xx, Swaim Biological 200X, Swaim Biological Inc. 2009). A recent habitat suitability field survey found potential habitat at Milagra Ridge and Rancho Corral de Tierra primarily because of the presence of prey items and the historic occurrence of the garter snake in nearby areas (Swaim

Biological 200X). However, subsequent trapping and visual surveys were unable to detect the presence of San Francisco garter snake at these sites (Swaim Biological 200X). . However, recent trapping surveys conducted by Swaim Biological indicate that a small, persistent population of San Francisco garter snakes are located using a wetland-coastal grassland-scrub complex at Mori Point and the southern end of Laguna Salada golf course (Figure SFGS-2). San Francisco garter snakes are currently present San Francisco Public Utilities Commission lands adjacent to GGNRA (Sweeney Ridge).

IV.J. NORTHERN SPOTTED OWL Exemption 5

Species Description. The northern spotted owl (*Strix occidentalis caurina*) is a medium-sized owl found in the Pacific Northwest. It is chocolate brown with round to elliptical white spots on the body feathers and while bars on the tail. Spotted owls are known to nest, roost, and feed in a wide variety of habitat types and forest stand conditions throughout their distribution. Spotted owls use western hemlock, mixed evergreen, mixed conifer, Douglas-fir, redwood, Douglasfir/hardwood, evergreen hardwood, ponderosa pines, western red cedar, and other forest types in different parts of their range. Spotted owls forage in a wide variety of habitats, including forest stands, managed stands, and clearings. Preliminary pellet analyses indicated that spotted owls forage primarily on dusky-footed woodrats (*Neotoma fuscipes*) in addition to other forest dwelling small mammals and songbirds (Chow 1996). Spotted owls require >70% canopy closure for nesting and >40% canopy closure for foraging and topped conifers or oaks with crevices for nesting.

Status and Distribution in the Project Area. The northern spotted owl is federally listed as a threatened species and is currently found from southern British Columbia, Canada, south to Marin County, California. Marin County supports a northern spotted owl population of possibly 75 pairs. This population is isolated from spotted owl populations to the north by large areas of grassland and shrubs and constitutes the southern end of the subspecies range. Genetic analysis has shown low levels of genetic diversity within and low levels of gene flow between spotted owl populations in Marin County and Mendocino National Forest (Henke et al. 2003). The Marin County population supports the highest known density of northern spotted owls range-wide.

Spotted owls in Marin inhabit coniferous forest, including second and growth and remnant stands of Douglas-fir (*Pseudotsuga menziesii*), bishop pine (*Pinus muricata*), coast redwood (*Sequoia sempervirens*), and mixed conifer-hardwood habitats comprised of tanbark oak (*Lithocarpus densiflorus*), coast live oak (*Quercus agrifolia*), and California bay (*Umbellularia californica*) (Fehring et al. 2002). Within the project area, known spotted owl locations are currently limited to Muir Woods and the Stinson Gulch area.

Since 1997, Annual spotted owl monitoring has been conducted by the NPS following the USFWS "Protocol for Surveying Proposed Management Activities That May Impact

Northern Spotted Owls" (USFWS 1992). In 1998, the majority of the potential owl habitat in the forested western part of Marin County was systematically surveyed using the Pacific Northwest Research Station's protocol (Forsman 1995). Annual monitoring appears to indicate a stable spotted owl population. Genetic research has shown that the Marin spotted owl population has little gene flow with and is relatively isolated from spotted owls farther to the north, indicating little chance for a "rescue effect" of other spotted owls dispersing to Marin after population declines (Henke et al. 2003). Within the GGNRA project area, spotted owl habitat only occurs in and around Muir Woods and Stinson Beach, and possibly in Oakwood Valley. Some forested areas, including Oakwood Valley, have not been adequately surveyed to determine occupancy.

Threats to spotted owls in the project area include urbanization, intense recreational pressure, disturbance from wildlife photographers and birders, genetic isolation, possible catastrophic wildfire, expansion in the range of the barred owl (*Strix varia*), and habitat changes due to Sudden Oak Death (Fehring et al. 2002). This isolated Marin County spotted owl population is subject to unique threats present in the region including: 1) urban development along protected-area boundaries, 2) intense urban recreational pressures, 3) increased controlled burns and wild fires along the urban/wildland interface, 4) potential for catastrophic wildfires due to unnatural fuel buildup and spread of invasive species (Monterey pine, eucalyptus), 5) possible genetic isolation, and 6) range expansion of the barred owl (*Strix varia*). Additionally, the barred owl, a known predator of northern spotted owls, was detected at two spotted owl territories (Muir Woods and Rifle Range in Olema Valley) in April 2004.

IV.K. WESTERN SNOWY PLOVER

Species Description: The western snowy plover is a small shorebird about 6 inches in height with dark markings across the forehead and a partial breast band. The Pacific coast population of western snowy plovers occurs from southern Washington State to northern Baja California and it inhabits sandy beaches, salt ponds and mudflats. Their diet consists of invertebrates, small crustaceans and other insects. During the wintering season, western snowy plovers are found on many of the beaches used for nesting as well as on beaches where they do not nest, in man-made salt ponds, and on estuarine sand and mud flats where they feed and rest building up fat reserves. When resting, they choose shallow depressions in the sand, which can be footprints or tire tracks, and are very well camouflaged. The Pacific Coast population of western snowy plovers was listed threatened by the U.S Fish and Wildlife Service in 1993 (USFWS 2007). Habitat degradation caused by human disturbance, urban development, introduced beachgrass (*Ammophila* spp.), and expanding predator populations have resulted in a decline in active nesting areas and in the size of the breeding and wintering populations (USFWS 2007).

Status and Distribution in the Activity Area: Within the GGNRA activity areas, a non-breeding population of western snowy plovers overwinters at Ocean Beach and Crissy Field in San Francisco County from early July through May (approximately 10 months of the year). There are no recent records of snowy plovers nesting on GOGA beaches, although there are breeding colonies in Point Reyes National Seashore and on the salt ponds of the South San Francisco Bay (Merkle et al. 2011).

A wildlife protection area was established at Crissy Field to protect an important resting and feeding area for shorebirds and seabirds using the near shore waters of the San Francisco Bay. From 1997 to 1998, approximately 100 acres of beach was restored by enhancing and protecting coastal dunes, removing rubble from the beach and the construction of a 20-acre tidal marsh. Snowy plovers were first observed consistently using the beach at Crissy Field in January of 2005 (NPS 2011).

At Ocean Beach, a 3.5 mile stretch of sandy beach provides important overwintering habitat for the threatened Western Snowy Plover (*Charadrius alexandrinus nivosus*) and other shorebirds and seabirds within the park. GOGA established the Snowy Plover Protection Area extending from Stairwell 21 to Sloat Blvd. to provide further protective measures for the western snowy plover.

In December of 1994, GOGA implemented the snowy plover monitoring program for Ocean Beach then applied the same survey protocols to Crissy Field in 2006 (Merkle et al. 2011). The objective of the monitoring program is to determine abundance and distribution of overwintering snowy plovers while also implementing the management objectives of reducing human-caused disturbance to overwintering western snowy plovers. The annual monitoring period is from July 1 to May 15 and is designed to detect any potential nesting activity during the early breeding season and determine the phenology of snowy plover arrivals and departures from Ocean Beach and Crissy Field. The average number of plovers has shown fluctuation between 1994 and 2012. Current numbers at Ocean Beach are between 20 to 25 individuals (Figure SNPL-1) and a small population of one to nine snowy plovers has been consistently observed in the Crissy Field wildlife protection area (Figure SNPL-2) during the non-breeding season since 2005 (Merkle et al. 2011).

IV.L. MARBLED MURRELET Exemption 5

Species Description. The marbled murrelet (*Brachyramphus marmoratus*) is a small Pacific seabird in the family Alcidae. Male and female marbled murrelets have identical plumages, but breeding and wintering plumages are distinct.

Marbled murrelets have a unique life history strategy that differs from most seabirds and provides special challenges in managing the species. Although marbled murrelets feed primarily on fish and invertebrates in nearshore marine waters, they fly inland to

nest on large limbs of mature conifers. The marbled murrelet is the only alcid known to nest in trees.

Marbled murrelets feed in nearshore marine waters, mainly within 1 to 2 kilometers (0.61.2 miles) from shore. These nearshore waters include estuaries, bays, island groups, and more open coastal waters. Throughout its range, the marbled murrelet consumes a very diverse group of prey resources, which suggests great flexibility in prey choice and a high capability for using alternative prey, indicative of opportunistic foragers (Carter 1984). This flexibility may serve to reduce effects due to inter-annual variability in prey resources due to several different factors, such as El Niño. The distance between nesting areas and foraging areas is probably one critical determinant of reproductive success in years of low prey abundance. Increased foraging time of adults, long flights inland, and more numerous trips inland with small prey items could potentially reduce both adult and chick survival (Burkett 1995).

Throughout the forested portion of the species' range, marbled murrelets use forest stands with old-growth forest characteristics, generally within 80 kilometers *(50* miles) of the coast for nesting. Nest stands are typically composed of low elevation conifers, which include Douglas-fir *(Pseudotsuga menziesii),* western red cedar *(Thuja plicata),* Sitka spruce *(Picea sitchensis),* western hemlock *(Tsuga heterophylla),* and coastal redwood *(Sequoia sempervirens).* There are multiple canopy layers (2 to 3) and snags are present (Nelson *et at* 1994). Trees must have large branches or deformities for nest platforms, including debris platforms created by mistletoe infestations. California nest sites have been located in stands containing old-growth redwood and Douglas-fir.

Status and Distribution in the Activity Area. The marbled murrelet is federally listed as a threatened species and is listed as California endangered species. It is currently found from Bristol Bay, Alaska, south to the Aleutian Archipelago, northeast to Cook Inlet, Kodiak Island, Kenai Peninsula and Prince William Sound, south coastally throughout the Alexander Archipelago of Alaska, and through British Columbia, Washington, Oregon, to northern Monterey Bay in central California. Birds winter throughout this breeding range and also occur in small numbers off southern California. The estimated population size of the marbled murrelet in California has been estimated between 1980 through 1995 as ranging between approximately 1,650 and 2,000 breeding birds, and approximately 6,000 total birds (USFWS 1997).

Within GGNRA, A few unverified inland sightings of marbled murrelet have been reported since 1990. Systematic surveys have been conducted in Muir Woods National Monument from 1997 to 1999, including nearshore surveys and searches for eggshell fragments beneath suitable nests trees. No murrelets have been detected within the old growth redwood forest (Redwood National and State Parks letter dated June 18,

2003). Marbled murrelets are infrequently seen in nearshore waters from mid-summer through winter. GGNRA is also assisting the CDFG to identify other suitable areas to survey in Marin County. Detection of breeding murrelets in Marin would be extremely significant as there is a geographical gap between breeding populations in San Mateo and Santa Cruz counties to the south, and Mendocino County to the north. Ravens and jays are known to be major predators on marbled murrelets, therefore all corvid observations are being documented by NPS staff as part of the systematic surveys performed within potential habitat areas.

Exemption 5

The following text describes the potential effects of the Proposed Actions on federally listed species. This section breaks down the potential, unavoidable effects by species. The effects are further categorized based on the severity of effects: permanent impact, temporary impact, and temporary disturbance. Permanent impacts are generally those resulting from project activities that cause a permanent loss of habitat and/or removal of essential habitat components. Temporary impacts are generally those associated with the duration of construction activities and where affected habitats and/or essential habitat components are restored within a year to values equal to or exceeding pre-project conditions. Temporary disturbance involves those actions that may preclude a listed species' full use of the site for a short period of time, but not result in any direct injury or mortality to the species.

V.A. TYPES OF EFFECTS (CALIFORNIA RED-LEGGED FROG)

Effects to the California red-legged frog are considered adverse if they result in any one of the following:

- Direct individual effects including: harassment, injury, and mortality of any lifestage of the California red-legged frog;
- Indirect effects including impacts to California red-legged frog habitat, that may result in increased mortality or reduced reproductive success; and
- Activities that may destroy or adversely modify critical habitat including (USFWS 2010):
    1. Actions significantly altering water chemistry or temperature
    2. Actions significantly increasing sediment deposition within a stream channel or pond or disturb upland foraging and dispersal habitat
    3. Actions that would significantly alter channel/pond morphology or geometry
    4. Actions that eliminate upland foraging or aestivating habitat, as well as dispersal habitat
    5. Actions that result in the introduction, spread, or augmentation of nonnative aquatic species in stream segments or ponds used by the California red-legged frog

Activities located in breeding habitat, aquatic non-breeding habitat, and to a lesser extent adjacent upland areas within the project area may result in discrete short- and/or long-term disturbance and may have the potential to harm, harass, or kill individual California red-legged frogs. The highest likelihood for "take" would occur with activities in moist or wet areas (freshwater aquatic sites, freshwater wetlands, creeks, riparian

areas) within one mile of a red-legged frog breeding site.

Disturbance, injury, and/or mortality may result from crushing, trapping, or otherwise damaging frogs that may be located within suitable habitats in the project areas. Impact mechanisms include vegetation removal, excavation, grading, culvert construction or removal, use of vehicles or motorized equipment, crew movement, debris placement, maintenance activities, and direct handling of frogs during relocation activities. it is difficult to estimate the number of frogs that may be disturbed, injured or killed as a result of GGNRA operations because of their small size and cryptic nature. However, using our best professional judgment, we have included a table describing the likelihood of various direct individual effects by GGNRA operation (Table 4)

A summary of indirect effects to red-legged frogs is illustrated in Table 5. An example of a permanent impact would be the construction of a pedestrian bridge and footing over a creek within 1 mile of a red-legged frog breeding site that results in the permanent loss of non-breeding riparian and wetland habitat. An example of a temporary loss would include the clean-out of drainage ditches and culverts where there may be short-term displacement of red-legged frog individuals during construction, but attains pre-project values after the regrowth of vegetation (which generally occurs within a few months). A temporary disturbance may result from activities that alter the behavior of individual listed animals for a short period of time. An example of this temporary disturbance might an infrequent activity (e.g., stream survey or interpretative program) that flushes an adult or juvenile frog from a bank basking location into the water. No structural components of the habitat are damaged by the activity and it is anticipated that re-occupancy can occur shortly after the disturbance is removed.

Table 4: Annual likelihood of direct individual effects table for California red-legged frog including implementation of conservation measures.
(**N**o **E**ffect, **U**nlikely, **L**ow: 1-5, **M**edium: 6-15, **H**igh: >16)

Project Action	Life Stage	Harassment	Injury	Mortality
Education/Interpretation Programs	• Egg/Tadpole • Juv/Adult	L M	L L	U U
Research, Inventory and Monitoring (NPS and outside)	• Egg/Tadpole[1] • Juv/Adult	H M	M L	L L
General In-Water Restoration Activities	• Egg/Tadpole • Juv/Adult	U M	U M	U L
Terr. Habitat Restoration Activities	• Egg/Tadpole • Juv/Adult	U M	U L	U L
Special Park Uses	• Egg/Tadpole • Juv/Adult	NE L	NE L	NE U

Project Action	Life Stage	Harassment	Injury	Mortality
Utility Maintenance	• Egg/Tadpole • Juv/Adult	U L	U L	U U
Equestrian Operations (San Mateo)	• Egg/Tadpole • Juv/Adult	U L	U U	U U
Windfall/Hazard Tree Management	• Egg/Tadpole • Juv/Adult	NE NE	NE NE	NE NE
Infrastructure Protection	• Egg/Tadpole • Juv/Adult	U L	U L	U L
Trails Activities	• Egg/Tadpole • Juv/Adult	U L	U L	U L
Road Activities	• Egg/Tadpole • Juv/Adult	U L	U L	U L
Beach Management Activities	• Egg/Tadpole • Juv/Adult	NE NE	NE NE	NE NE
Integrated Pest Management	• Egg/Tadpole • Juv/Adult	U L	U L	U L
Hazardous Materials Remediation	• Egg/Tadpole • Juv/Adult	U L	U L	U L

[1] Current USFWS Sec 10 permit includes the use of fish traps during the spring that also captures red-legged frog tadpoles. There is some discussion as to whether such activity would remain under Sec 10 permit or be considered as an "incidental" capture and therefore part of this consultation.

Table 5: Habitat (indirect) impact assessment table for California red-legged frog (**N**o **E**ffect, **U**nlikely, **Y**es-May Effect).

Project Action	Permanent Impact	Temporary Impact	Comments
Education/Interpretation Programs	N	N	
Research, Inventory and Monitoring (NPS and outside)	N	N	
General In-Water Restoration Activities	U	Y	Short-term disturbance to cover from restoration construction
Terr. Habitat Restoration Activities	U	Y	Short-term disturbance to cover (weed removal)
Special Park Uses	U	U	
Utility Maintenance	U	Y	Temporary impacts associated with site preparation and access
Equestrian Operations (San Mateo)	U	Y	Possible fine sediment discharge from facilities
Windfall/Hazard Tree Management	U	Y	Short-term disturbance to cover (LWD removal)
Infrastructure Protection	Y	Y	Temporary impacts associated with

Project Action	Permanent Impact	Temporary Impact	Comments
			site preparation and access. Possible permanent impacts (e.g., draining of historic structures)
Trails Activities	Y	Y	Temporary impacts associated with site preparation and access. Permanent impacts assoc. with minor reroutes
Road Activities	U	Y	Temporary impacts associated with drainage maint and mowing of shoulders.
Beach Management Activities	N	N	No habitat
Integrated Pest Management	U	Y	Possible short-term impact to invert food base (midge/mosquito)
Hazardous Materials Remediation	U	Y	Temporary impacts associated with site preparation and access.

While GGNRA operations may effect individual frogs or designated critical habitat, the implementation of the general and species-specific conservation measures in this BA should reduce avoid or minimize frog impacts. Most of the effects are expected to be temporary in nature. Any unavoidable, temporary impacts would be offset by the continued implementation of restoration and enhancement actions currently undertaken by GGNRA for the species (See Section VIII.B. Minimization Measures for Unavoidable Impacts-California red-legged frog). Because temporary displacement activities are expected to be of limited occurrence and no habitat impacts would be created, no habitat restoration activities would be needed to offset losses. Any permanent habitat impacts would be offset at a 2:1 ratio.

V.A. TYPES OF EFFECTS—OTHER SPECIES Exemption 5

VI. INTERDEPENDENT AND INTERRELATED EFFECTS Exemption 5

VII. CUMULATIVE EFFECTS Exemption 5

VIII. Conservation Measures

VIII.A. General)

Implementation of the various routine GGNRA operations would be accomplished by GGNRA staff, non-profit partners such as the Golden Gate National Parks Conservancy, and contractors. All GGNRA division chiefs and program managers would be informed of the requirements of the BA and eventual BO as it affects their operations. In addition, all contracts that involve implementation of any of the actions described below would be required to include general and species specific conservation measures as described below:

1. **Process**
   a. The project would adhere to any additional measures required in the forthcoming Section 7 Biological Opinion, Section 404 permits, and NPDES II permits beyond those described in this document.
   b. To ensure that routine GGNRA operations are in conformance with NEPA, individual projects or annual division workplans will be subject to GGNRA Project Review. Through the Project Review process, an interdisciplinary team will evaluate whether the potential effects of an action, including appropriate mitigation measures, are adequately addressed and reflect NPS management policies (See Section III.C. of this document).
   c. Any solicitations for design and construction of routine GGNRA operations will include a copy of this biological opinion making the primary contractor responsible for implementing all requirements and obligations included within the biological opinion, and to educate and inform all other contractors involved in the project as to the requirements of the biological opinion.
   d. Park partners, permittees, lease holders, or others who have operational activities that potentially affect listed species and critical habitat described within this document would be provided a copy of this biological opinion and specific terms and conditions associated with their operations would be highlighted.

2. **Resource Sensitivity Training**
   a. Contractors, or any NPS staff managing or conducting operational actions as described herein, would be required to have a project orientation for all workers to increase their understanding and sensitivity to the challenges of working in a national park environment. A training session would be required for all contractor crews at the beginning of each action to be constructed or undertaken. At this training, construction workers and supervisors would be informed about the Endangered Species Act and listed species in the project area, sensitivity of park resources, and of National Park standard values, regulations, and appropriate housekeeping practices. Training sessions will

include identification of NPS staff resource contacts; special-status plants, wildlife, or other sensitive resources in the work area; markings for the limit line of disturbance; thresholds that would trigger a change in implementation techniques or require a halt in project implementation; prohibitions on feeding resident wildlife; and proper disposal of food waste and garbage to discourage feeding by and wildlife, including corvids (scavengers, such as ravens), which may increase predation on native wildlife. Upon completion of training, employees or contracting crews will sign a form stating that they attended the training and understand all the conservation and protection measures. Documentation of the training will be kept on file and available upon request. As needed, the training would be provided on the language of the contractor crews.

3. **Biological Monitor**
   a. NPS natural resource specialists will determine and document the appropriate level of biological monitoring for all stages of operational actions. In situations where there is a high likelihood of encountering a listed species or having inadvertent impacts to habitat for a listed species, a qualified biological monitor will be required to ensure that project actions conform to restrictions developed for species protection.

   b. The qualified biological monitor will have either a Sec10(a)(1)(A) permit for the listed species or experience in the identification and behavior of special-status plant and wildlife species that could be affected, habitat assessment experience, and knowledge of the terms and conditions of the Biological Opinion of this project. GOGA will submit the names and qualifications of the biological monitor(s) at least 30 calendar days prior to initiating operational actions. The biological monitor(s) will keep a copy of the Biological Opinion in their possession when onsite. The biological monitor would have authority to stop work if necessary to protect biological resources and is responsible for the implementation of all the Terms and Conditions in the biological opinion for this project. If the biologist has requested a stop work due to take of any of the listed species, the Service and the California Department of Fish and Game will be notified within (1) working day via email or telephone. The biological monitor will complete a daily log summarizing activities and environmental compliance.

   c. The Biological Monitor will be the contact source for any employee or contractor who might inadvertently kill or injure a federally listed species or who finds a dead, injured or entrapped individual. The biological monitor shall be identified during the crew training program.

4. **Avoidance Zones**
    a. Clearly mark project limits are required prior to the beginning of ground disturbing activities. No disturbance would occur beyond these limits. All protection measures would be clearly stated in the construction specifications and workers would be instructed to avoid conducting activities beyond the construction zone (including storage of equipment, materials, soil, etc.).
    b. The Biological Monitor will identify, flag, and map sensitive resource areas. Exclusion zones around sensitive resources (e.g. wetlands, T&E species, archeological sites etc.) will be identified on construction plans. Temporary protective fencing or other barriers will be installed around sensitive native plant communities and resources to facilitate sight recognition, and to aid in avoiding inadvertent disturbance by construction crews (including storage of equipment, materials, soil, etc.)
    c. Equipment and material staging areas would be located in existing disturbed areas within the construction limits. Staging areas would be indicated on the grading plans. Fueling and maintenance of equipment would not occur within 100 feet of sensitive resources (e.g., wetlands, riparian zones, mission blue butterfly habitat). No-fueling zones would be indicated on the grading plan and should be situated at least 30 m (100 ft) from sensitive resources.

5. **Compliance Report**
    a. Annually, the Biological Monitor will submit a post-activity compliance report to the USFWS and NOAA Fisheries that details, but is not limited to, the following information: proof of compliance with fulfilling project conservation measures for listed species, dates that project activities occurred, a list of avoidance and take reduction measures implemented and effectiveness of such measures; known project effects on listed species, if any, an assessment of the extent and severity of project impacts on all sensitive wildlife habitat; occurrences of incidental take of federally listed species, if any; and a list of all personnel involved with the project who received training.

6. **Erosion Control**
    a. Project actions will include Best Management Practice (BMPs) strategies to minimize impacts from erosion, timing grading activities to minimize erosion potential, avoiding scraping to bare mineral soil (layer below duff), or using erosion control techniques during or after grading activities. The BMPs include measures guiding the management and operation of construction sites to control and minimize the potential contribution of pollutants to storm runoff and prevent the inadvertent introduction of non-native invasive plant species into construction areas.

These measures address procedures for controlling erosion and sedimentation and managing all aspects of the construction process to ensure control of potential water pollution sources and restrictions on the use of non-native plant species for revegetation. Erosion and sedimentation control practices could include:

b. Limiting road and infrastructure construction to the dry-weather months, to the greatest extent practical.
c. Installing erosion and sedimentation control measures, such as weed free rice straw mulch, sediment traps, check dams, geofabrics, drainage swales, sand bag dikes and/or straw wattle wherever deemed appropriate to eliminate the potential for sediment discharge into storm water and into streams, lakes reservoirs or other waters from project construction materials.
d. Prohibiting the use of erosion control measures and mulches that contain non-native plant seeds. Only rice straw should be permitted to prevent inadvertent introduction of wheat and barley species.
e. Temporarily covering disturbed and/or stockpiled soils with rice straw, matting, netting, or plastic sheeting. Cover all open trench areas at the end of work day.
f. Stockpiling waste and excess excavated materials outside of drainages, and contained with appropriate silt control.
g. Unless no feasible alternative is available, no heavy equipment would be used in areas with soils that are undisturbed, saturated or subject to extensive compaction. Where staging of heavy equipment, vehicles or stockpiling is unavoidable, the limit of allowable disturbance will be clearly demarcated by staking, flagging or fencing. Following the end of work, surface soils will be scarified to retard runoff and promote revegetation.
h. Implementing erosion and sediment control measures where project actions could leave soils exposed to runoff prior to revegetation. Areas disturbed by equipment or vehicles will be rehabilitated as quickly as possible to prevent erosion, discourage the spread of nonnative plants and address soil compaction. Techniques, including decompacting and recontouring to natural topography, compacting to natural, soil stabilization, and removal and monitoring of nonnative plants, will be used for rehabilitation efforts.
i. After tree felling, leaving roots in place in areas with highly erosive soils or on steep slopes. Stumps can be ground down to the ground level.
j. Regular site inspections would be conducted during construction to ensure that erosion control measures remain in place and are maintained and function properly.

k. Subject matter experts will ensure that the erosion control plan for each action is sufficient to prevent long-term moderate or major impacts on the rate of soil erosion. Sites with identified high potential for soil erosion will be monitored. A post-project site stabilization plan will be developed and implemented.

7. **Pollution Prevention**
   a. Proper storage, use and disposal of chemicals, fuels, and other toxic materials would be required.
   b. Equipment would be required to be refueled or refilled only in upland areas and in conformance with the Avoidance Zones described above to prevent fuel spills near sensitive habitats. Equipment would be inspected for hydraulic and oil leaks regularly as well as prior to use in the GGNRA.
   c. All heavy equipment working in the GGNRA would be required to carry emergency spill containment materials. For example, pans should be placed under equipment that is stored onsite to reduce potential for leaking oil and other substances onto GGNRA lands. Absorbent materials should be on hand at all times to absorb any minor leaks and spills.
   d. An Emergency Response Plan will be prepared by the contractor(s), approved by NPS, and implemented during project implementation.
   e. The asphalt batch plant would not be permitted in the GGNRA.

8. **Dust Control**
   a. All active construction areas would be watered where soil is exposed to control dust frequency, depending on type of operation and wind exposure.
   b. A person or persons would be designated to oversee the implementation of a comprehensive dust control program and to increase watering, as necessary.
   c. All trucks hauling weed free soil, sand, and other loose materials will be covered, or all trucks will be required to maintain at least two feet of freeboard (i.e., the minimum required space between the top of the load and the top of the trailer) in accordance with Section 23114 of the California Vehicle Code during transit to and from the site.
   d. Inactive storage piles will be covered.

9. **Noise Control**
   a. To reduce daytime noise and potential disturbance to wildlife species due to construction, construction contractors should muffle or control noise from construction equipment through implementation of the following measures:
      i. Equipment and trucks used for construction should utilize the best available noise control techniques (e.g., improved mufflers,

equipment redesign, use of intake silencers, ducts, engine enclosures and acoustically-attenuating shields or shrouds, and installation of sound blanket around the project site, wherever feasible and necessary). Construction vehicles should be properly maintained and equipped with exhaust mufflers that meet state standards;

ii. Impact tools (e.g., jackhammers and pavement breakers) used for construction should be hydraulically or electrically powered wherever possible to avoid noise associated with compressed air exhaust from pneumatically powered tools. Where use of pneumatic tools is unavoidable, an exhaust muffler on the compressed air exhaust should be used; this muffler can lower noise levels from the exhaust by up to about 10 dBA. External jackets on the tools themselves should be used where feasible, and this could achieve a reduction of 5 dBA. Quieter procedures should be used such as drilling rather than impact equipment whenever feasible.

10. **Vegetation Management**

a. ***Invasive Plant Species and Pathogens***

i. It is anticipated that existing commercial sites in the SF Bay Area would provide all required aggregate and construction materials as well as materials disposal sites. In the event a Contractor proposed to use a non-commercial material source, staging or spoils area they would be required to submit proposed source locations and written documentation (under the laws noted) to ensure that potential effects on rare, threatened or endangered species (Endangered Species Act), waters of the United States (Clean Water Act), or prehistoric or historic resources (National Historic Preservation Act) have been evaluated as to presence and effects of the proposed activities. Prior to the approval of material sources from outside the GGNRA, the Biological Monitor would inspect proposed source sites for weed contamination, and would accept or decline sources based on this inspection. Aggregate would be supplied from solid rock or deep layers of quarry sites to avoid material potentially contaminated with weed seeds and to minimize the potential introduction of invasive non-native species.

ii. Appropriate excavated soil and aggregate materials from other projects within the GGNRA will be reused before allowing the importation of materials from outside the GGNRA. Soils and vegetation contaminated with weed seeds from within the

GGNRA would be segregated and disposed of or treated as appropriate.

iii. At the direction of the Biological Monitor, restrictions will be placed on the movement or deposition of fill, rock, or other materials containing weed seed or viable plant cuttings to areas relatively free of weeds.

iv. All construction equipment coming from outside the GGNRA would be required to be thoroughly cleaned, both inside and out, of soil and weed seeds prior to entering the GGNRA. Contractors would be required to make the equipment available for inspection prior to entry into the GGNRA. Contractors or GGNRA staff would also be required to clean equipment during construction activities whenever moving equipment from areas known to support invasive weeds to other areas within the GGNRA, and before leaving the site. Contractors or GGNRA staff will allow inspection of equipment by GGNRA natural resource specialists prior to beginning construction in other areas.

v. Soil disturbance during grading activities will be minimized to the greatest extent possible to reduce potential for introduction or spread of invasive non-native plant species, to protect topsoil resources and to reduce available habitat for new non-native plant species. Where surface soils supporting native vegetation will be disturbed as a result of the Proposed Action, the topsoil layer will be excavated and stockpiled separately from other fill and replaced as topsoil at the end of the action.

vi. All herbicide use will be administered through the GGNRA's Integrated Pest Management (IPM) coordinator, and only licensed personnel will be allowed to apply pesticides, under the oversight of NPS staff or the biological monitor. All herbicide use for project actions will be reported monthly to the IPM coordinator. No herbicide foliar spraying or direct stump applications will be allowed in riparian or wetland habitats supporting special status species except in the dry season. Foliar herbicide applications beyond the riparian corridor are not approved where saturated soils are present, at wind speeds over 10 miles per hour, or when weather conditions facilitate herbicide movement toward drainages.

vii. Based on the density of the invasive non-native plant population present, invasive species surveys will be conducted along the road shoulders of the routes that will provide project access. Areas subject to project activities would be monitored periodically for the presence of invasive non-native plant species; if such species

become established or spread as a result of such activities, the non-native, non-historic plants will be removed.

viii. In remote, steep areas, biomass generated from the removal of invasive non-native trees may be staged on site. Material would be bucked and/or macerated into small sections and then strategically placed under mature coastal scrub, within erosion gullies or other areas deemed appropriate by NPS natural resources staff to reduce potential impacts associated with hauling off-site.

b. ***Revegetation/Restoration***

i. A revegetation strategy will be developed for each project action where natural recruitment of native plant species is not anticipated. Elements that likely would be included in the plan(s) are:

- If determined appropriate by natural resources specialist, conduct salvaging of top 6 to 12 inches of topsoil (to retain seeds, soil micorrhiza, and fungi) from all excavation and disturbance areas of a project action where invasive plant propagules are limited and native plant species respond well to salvaging. Reapply salvaged topsoil over all areas of the proposed action to be revegetated.
- For smaller site, passive revegetation may be accomplished by seeding from adjacent native seed sources. For larger sites, active revegetation may be accomplished by direct seeding or active revegetation. Seeds would be collected from the site or adjacent similar habitats. Revegetation will focus on establishing appropriate assemblages of native plants species known to occur in mission blue butterfly habitat (when within the flight corridor).
- No introduction of incompatible fill materials will occur. Only fill material that is compatible with future restoration/rehabilitation should be approved in coordination with a natural resource specialist or geologist.
- Scarifying (ripping) soils may be conducted to decrease compaction where restoration treatments are prescribed.
- Rounding tops of cuts and bottoms of fills, and sculpting restoration areas will be conducted to blend with surrounding terrain.

- Placement of soil aggregate mix on all road shoulders where re-establishing vegetated shoulders is desired.
- Developing a native seed mix for vegetated road shoulders. Grassy road shoulders have been identified a major character defining features for the historic roads, therefore maintaining a grass cover is critical for erosion control.
- Applying weed free mulch materials (rice straw, hydromulch, blankets etc.).
- For narrow off-road bench sites, with a high likelihood of seeding from adjacent native seed sources, active planting may not be used.
- For larger off-road bench sites, without a high likelihood of natural seeding from adjacent native seed sources, active planting with on-site collected and propagated plants would be required. For larger off-road bench areas where seeding is desired, seeds would be collected from the site or adjacent similar habitats, and a seed increase program such as the Natural Resource Conservation Service (NRCS) Plant Materials Center would be employed to generate the required quantities of seed.
- Revegetation of native plant areas affected by construction would occur immediately following construction to reduce the potential of colonization by non-native species. If the Biological Monitor or a natural resource specialist determines that interim erosion control and site stabilization measures are beneficial, this measure should be implemented prior to revegetation.
- Funding and performance standards regarding follow-up care of plantings for one year following out planting, and weed control for three years would be funded as a part of projects.

VIII.B. Specific Conservation Measures (California red-legged frog)

11. To prevent inadvertent entrapment of California red-legged frog during construction, steep-walled holes or trenches more than 2 feet deep will be covered at the close of each working day by plywood or similar materials. Alternatively, an additional 4-foot high vertical barrier will be used to further prevent the entrapment of the red-legged frog. If neither of these are feasible, one or more escape ramps will be installed. Before such holes or trenches are filled, they will be thoroughly inspected for trapped animals. If at any time a

trapped listed animal is discovered, escape ramps would be placed to allow the animal to escape. If the listed animal is still present, the qualified biological monitor will be authorized to capture and move it to suitable habitat outside the construction zone.

12. Any on-site materials left overnight will be inspected prior to use unless those materials have been outfitted with barriers previously reviewed by the biological monitor or NPS resource specialist. These onsite materials include, but are not limited to, pipes, culverts, or boards. California red-legged frogs may become trapped or injured if such materials are moved.
13. Project activities within the vicinity of aquatic breeding habitat will occur outside breeding and movement periods (e.g., May through November).
14. Because dusk and dawn are often the times when red-legged frogs are most actively foraging and dispersing, all construction activities shall cease one half hour before sunset and should not begin prior to one half hour after sunrise.
15. Prior to construction activities in California red-legged frog aquatic breeding habitat, aquatic non-breeding habitat and targeted upland habitat, a Biological Monitor will search all work localities for presence of red-legged frogs. Surveys in targeted upland habitats would focus on any springs, seeps or features with moist ground conditions and easily movable cover structures. The search area will encompass a 15-m (or 50-foot) buffer around the construction sites.
16. Vegetation that will be disturbed within the project area at aquatic breeding habitat, aquatic non-breeding habitat and targeted upland habitat will be removed during these surveys to aid in observations of the species and to prevent occupation during construction. To reduce direct injury to California red-legged frogs and to increase the likelihood of that frogs would leave the construction site, vegetation would be cut and removed to a height that allows for visual inspection of the ground.Should any frogs be observed, activities will cease until the animal is removed and relocated by a qualified Biological Monitor or permitted biologist. Captured frogs shall be relocated to suitable habitat outside of the construction zone, either upstream or downstream of the construction zone.
17. For mowing activities without visual surveys associated with road and trail shoulder maintenance within 1 mile of a red-legged frog breeding site, the minimum height of cut vegetation would be 0.3 m (approx 1 feet).
18. Nets or bare hands may be used to capture red-legged frogs. Service-approved biologists will not use soaps, oils, creams, lotions, repellents, or solvents of any sort on their hands within two hours before and during periods when they are capturing and relocating red-legged frogs. Any captured red-legged frog will be relocated shortly after capture. While in captivity, individuals of these species shall be kept in a cool, moist, aerated environment, such as a bucket containing a damp sponge. Containers used for holding or transporting adults of these species shall not contain any standing water.
19. To avoid transferring disease or pathogens between aquatic habitats, any field

equipment used between watershed areas will require sterilization per practices identified in the Declining Amphibian Populations Task Force's "Code of Practice."

20. Solid barrier fencing (3 ft or higher) will be installed for any ground disturbing activities that are within 50 m of breeding habitat to exclude red-legged frog individuals from the work area and to protect existing wetland habitat; if individuals are located within the fenced work area, a Biological Monitor or permitted biologist will collect and relocate any individuals to nearby suitable habitat. All fenced areas would be inspected daily to determine whether animals may be entrapped and require movement.
21. Any erosion control materials used shall not entrap animals. Tightly woven fiber netting or non-binded materials (e.g., rice straw) shall be used for erosion control or other purposes. This limitation will be communicated to the contractor through use of Special Provisions included in the bid solicitation package. No plastic mono-filament matting shall be used for erosion control.
22. Ground or vegetation disturbing activities at the breeding sites will only occur in the non-breeding season (except as required for emergency situations such as clogged culverts causing flooding).

VIII.B. Specific Conservation Measures (Other species)- Exemption 5

VIII.C. Minimization Measures for Unavoidable Impacts

In general, permanent impacts would be minimized through incorporation of general and species' specific conservation measures. In addition, any permanent impacts would be offset by implementation of compensatory habitat restoration at a 2:1 area ratio. Any temporary impacts would also be minimized through implementation of conservation measures. The mission of the NPS (and hence GGNRA) is to preserve unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The GGNRA has initiated several habitat enhancement activities and restoration activities that are not associated with any previous mitigation requirements that would benefit our listed species. V Exemption 5

Exemption 5

In addition, habitat restoration to offset impacts to mission blue butterfly habitat from GGNRA operations have Exemption 5

Exemption 5 These include road and trails operations in the Marin Headlands/Fort Baker (1-1-06-F-0163, 1-1-91-F-25R, Figure 14) and Notch Trail maintenance in San Mateo County (USFWS consultation 1-1-95-F-31).

VIII.C.1. Unavoidable, permanent loss of habitat (California red-legged frog)

Any long-term permanent impacts to red-legged frog habitat would be offset through the creation of similar habitat at a 2:1 ratio. For instance, the creation of a new footbridge and abutments (0.25 acres) along a creek within a mile of red-legged frog breeding habitat would result in the creation of 0.5 a of aquatic non-breeding habitat.

VIII.C.2. Unavoidable, temporary loss of habitat (California red-legged frog)

The most recent actions include the control of non-native bullfrogs in Tennessee Valley through the removal of a breeding pond in Marin County (Fong 2006), enhancement of a red-legged frog breeding pond at Milagra Ridge (Fong and O'Neill 2000), and creation of red-legged frog breeding and non breeding habitat at Mori Point (San Mateo) and lower Redwood Creek (Marin Co). A table summarizing these activities is below (Table 6). A total of 18.8 acres of non-breeding habitat has either been or planned for enhancement (e.g., removal of non-native vegetation) or restoration (e.g., removal of compacted trails and restoration to native habitat). In addition, creation of new breeding habitat (0.55 a) has occurred at two sites (Mori Point and Redwood Creek/Big Lagoon). Over 100 red-legged frog egg masses have occurred during the last two breeding seasons at Mori Point (See Figure CRLF-8). Although breeding has not yet occurred at Redwood Creek/Big Lagoon, recent monitoring has documented the colonization of the new breeding ponds by juvenile red-legged frogs with breeding to hopefully occur in subsequent years.

Table 6: Summary of breeding and non-breeding habitat restored for California red-legged frog in GGNRA

Project	**USFWS Consultation**	**County**	**Non-breeding aquatic habitat (acres)**	**Upland habitat (including wetlands) (acres)**	**Breeding habitat area (acres)**
Haypress Pond Removal and Creek Restoration	1-1-02-F-0219	Marin	0.9 (creek/riparian)		
Milagra Ridge Pond Management	1-1-00-I-3115	San Mateo	0.4 (aquatic)		0.4
Mori Point Restoration and Trail Plan;	1-1-06-F-1575, 1-1-05-F-0063	San Mateo		16.4	0.3

Enhancement of SF gartersnake foraging habitat					
Wetland and creek restoration at Big Lagoon	81420-2008-0860	Marin	1.1 (aquatic)		0.25
TOTALS			**2.4**	**16.4**	**0.95**

VIII.C.1. Unavoidable, permanent loss of habitat (OTHER SPECIES)[TO COMPLETE]
VIII.C.2. Unavoidable, temporary loss of habitat (OTHER SPECIES)[TO COMPLETE]

VIII.D. Reporting

GGNRA will submit annually to the USFWS a program summary of GGNRA operational activities associated with this consultation. Reports would be due on December 31 of each year and cover the prior federal Fiscal Year (or hydrologic year!). The summary will be separate from the project specific compliance summaries as described in Section VIII.A.5. It will include GGNRA's evaluation of various program activities (e.g., roads and trails) through our NEPA process and a determination of the projects that were eligible under this consultation. Program documentation could include copies of the T&E Evaluation Matrix as illustrated in Attachment 4. The program summary would also provide an annual update of habitat restoration activities by species. Any compensatory habitat created to offset permanent impacts would be described, including the type and acreage of habitat injured and created. Following the submittal of the first year's annual report, GGNRA natural resource specialists, GGNRA planning/compliance staff, and representatives from the USFWS Sacramento Field Office would review whether the reporting process is fulfilling the needs of both agencies.

IX. DETERMINATION OF EFFECT (BY SPECIES)[TO COMPLETE]

A. NO EFFECT:
B. IS NOT LIKELY TO ADVERSELY EFFECT—BENEFICIAL EFFECT:
C. IS NOT LIKELY TO ADVERSELY EFFECT-INSIGNIFICANT EFFECT:
D. IS LIKELY TO ADVERSELY EFFECT:

X. LITERATURE CITED:

Becker, G.S. and I.J. Reining. October 2008. Steelehead/rainbow trout (Oncorhynchus mykiss) resources south of the Golden Gate, California. Prepared for California State Coastal Conservancy and the Resources Legacy Fund Foundation. 425 pp.

Bishop, M. 2011. Diet, Foraging Activity, and Food Webs of the California Red-legged Frog. MS Thesis. San Francisco State University. 34 pp.

Castellini, L., D. Fong, D. Schirokauer, S. Miller, and A. Parravano. 2006. Wetlands inventory for Golden Gate National Recreation Area 2002-2004 including Rodeo Valley, lower Redwood Creek watershed, Mori Point, and Bolinas Lagoon sites. Unpublished report prepared for the San Francisco Bay Area Network, Inventory and Monitoring Program, National Park Service. 34 pp + appendices

Ely, E. May 22, 1993a. Report and findings California red-legged frog survey-Biological survey for the special status Rana aurora draytonii along a specified reach of Lobos Creek. Unpublished report prepared for the Bureau of Engineering, Department of Public Works, City and County of San Francisco. 3 pp.

Ely, E. October 1993b. Sensitive species herpetological survey-Golden Gate National Recreation Area. Unpublished report prepared for the Golden Gate National Park Association. N.p.

Erler & Kalinowski Inc. October 2002 (revised May 2006). Development of Presidio-wide cleanup levels for soil, sediment, groundwater, and surface water. Presidio of san Francisco, California. Unpublished document prepared for the Presidio Trust. Np.

Fellers, G. and G. Guscio. February 2004. California red-legged frog surveys of lower Redwood Creek, Golden Gate National Recreation Area. U.S. geological survey-Western Ecological Research Center. Unpublished report prepared for the National Park Service. 70 pp.

Fellers, G.M. and P.M. Kleeman. 2007. California red-legged frog (*Rana draytonii*) movement and habitat use: Implications for conservation. Journal of Herpetology 41:276-286.

Fellers, G.M., P.M. Kleeman, and S. Traiger. 2012. California red-legged frog (Rana draytonii) movement and habitat use at Mori Point, California. Unpublished report. 15 pp.

Fong, D. April 2000. Winter 1998-2000 frog breeding survey, Golden Gate National Recreation Area. Unpublished report prepared for National Park Service, Golden Gate National Recreation Area and U.S. Fish and Wildlife Service, Portland Regional Office. 33 pp.

Fong, D., S. O'Neill, P. Warner, and B. Peterson. August 2000. Milagra Ridge Oxidation pond management plan, Golden Gate National Recreation Area, San Mateo County. Unpublished document prepared for the Golden Gate National Recreation Area. 19 pp.

Fong, D. March 2004. Calendar Year 2001-2003 aquatic species activities within the Golden Gate National Recreation Area. Unpublished report prepared for National Park Service, Golden Gate National Recreation Area and U.S. Fish and Wildlife Service, Sacramento Office. 11 pp.

Fong, D. and J. Campo. April 2006. Calendar Year 2003-2005 California red-legged frog (*Rana draytonii*) surveys, Golden Gate National Recreation Area. Unpublished report prepared for National Park Service, Golden Gate National Recreation Area and U.S. Fish and Wildlife Service, Portland Regional Office. 35 pp.

Fong, D., C. Crooker, S. Bennett, R. LoBianco, J. Campo, and M. Reichmuth. March 2010. Calendar Year 2006-2009 California red-legged frog (*Rana draytonii*) surveys, Golden Gate National Recreation Area. Unpublished report prepared for National Park Service, Golden Gate National Recreation Area and U.S. Fish and Wildlife Service, Portland Regional Office. 49 pp.

Golden Gate National Recreation Area. January 10, 2012. 2012 Superintendent's compendium of designations, closures, permit requirements and other restrictions imposed under discretionary authority.

Hatch, D. May 1998. Golden Gate National Recreation Area snowy plover management plan, Ocean Beach, San Francisco. Administrative Draft. 82 pp.

Hayes, M.P., and M.R. Jennings. 1988. Habitat correlates of distribution of the California red-legged frog (*Rana aurora draytonii*) and the foothill yellow-legged frog (*Rana boylii*): implications for management. Pages 144-158 *in* R. Sarzo, K. E. Severson, and D. R. Patton (technical coordinators). Proceedings of the symposium on the management of amphibians, reptiles, and small mammals in North America. United States Department of Agriculture, Forest Service, Rocky Mountain Range and Experiment Station, Fort Collins, Colorado. General Technical Report (RM-166): 1-458.

Hayes, M.P. and M.M. Miyamoto. 1984. Biochemical, behavioral and body size

differences between *Rana aurora aurora* and *R. a. draytonii*. Copeia 1984(4):1018-1022.

Holladay Engineering Company. Oct 2012. Muir Woods sewer system management plan. 100% Draft Submittal. Unpublished report prepared for the Golden Gate National Recreation Area.

Koo, M.S., J.V. Vindum, and D.G. Mulcahy. May 9, 2007. Herpetological baseline survey of the Presidio of San Francisco. California Academy of Sciences, San Francisco, CA. Unpublished report prepared for the Presidio Trust. 55 pp.

Merkle, B., D. Press, R. Townsend, D. Adams, and M. Koenen. 2011. Snowy plover monitoring protocol for Golden Gate National Recreational Area: Version 2.3. Natural Resources Report NPS/SFAN/NRR-2011/XXX. National Park Service, Fort Collins, Colorado.

National Park Service (NPS), August 2011. Golden Gate National Recreation Area – Muir Woods National Monument draft general management plan/environmental impact statement. Vol. 1. 345 pp.

Storer, T.I. 1925. A synopsis of the amphibia of California. University of California Publications in Zoology 27:1-1-342.

Swaim Biological Inc., 2009. San Francisco garter snake habitat improvement project at Mori Point, Pacifica, California, 2004-2008. Unpublished report prepared for U.S. Fish and Wildlife Service, Req. No 8142080146.

URS Corporation. September 24, 2009. Results of the 2009 sensitive habitat mapping for the Golden Gate National Recreation Area (GGNRA) newly acquired and expansion lands in San mateo County, CA. Unpublished document prepared for Sharon Farrell, Golden Gate National Parks Conservancy. 20 pp.

U. S. Fish and Wildlife Service. 1976. Determination that six species of butterflies are endangered species. **Federal Register** 41:22041-22044.

_____ 1984. Recovery plan for the San Bruno elfin and mission blue butterflies. Portland, Oregon. 81 pages.

_____ 1994. Endangered and threatened wildlife and plants; determination of endangered status for the tidewater goby; final rule. **Federal Register** 59:5494-5499.

_____ 1996. Endangered and threatened wildlife and plants; determination of

threatened status for the California Red-Legged Frog. **Federal Register** 61:25813-25833.

_____ 2002. Recovery Plan for the red-legged frog (*Rana aurora draytonii*). Portland, Oregon. 258 pp.

_____ 2004. Recovery plan for five plants from Monterey County, California. U.S. Fish and Wildlife Service, Portland, Oregon. xii + 159 pp.

_____ 2005a. Recovery Plan for the Tidewater Goby (*Eucyclogobius newberryi*). U.S. Fish and Wildlife Service, Portland,Oregon. vi + 199 pp.

_____. August 2005b. Revised guidance on site assessments and field surveys for the California red-legged frog. 26 pp.

_____. 2007. Recovery plan for the Pacific Coast population of the western snowy plover (*Charadrius alexandrinus nivosus*). In two volumes. Sacramento, CA.

_____. 2010. Endangered and Threatened Wildlife and Plants: Revised Designation of Critical Habitat for California Red-Legged Frog; Final Rule. Federal Register 75:12815-12959.

_____ .2010. San Bruno elfin Butterfly (Callophrys mossii bayensis) and Mission Blue Buttefly (Icaracia icarioides missionensis) 5-Year Review: Summary and Evaluation. Sacramento, California. U.S. Fish and Wildlife Service, Sacramento, California. 39 pp.

Wood, L.L. July 15, 2004. Final report: GGNRA Tennessee Valley seep and stream amphibian surveys and Big Lagoon amphibian surveys. Unpublished report prepared for Golden Gate National Recreation Area. 15 pp.

_____. June 23, 2005a. 2004-2005 California red-legged frog (*Rana aurora draytonii*) studies. Habitat assessment report: Rodeo Creek tributaries and Tennessee Valley Creek and winter breeding surveys: Rodeo drainage. Unpublished report prepared for Golden Gate National Recreation Area. 46 pp.

_____. August 31, 2005b. 2004-2005 California red-legged frog (*Rana aurora draytonii*) studies. Breeding and non-breeding season surveys: Rodeo and Tennessee drainages and radiotelemetry study. Unpublished report prepared for Golden Gate National Recreation Area. np.

_____. June 30, 2006a. 2006 California red-legged frog (*Rana draytonii*) studies. Breeding and non-breeding season surveys: Big Lagoon and vicinity. Unpublished report prepared for Golden Gate National Recreation Area. np.

_____. June 30, 2006b. 2006 California red-legged frog (*Rana draytonii*) studies. Breeding and non-breeding season surveys: Backdoor Pond. Unpublished report prepared for Golden Gate National Recreation Area. np.

_____. June 27, 2007a. 2007 California red-legged frog (*Rana draytonii*) studies. Breeding and non-breeding season surveys: Rodeo Lake and Rodeo Lagoon. Unpublished report prepared for Golden Gate National Recreation Area. 14 pp.

_____. August 7, 2007b. 2007 California red-legged frog (*Rana draytonii*) studies. Breeding season surveys: Big Lagoon. Unpublished report prepared for Golden Gate National Recreation Area. 17 pp.

_____. May 7, 2008a. 2008 California red-legged frog (*Rana draytonii*) studies. Breeding season surveys: Milagra Ridge, Mori Point, GGNRA. Unpublished report prepared for Golden Gate National Recreation Area. 17 pp.

_____. June 16, 2008b. 2007 California red-legged frog (*Rana draytonii*) studies. Breeding season surveys: Big Lagoon environs, GGNRA. Unpublished report prepared for Golden Gate National Recreation Area. 23 pp.

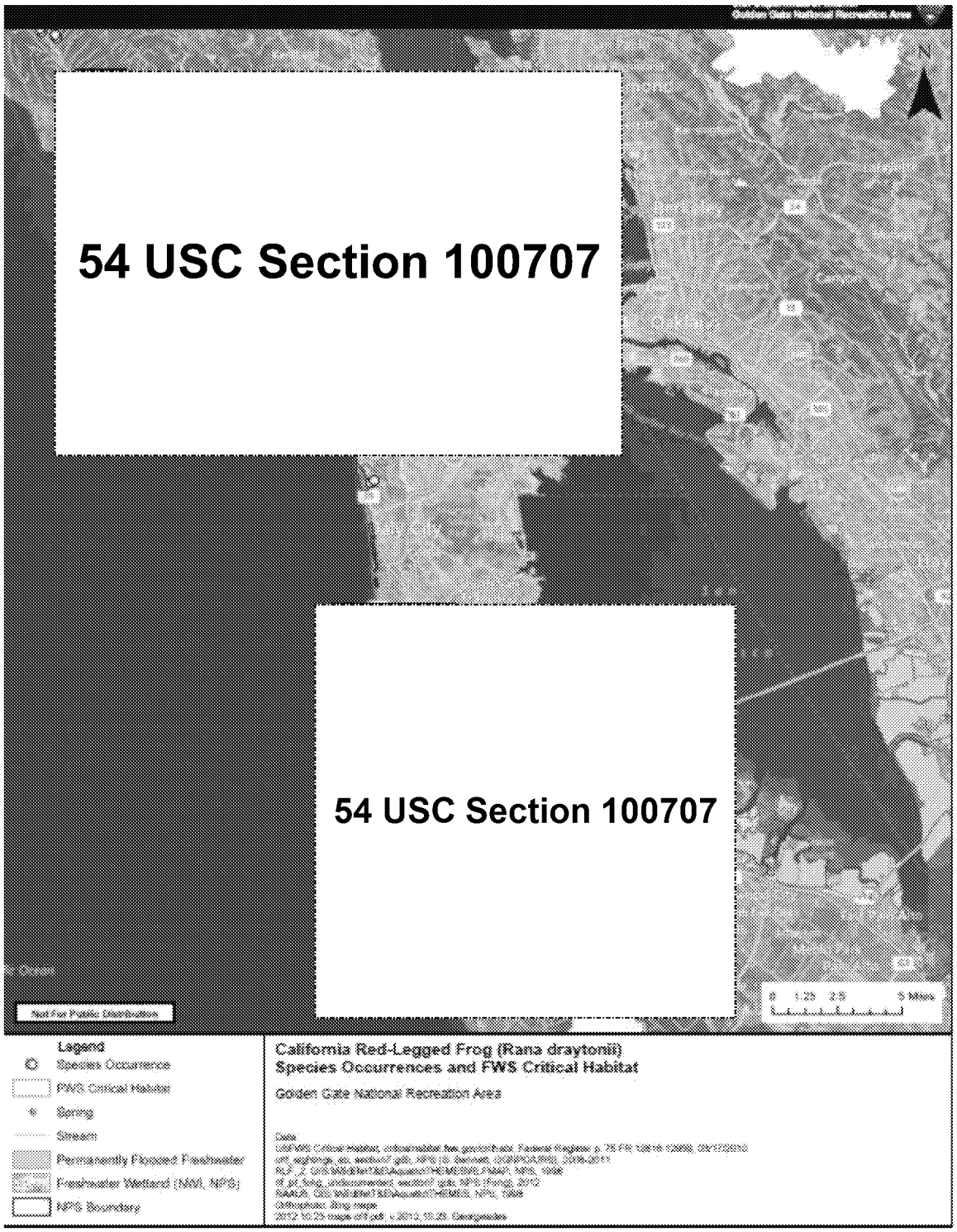

Figure 1: Designated critical habitat for California red-legged frog within the Golden Gate National Recreation Area.

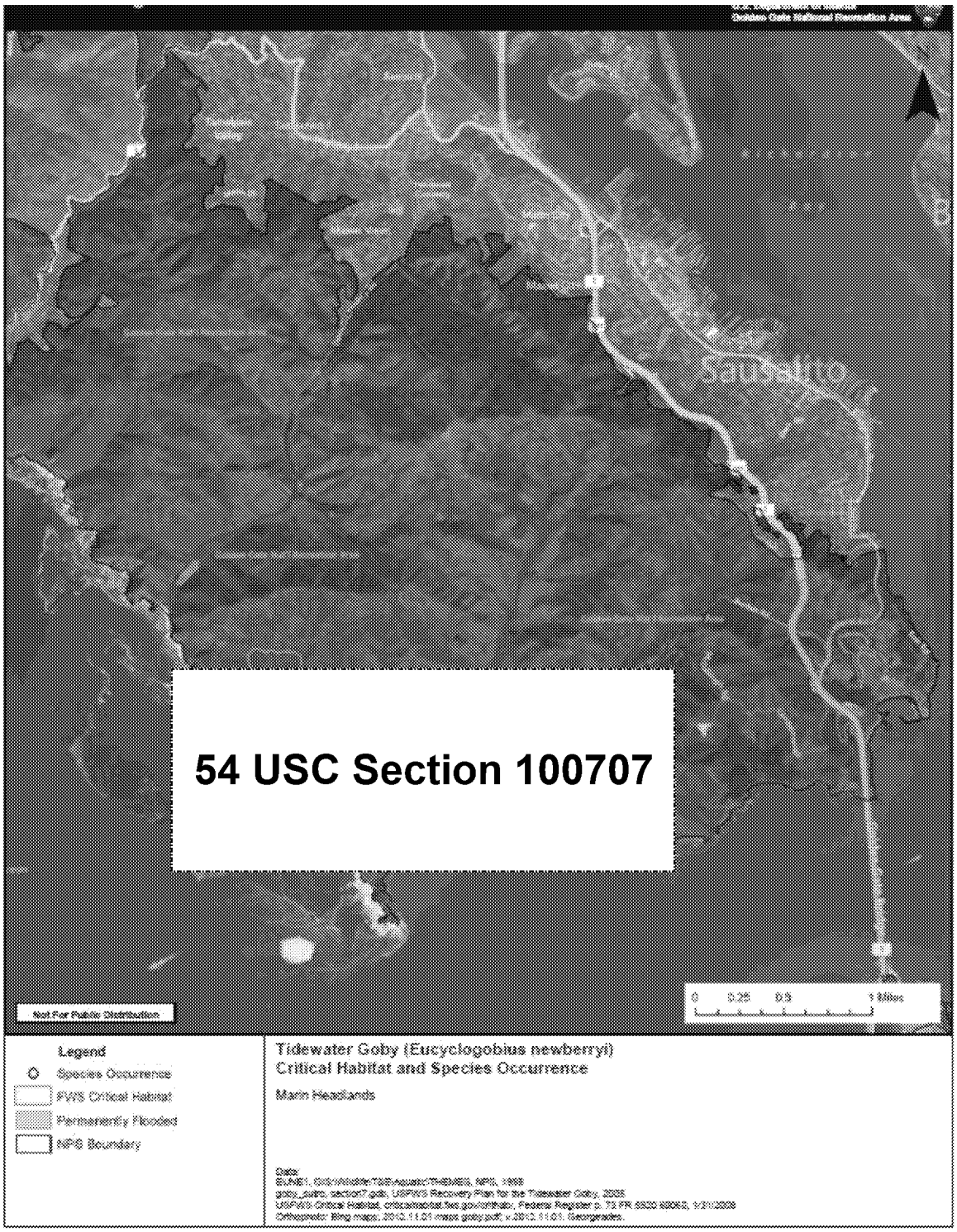

Figure 2: Designated critical habitat for tidewater goby within the Golden Gate National Recreation Area.

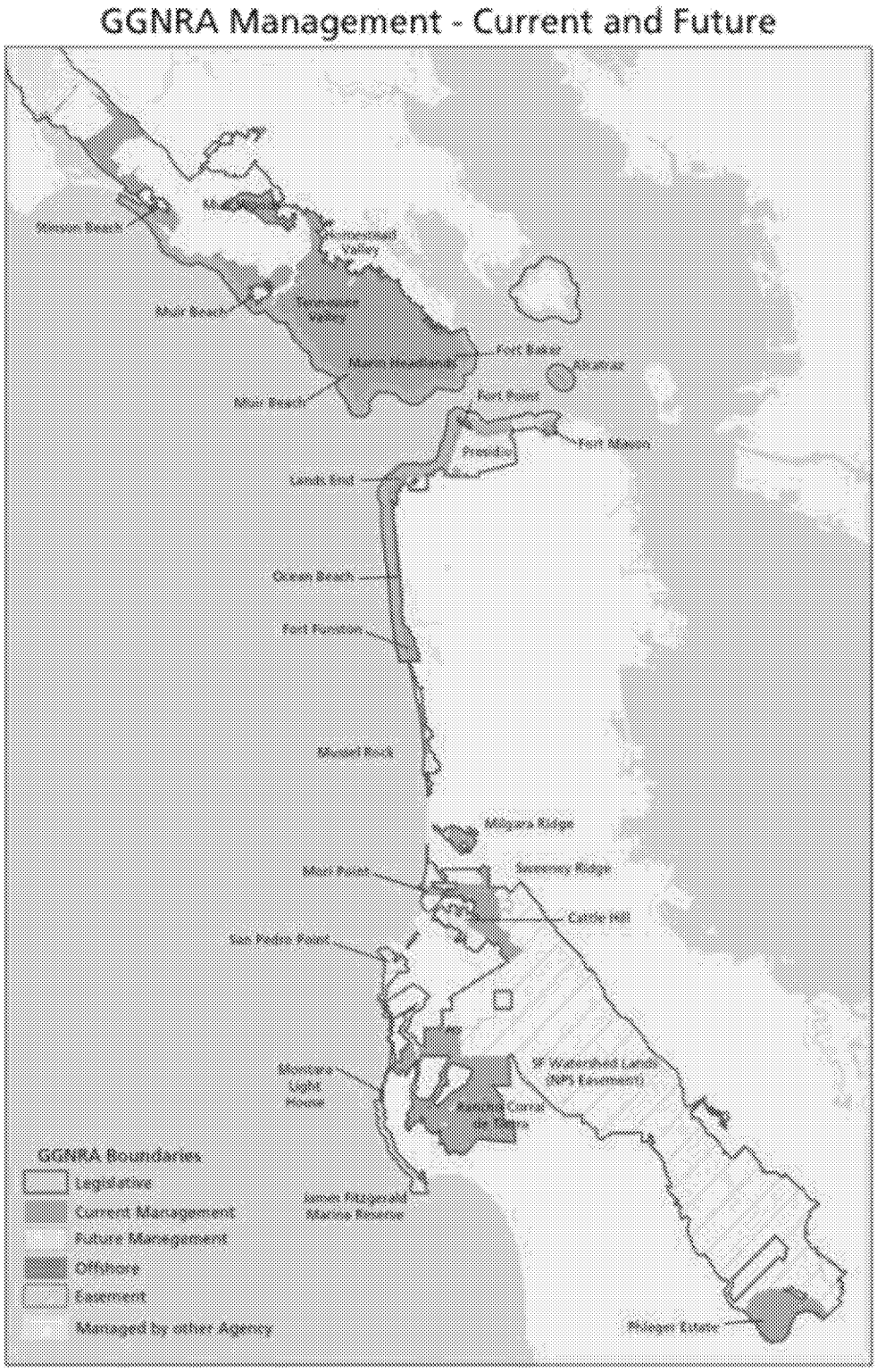

Figure 5a: Boundary and management area map for the Golden Gate National Recreation Area

Figure 5b: Boundary and management area map for areas of the Presidio (San Franicsco County) managed by the Golden Gate National Recreation Area (Area 'A')

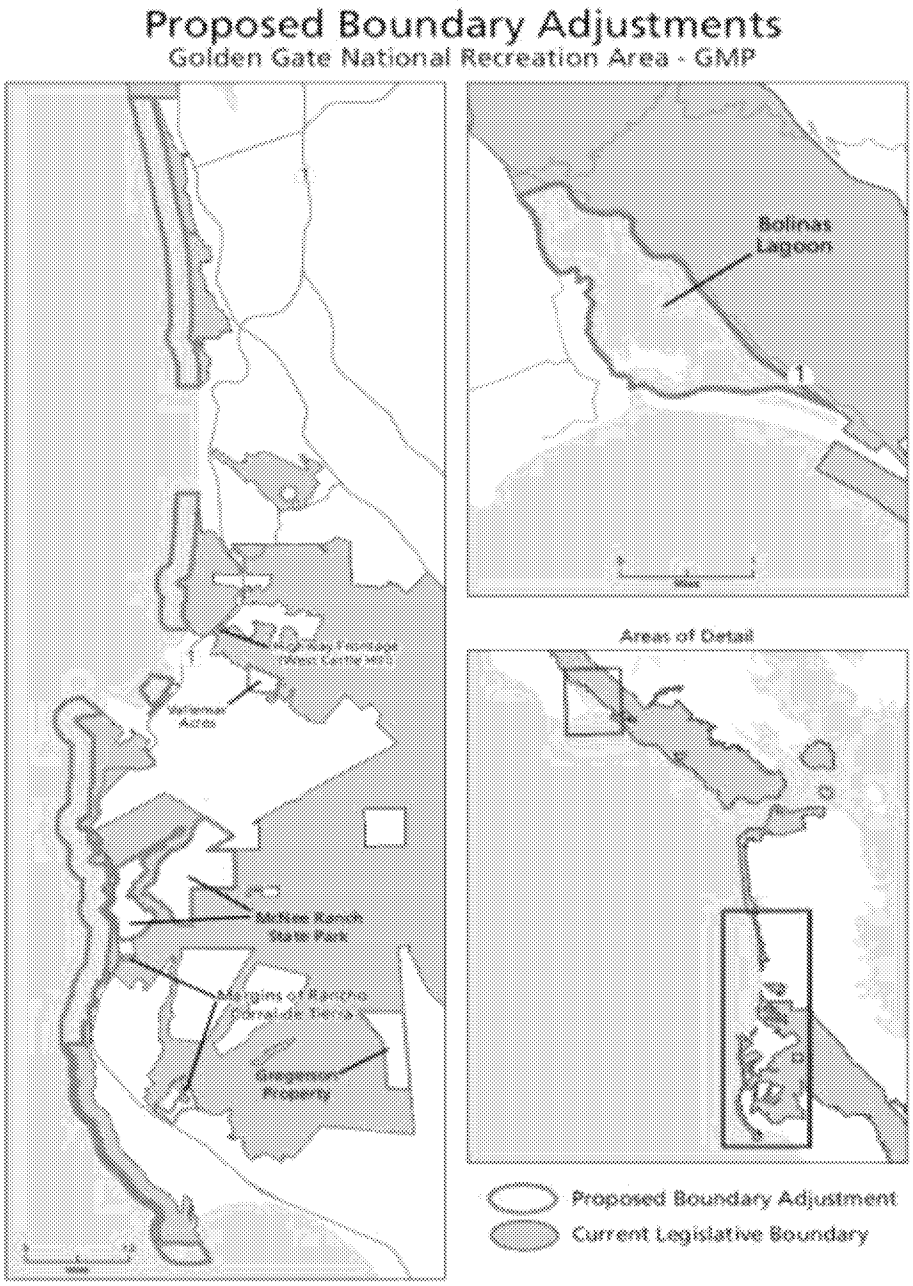

Figure 6: Proposed boundary adjustments and possible management areas for the Golden Gate National Recreation Area

Figure 7: Proposed protection and restoration of 127-acres of Mission blue butterfly habitat through non-native plant control activities near Sausalito, Marin County, Golden Gate National Recreation Area

Figure 8: Typical elevated trail causeway with rock to facilitate drainage

Figure 9: Typical wooden staircase (box steps)

Figure 10: Typical wooden bridge and footings used to span greater than 5 foot distances.

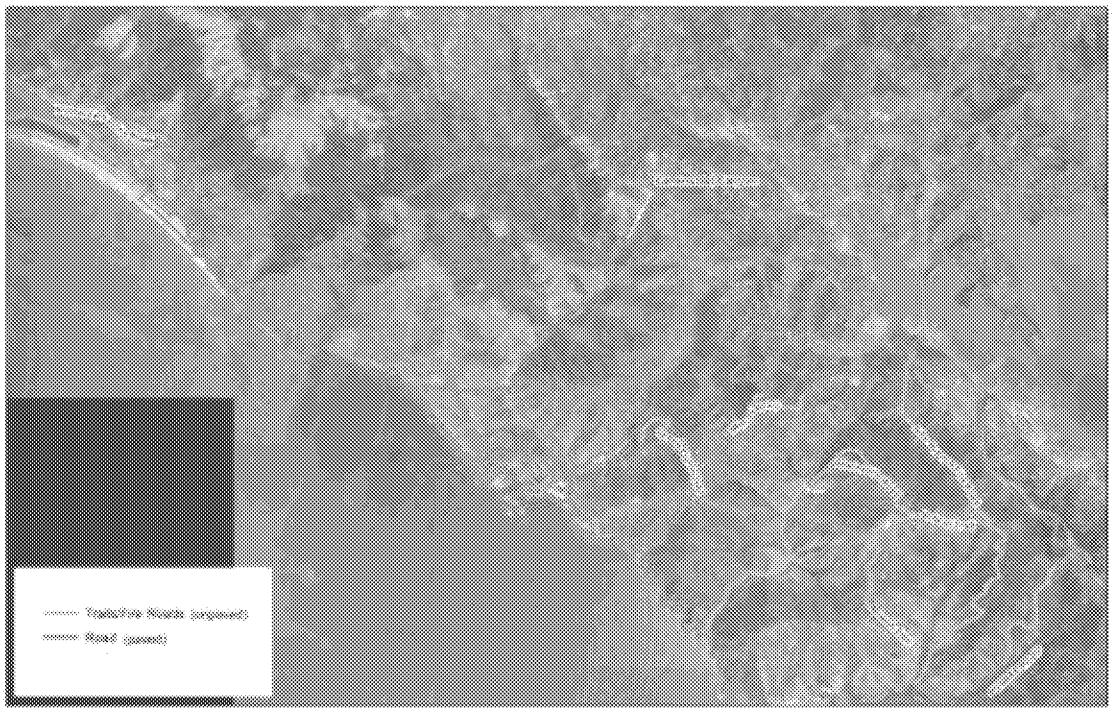

Figure 11a: Unpaved and paved roads within Muir Beach and Stinson Beach areas of the Golden Gate National Recreation Area.

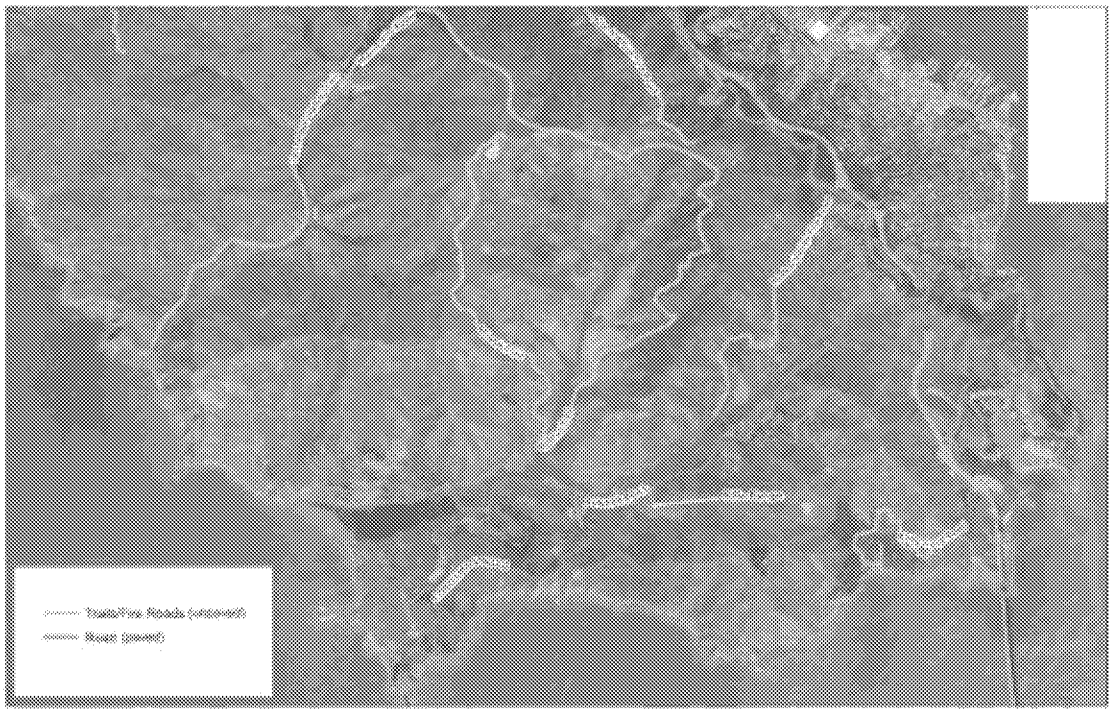

Figure 11b: Unpaved and paved roads within Marin Headlands of the Golden Gate National Recreation Area.

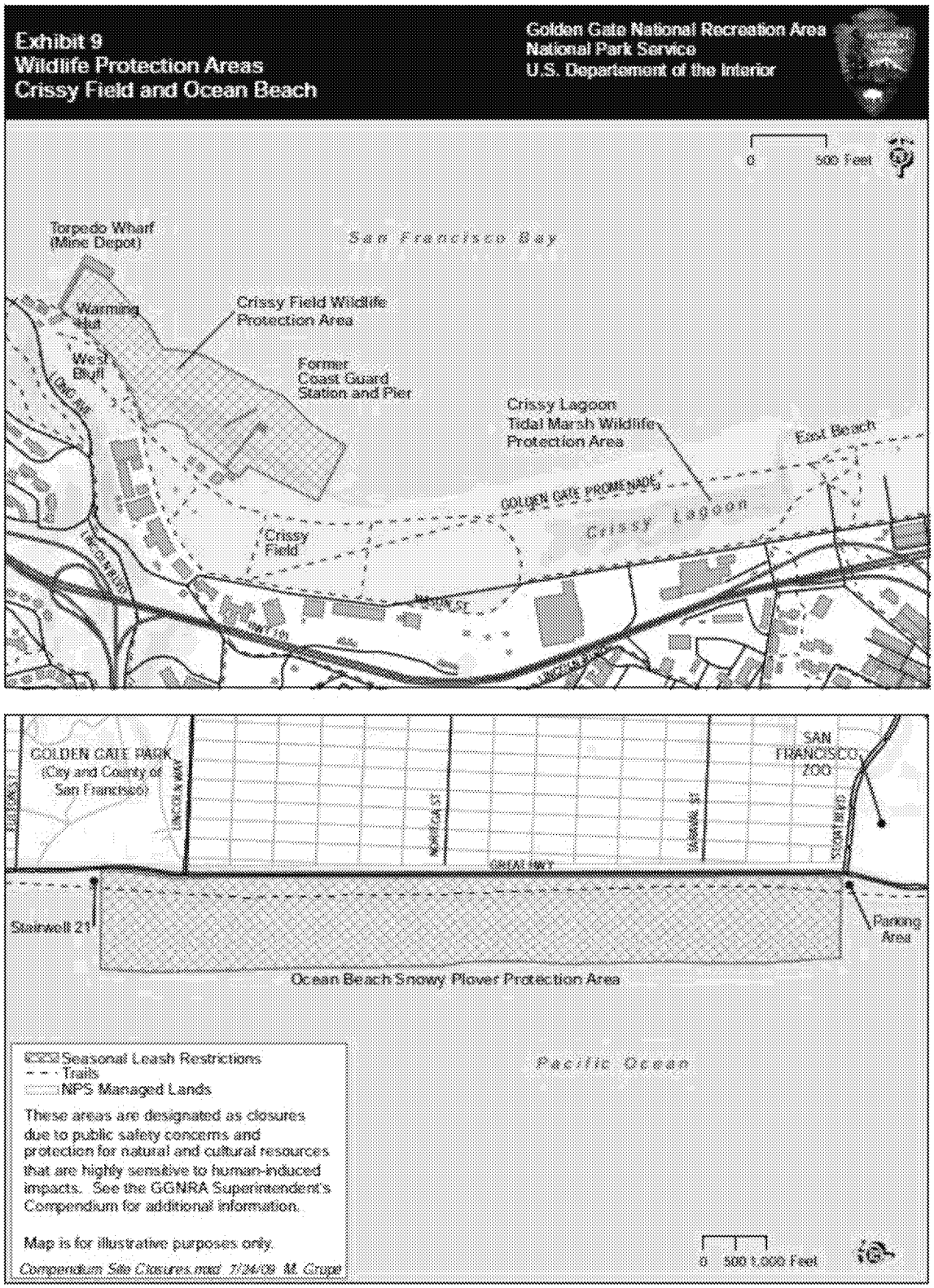

Figure 12. Crissy Field Wildlife Protection Area and Ocean Beach Snowy Plover Management Area (GGNRA, 2012)

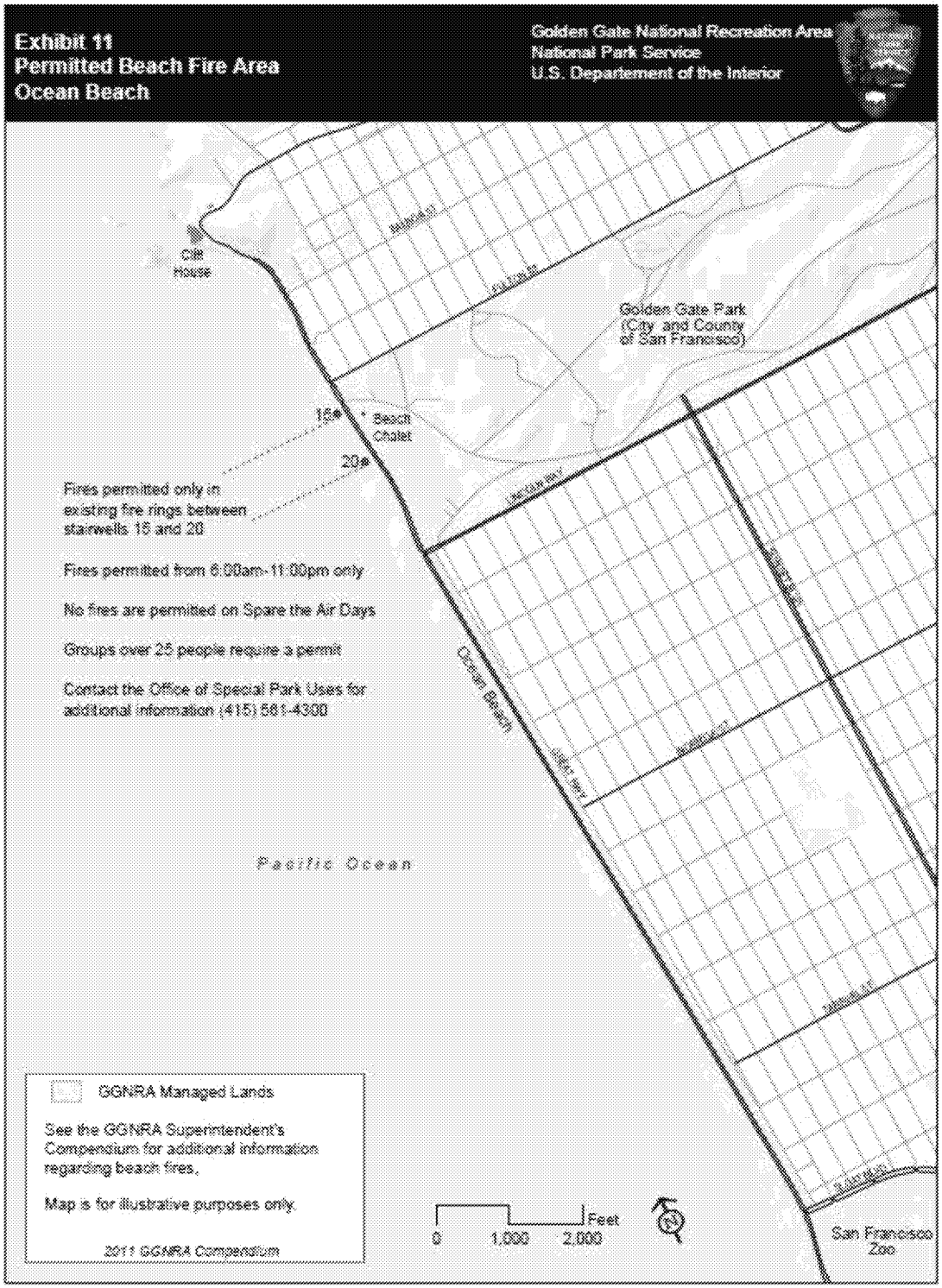

Figure 13. Location of permitted campfires on Ocean Beach (San Francisco Co.) (GGNRA, 2012)

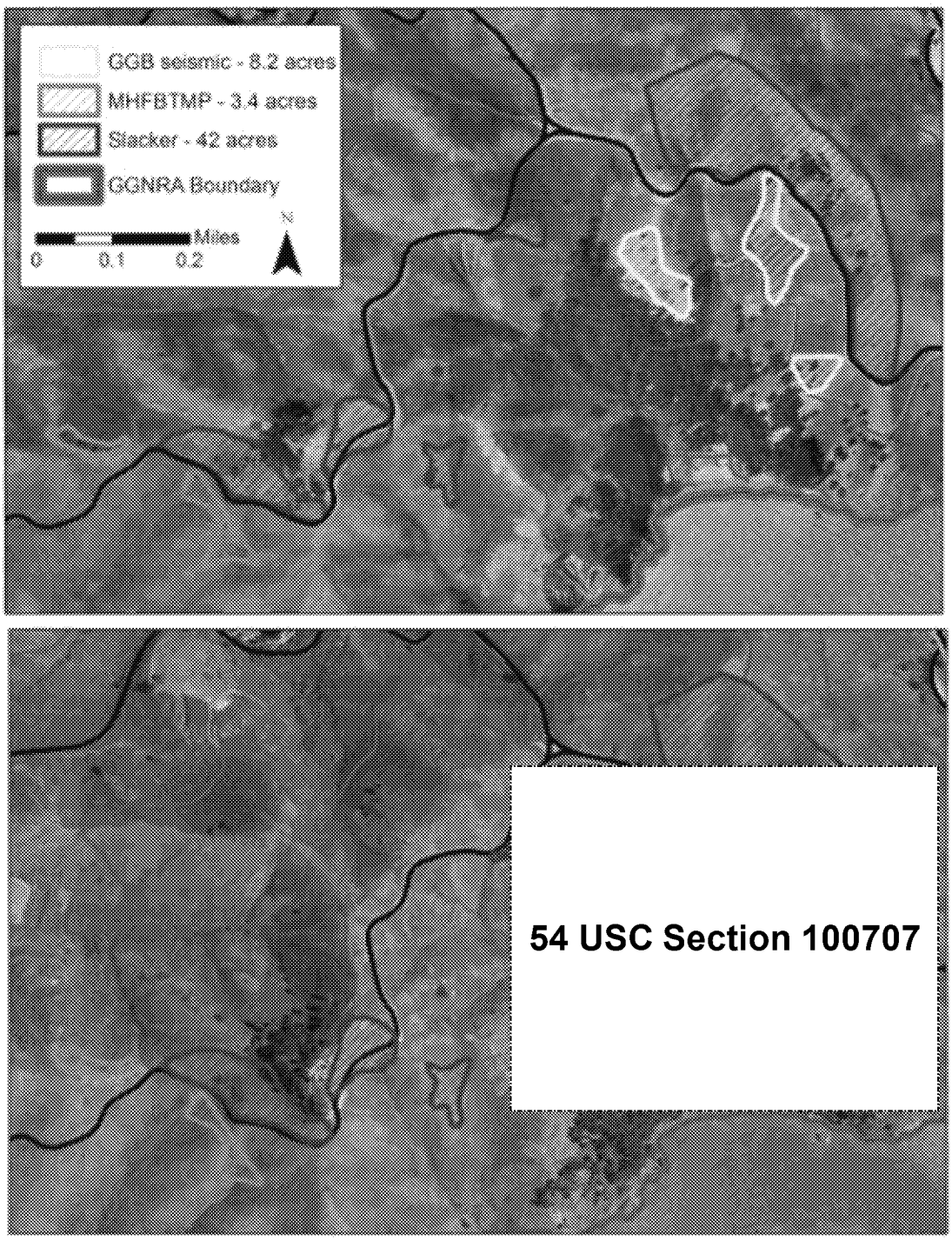

Figure 14. Completed mission blue butterfly habitat restoration areas in the Marin associated with long-term roads and trails maintenance. Note: photos show pre (top)- and post-conditions (bottom) following weed and non-native tree removal activities.

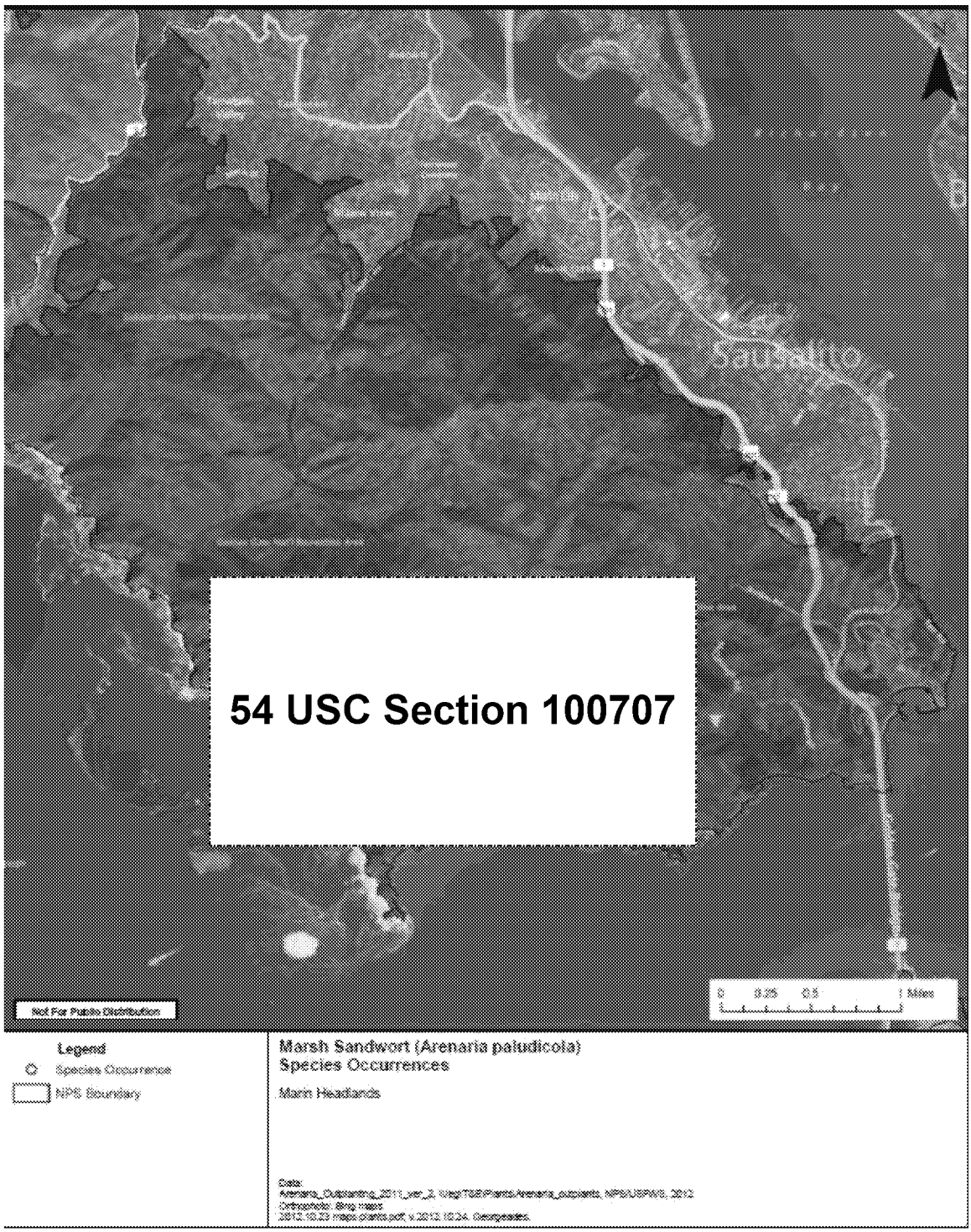

Figure ARPA-1.

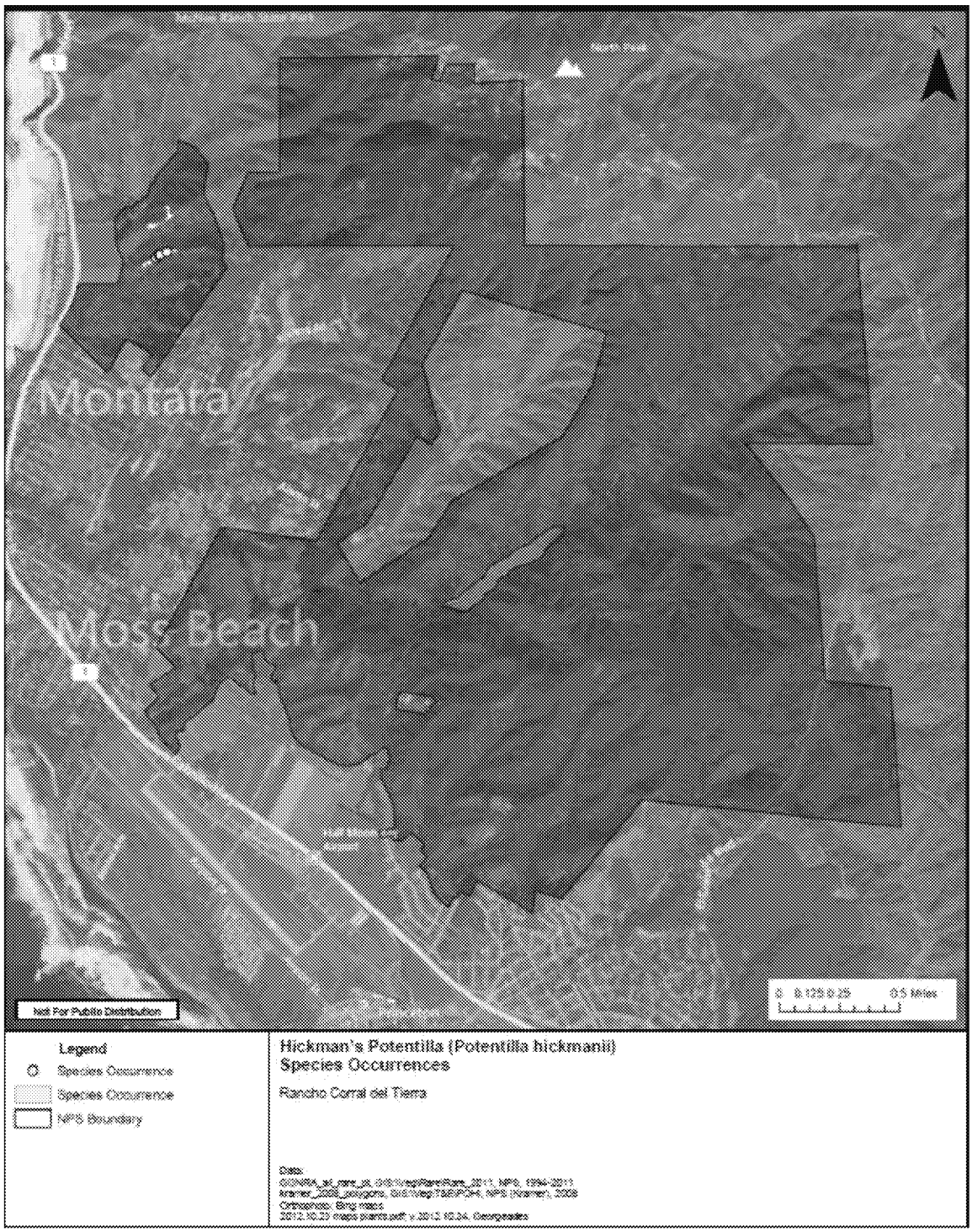

Figure HIPO-1

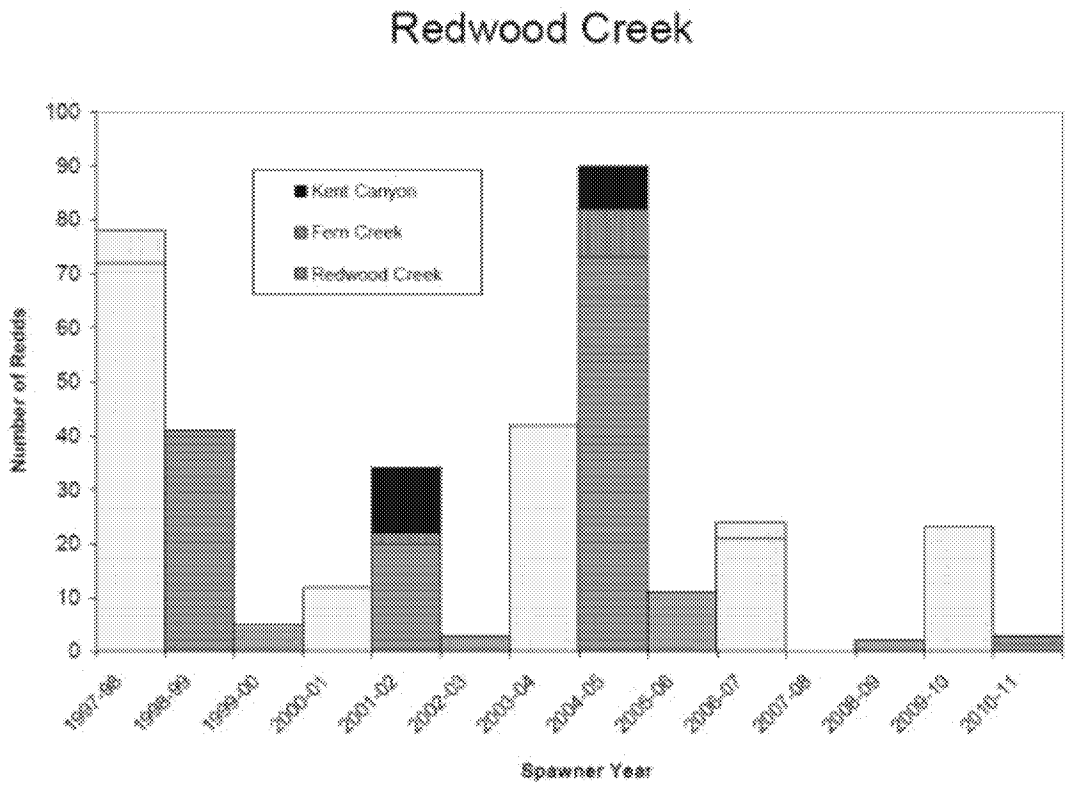

Figure CO-2

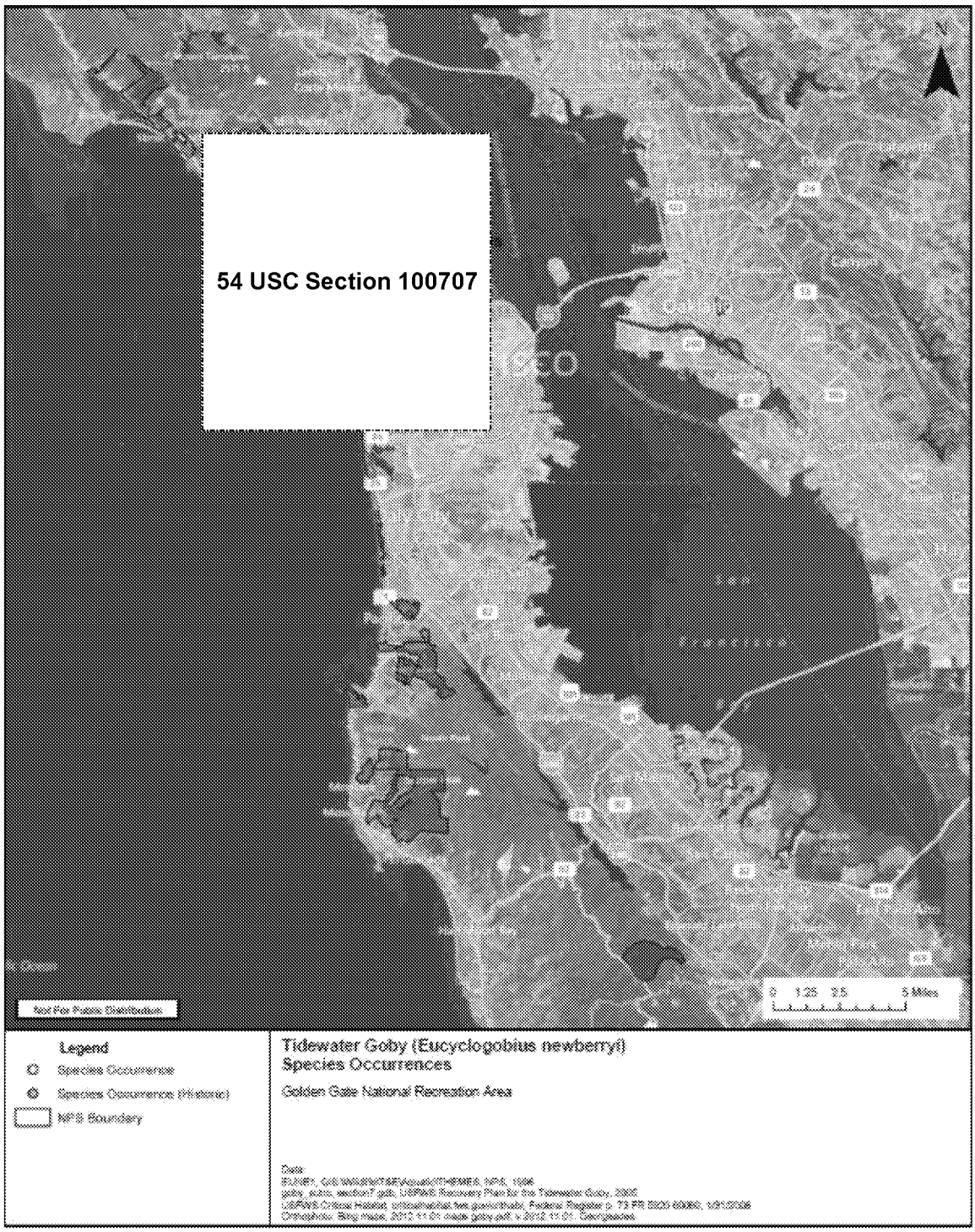

Figure TW-1

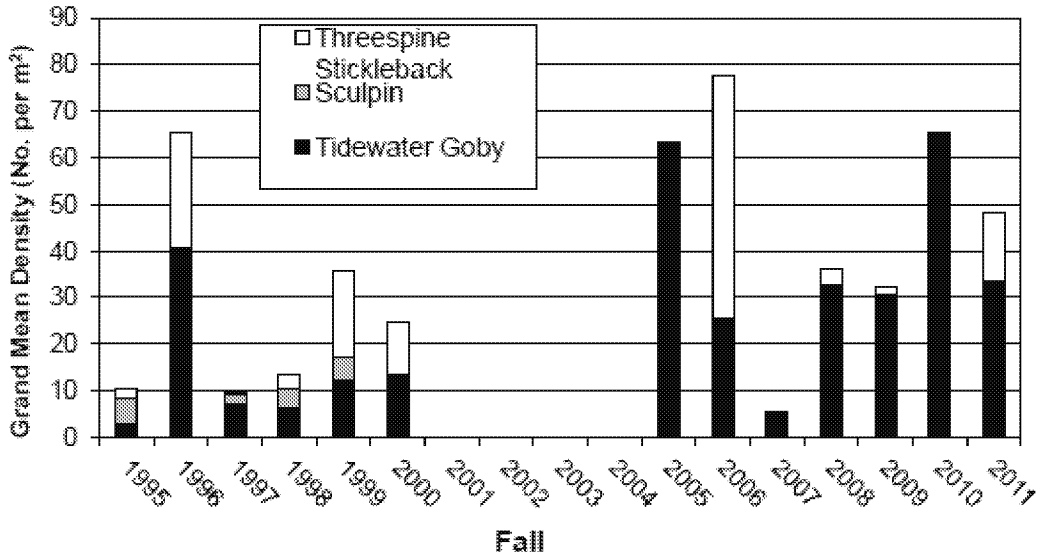

Figure TW-2. Grand mean density of fish from Rodeo Lagoon beach seine sampling in the fall, 1995-2011, Marin Co., CA (from Fong 2012)

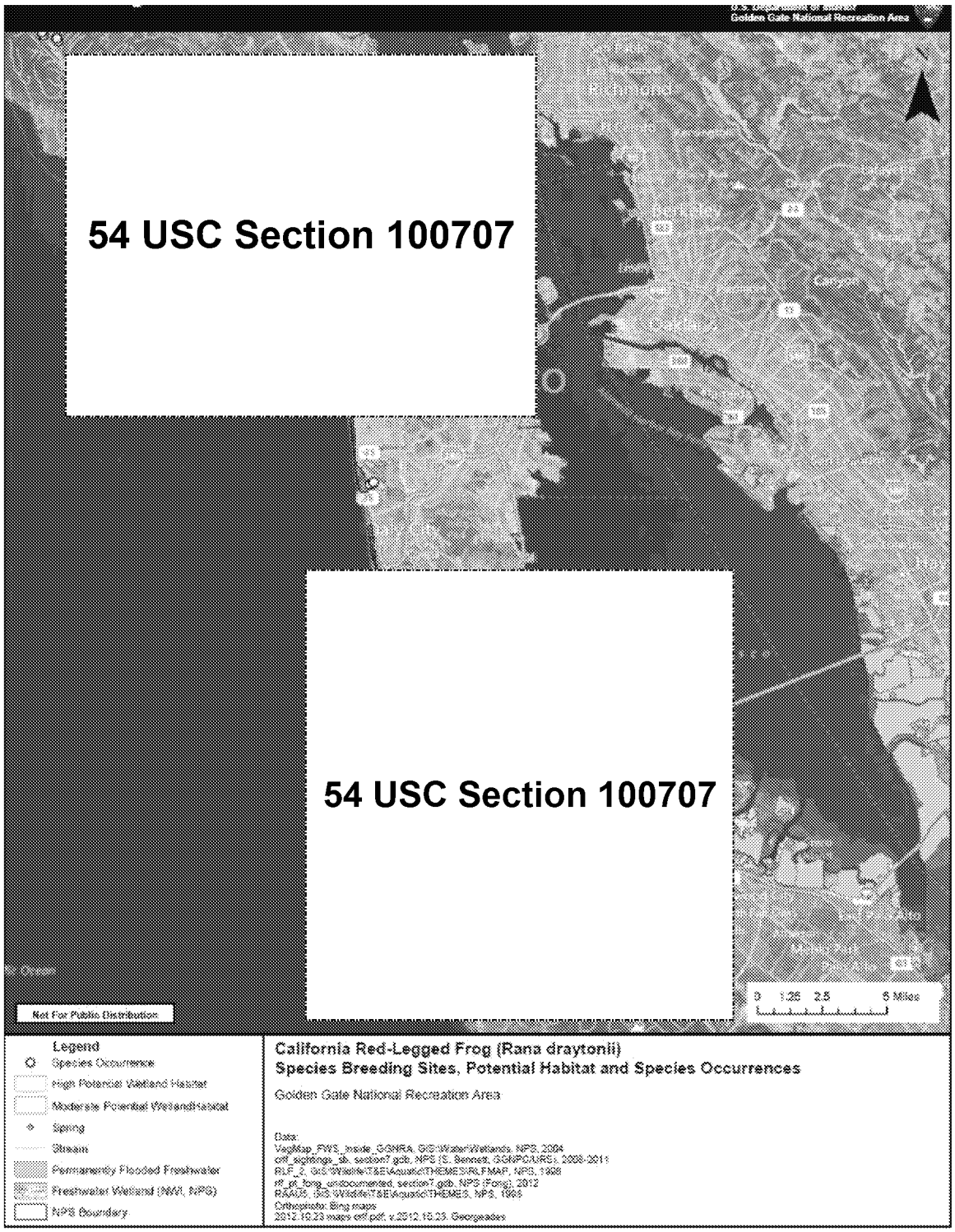

Figure CRLF-1.

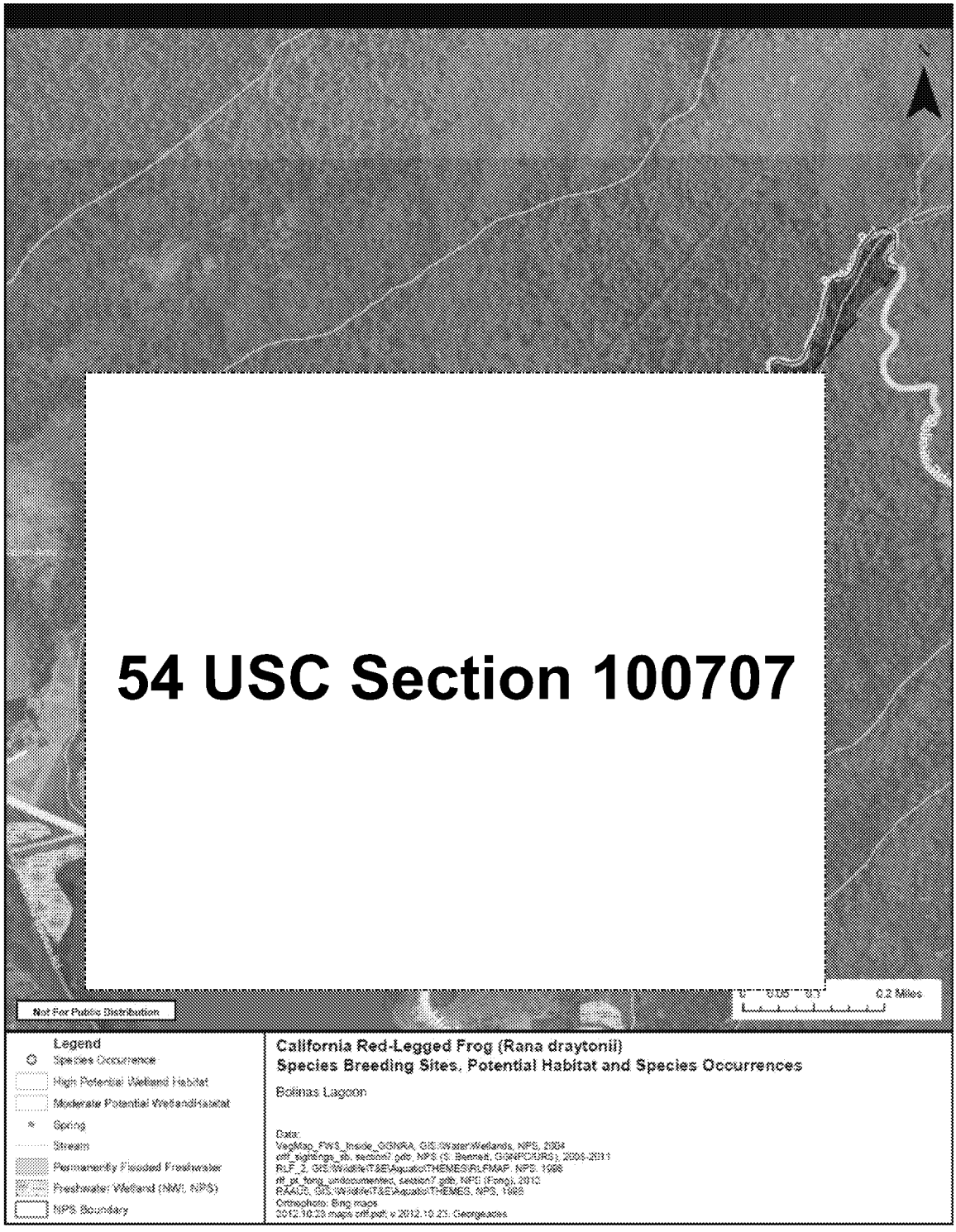

Figure CRLF-2

Figure CRLF -3

Figure CRLF -4

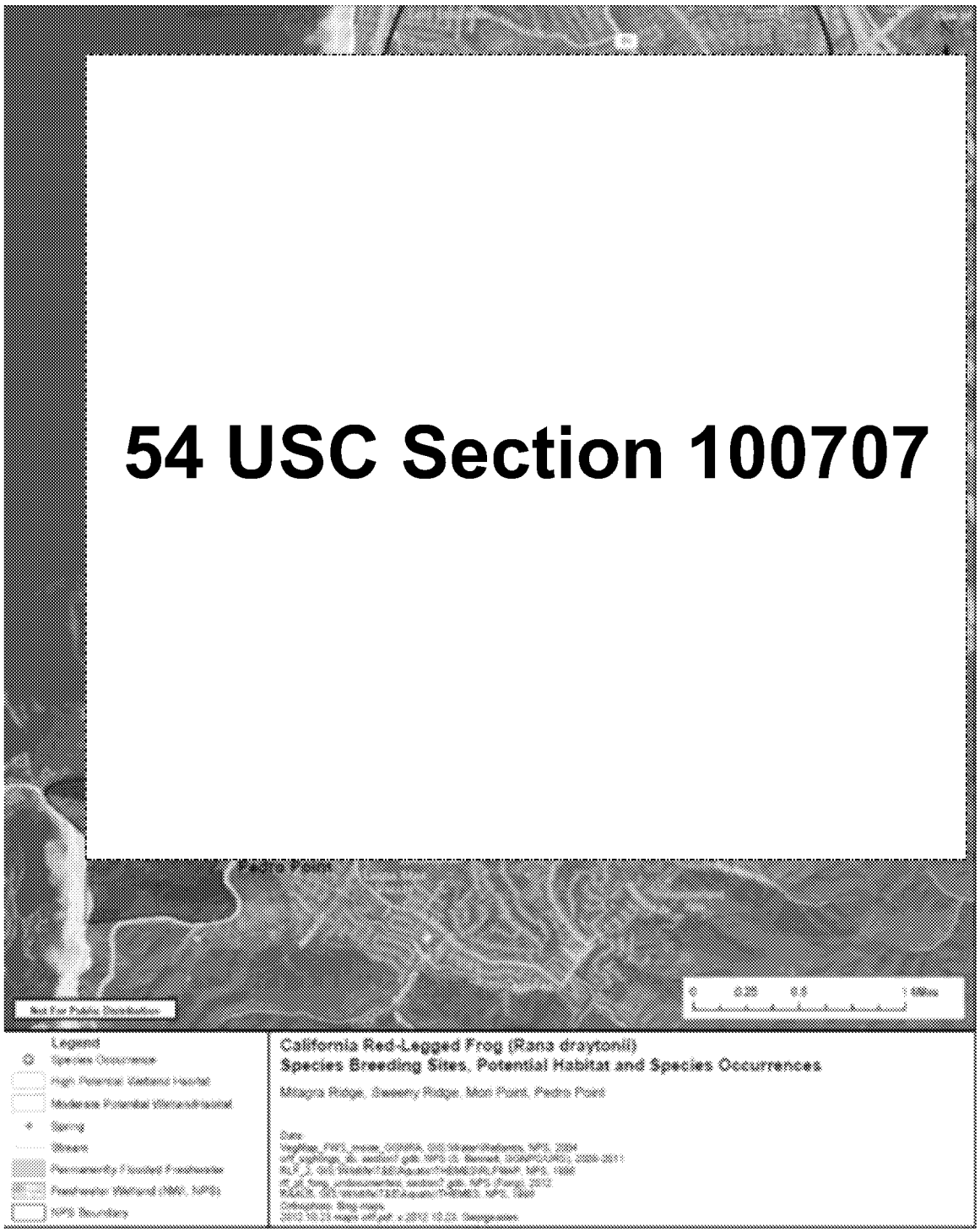

Figure CRLF -5

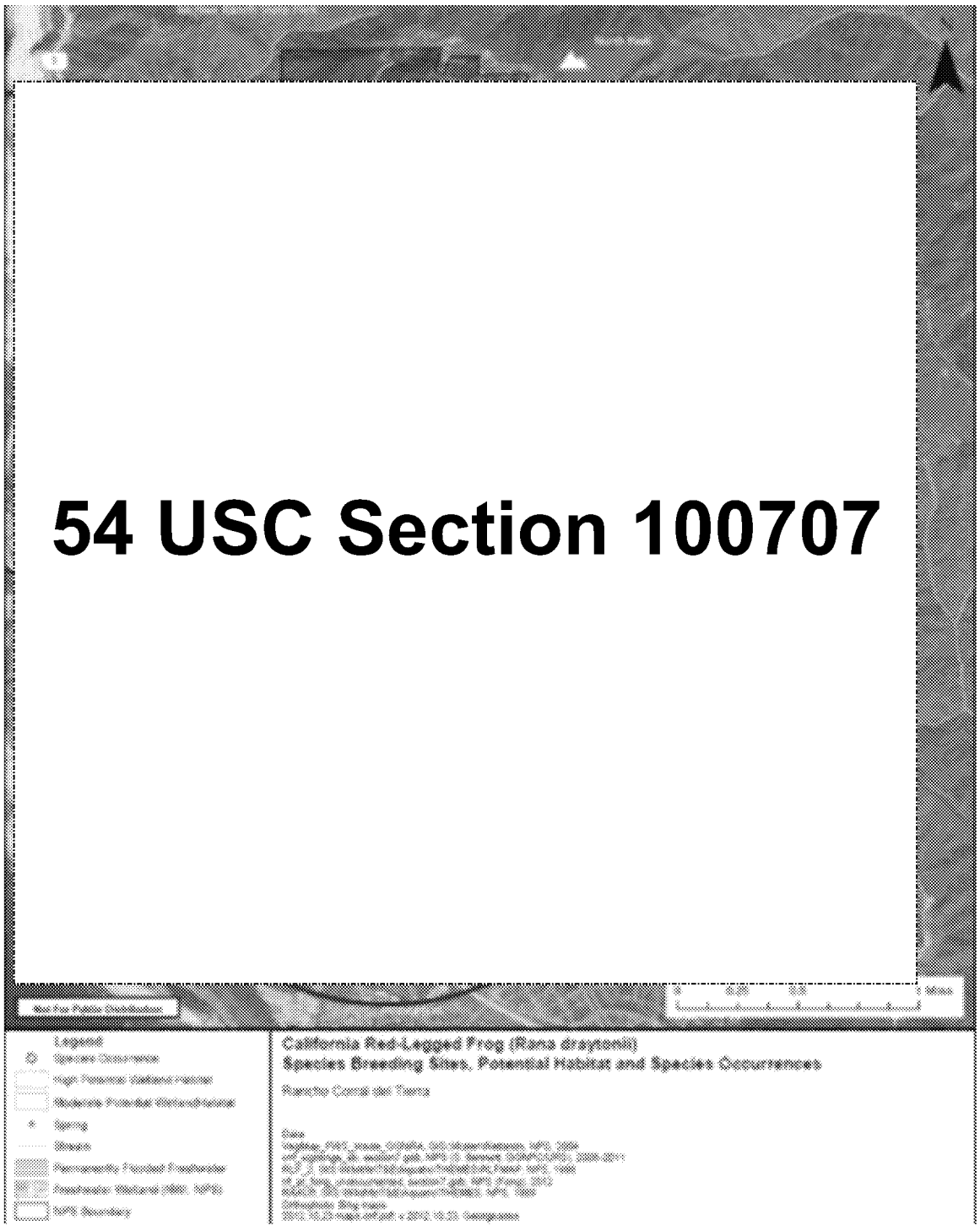

Figure CRLF -6

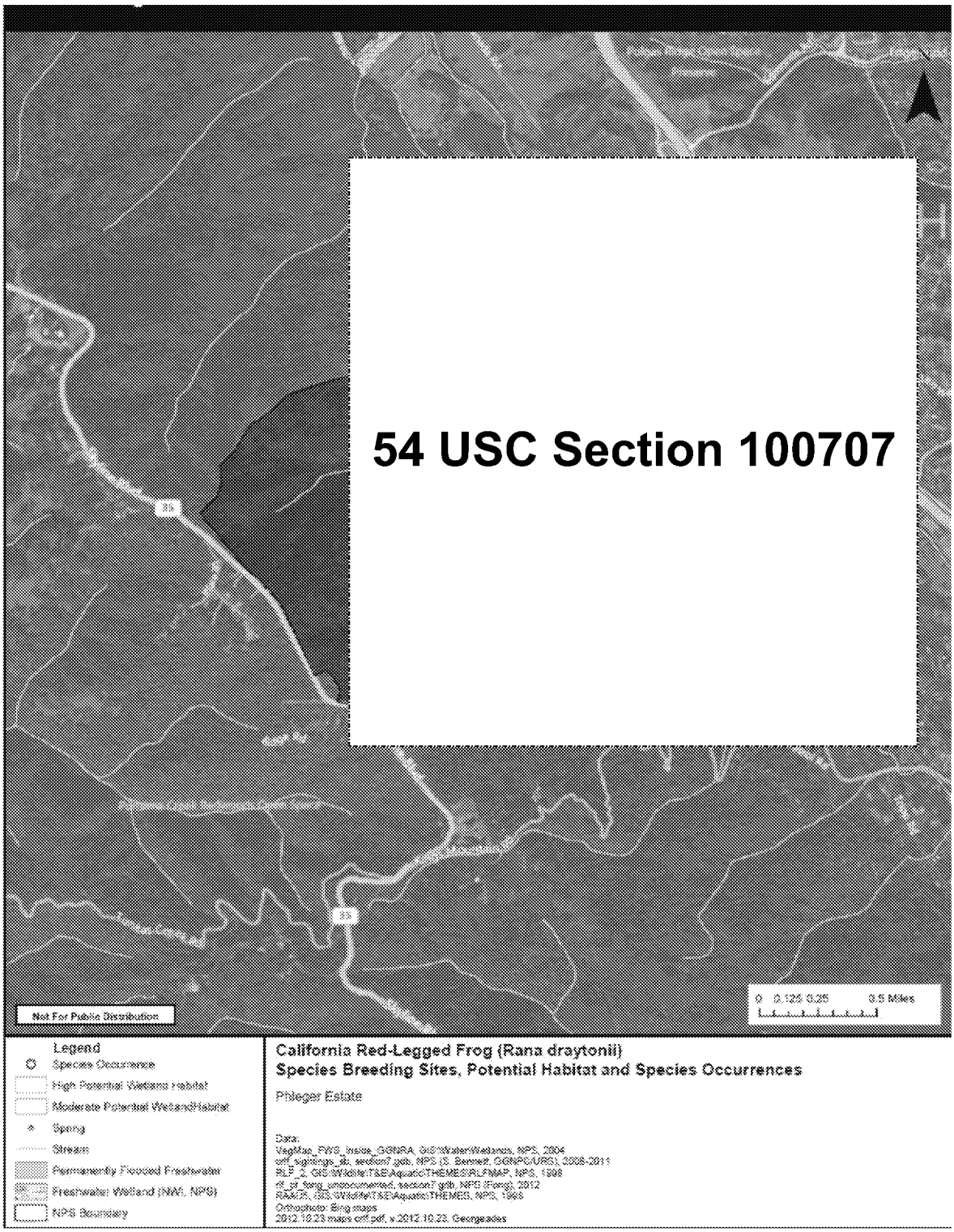

Figure CRLF -7

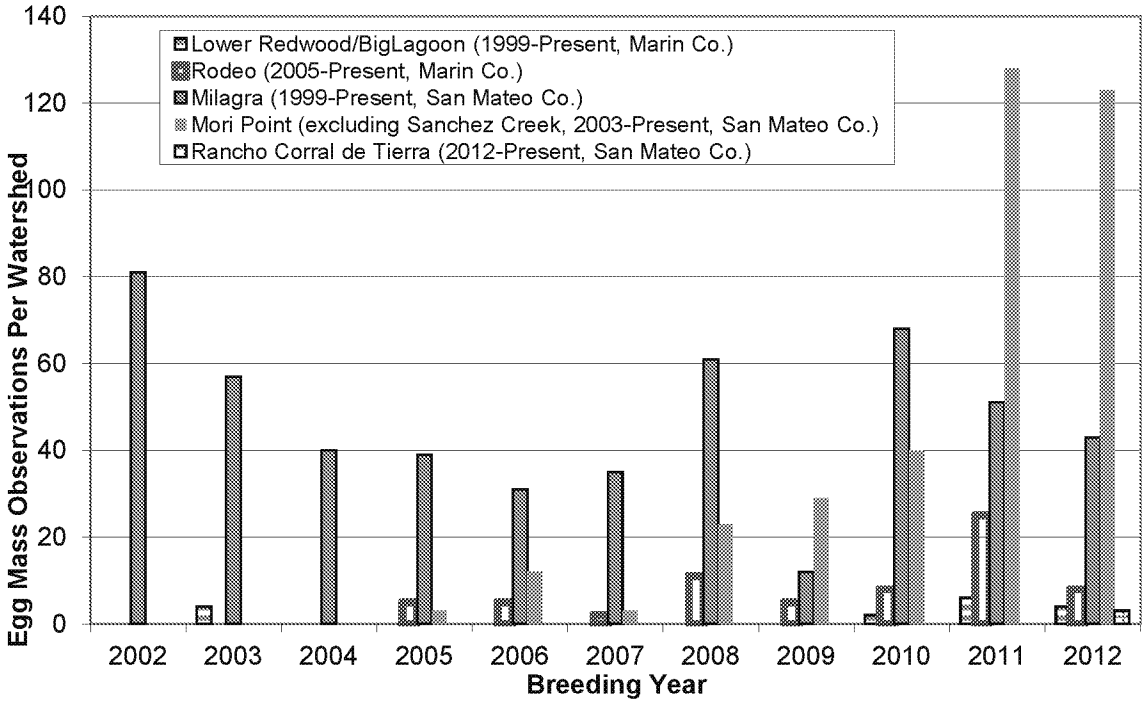

Figure CRLF-8. -Trends in California red-legged frog egg mass counts at breeding sites within the Golden Gate National Recreation Area

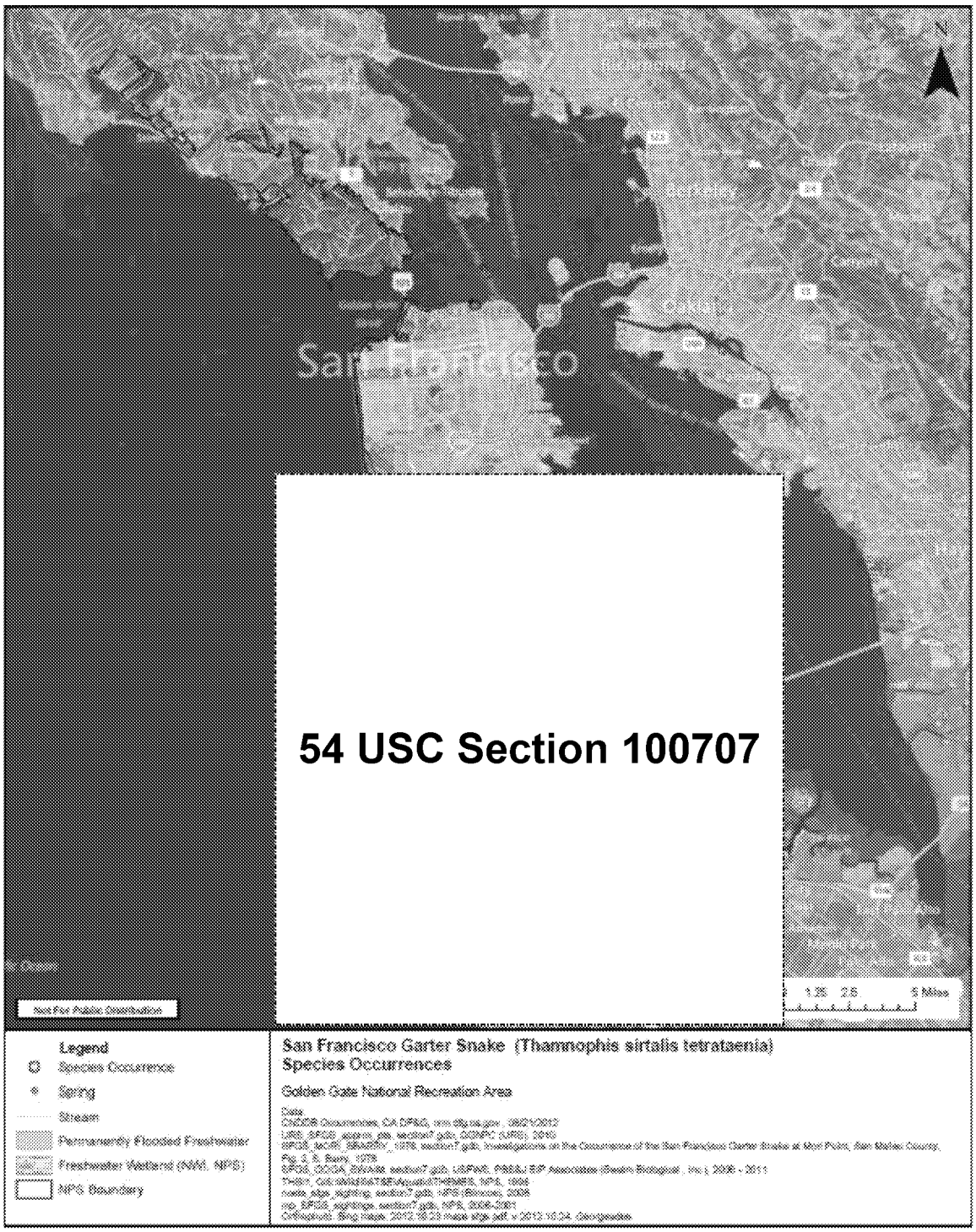

Figure SFGS-1

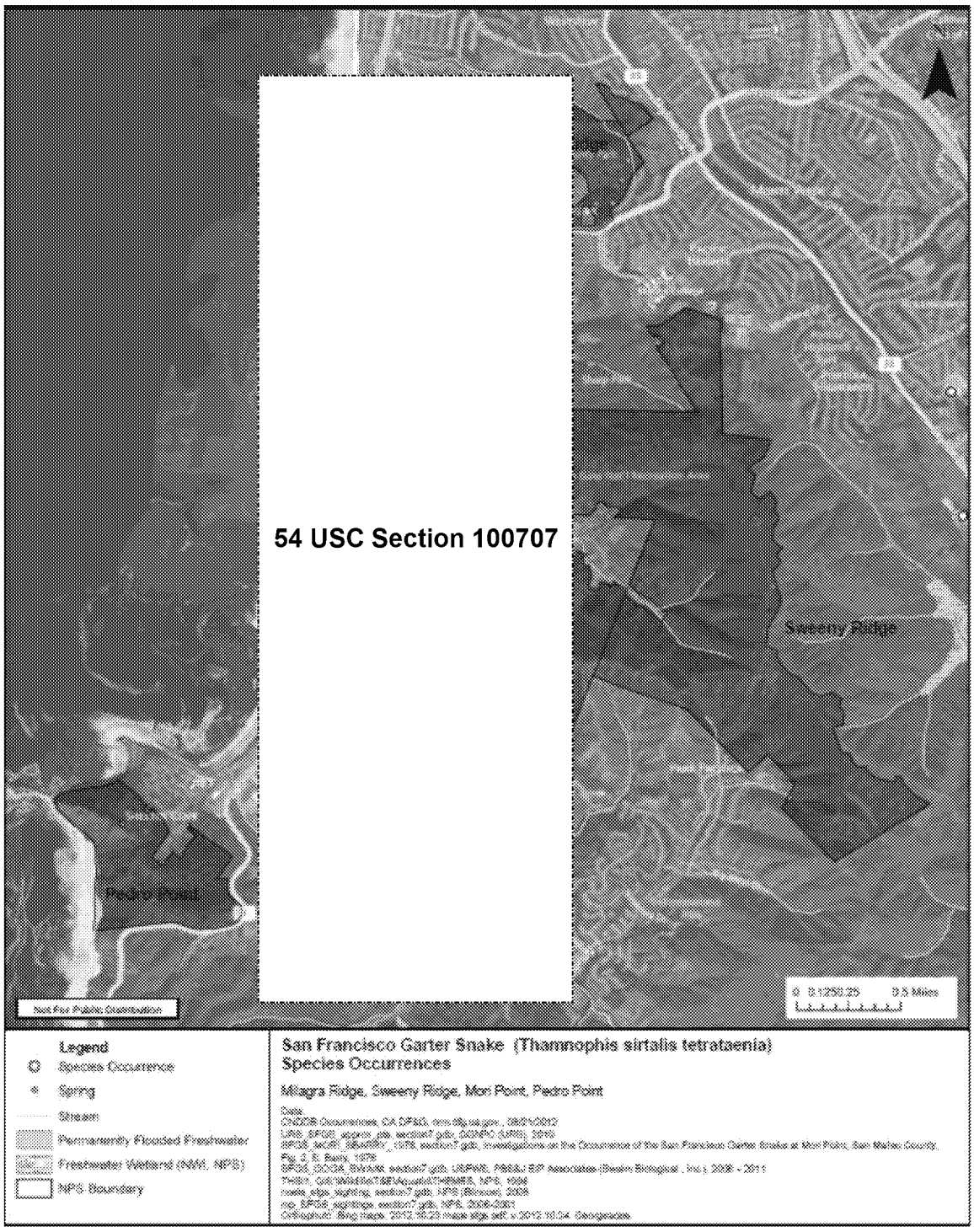

Figure SFGS-2

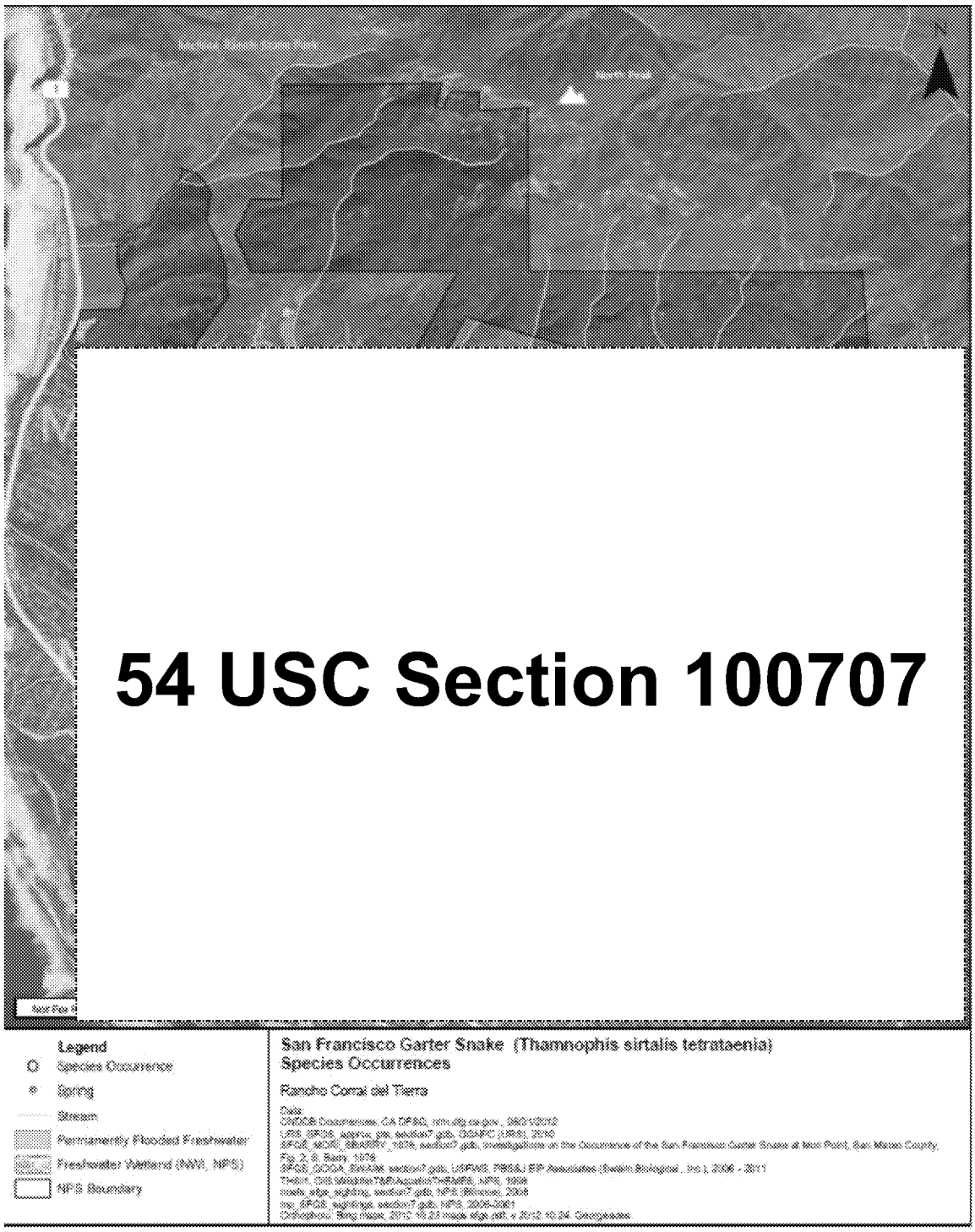

Figure SFGS-3

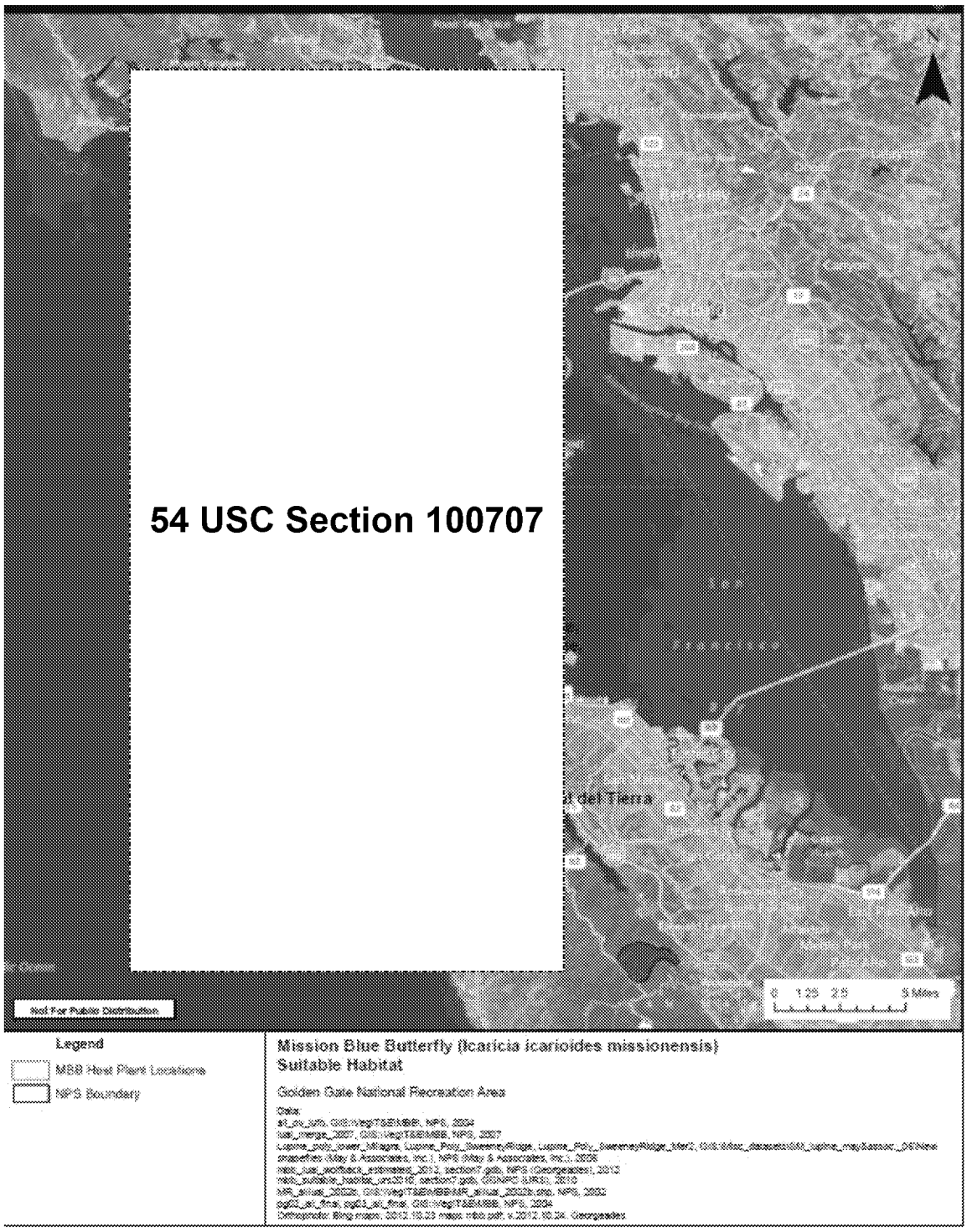

Figure MBB-1

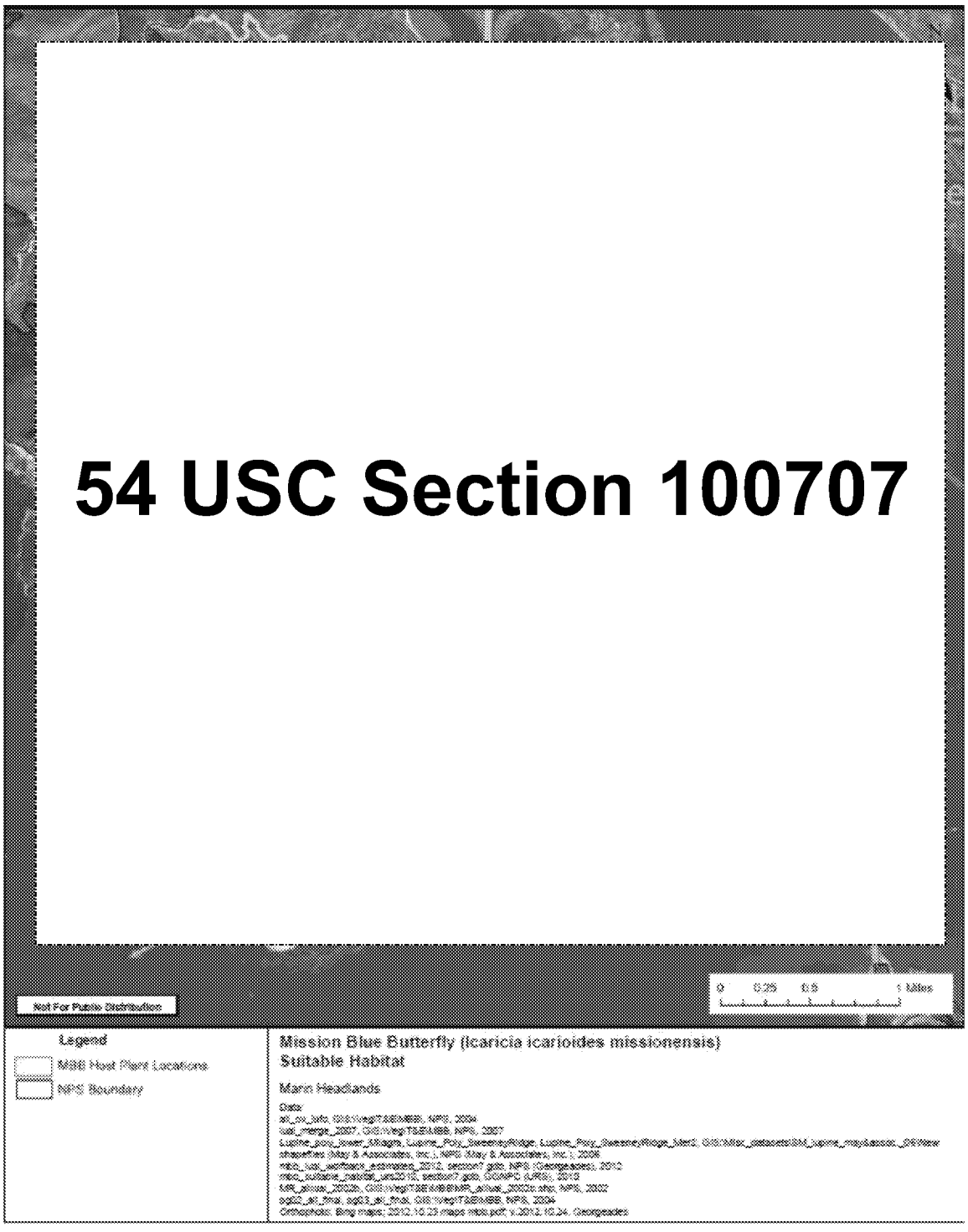

Figure MBB-2

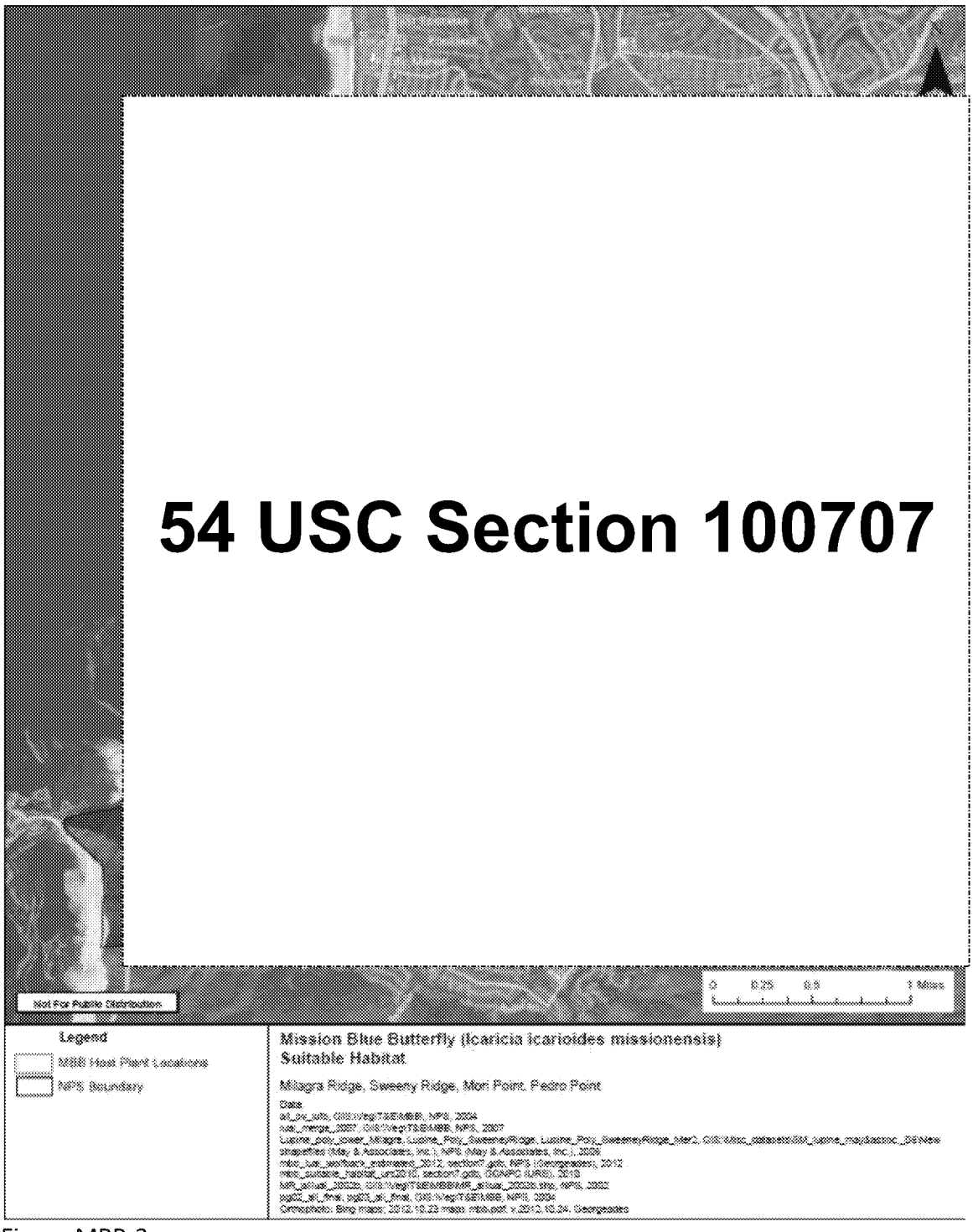

Figure MBB-3

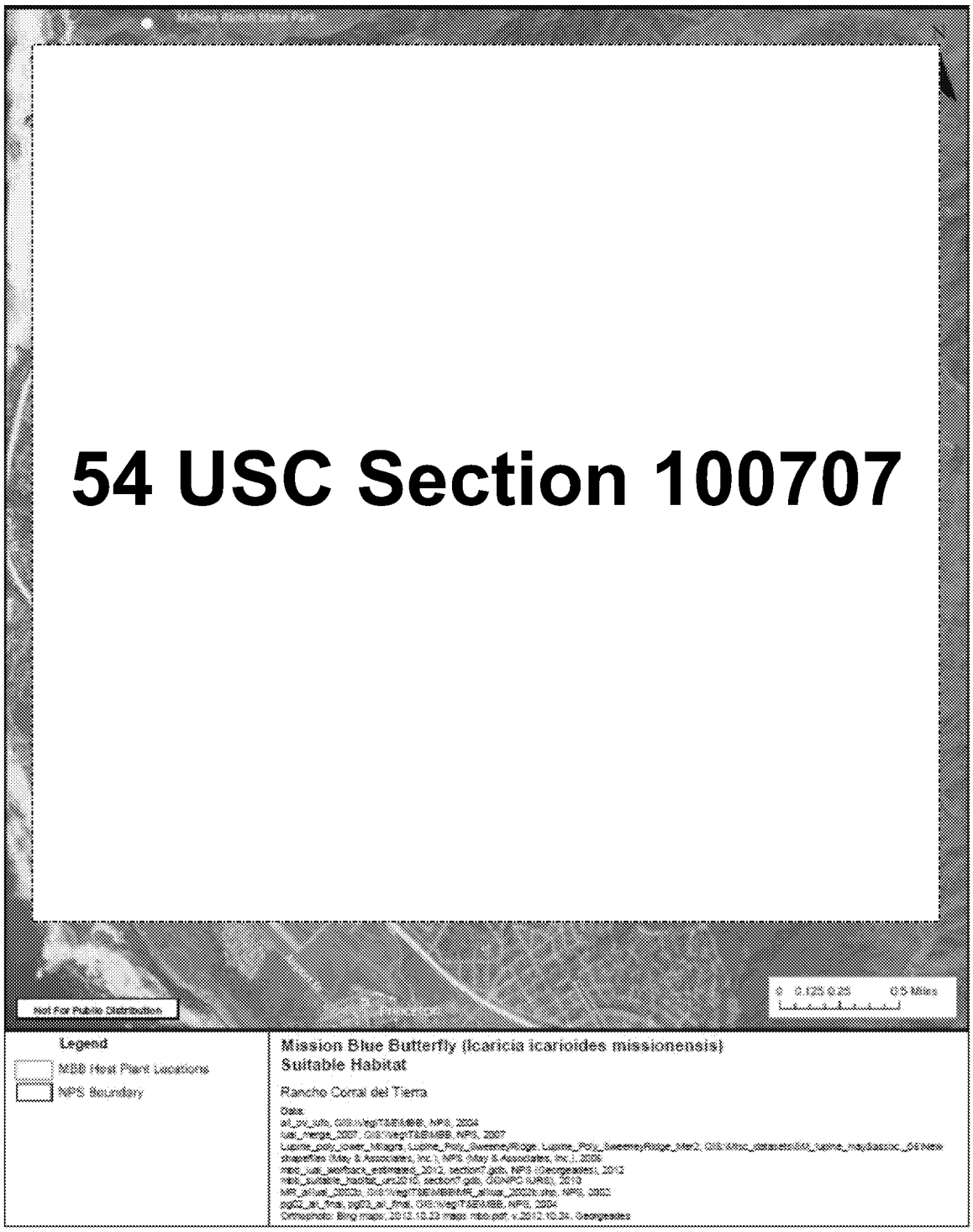

Figure MBB-4

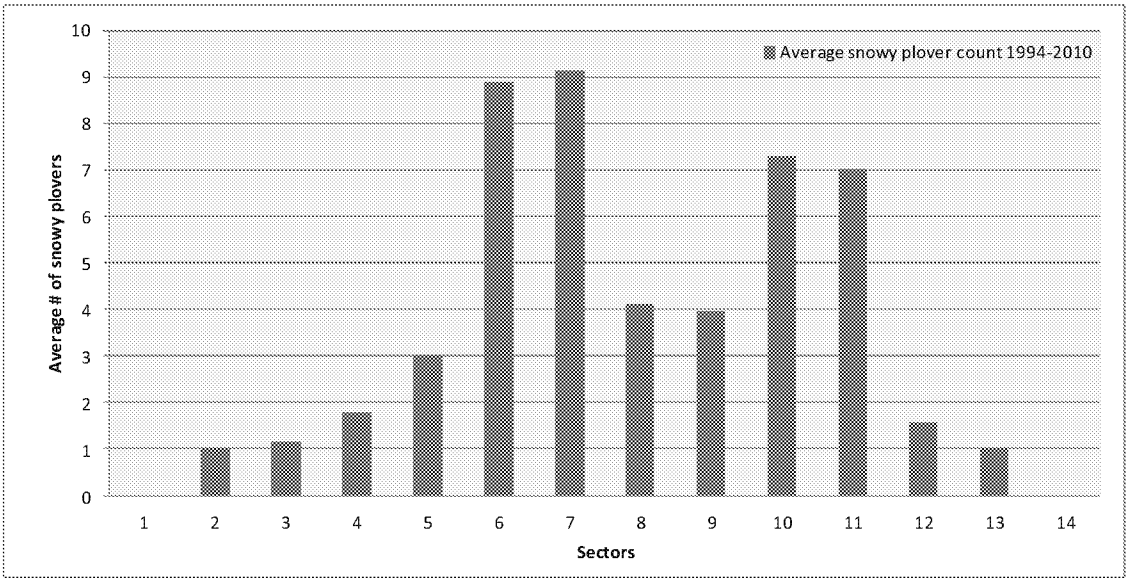

Figure SNPL-1: Average number of western snowy plovers observed at Ocean Beach per sector for the 1994-2010 survey seasons.

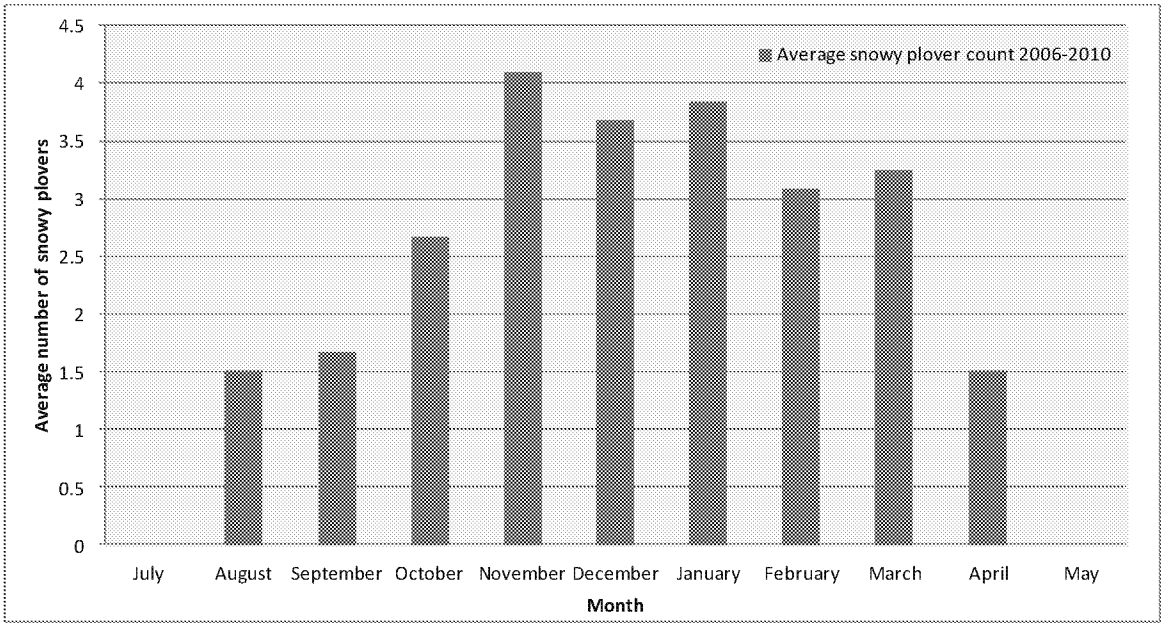

Figure SNPL-2: Average number of western snowy plovers observed in Crissy Field from 2006 to 2010.

Attachment 1

U.S. Fish & Wildlife Service
Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in
or may be Affected by Projects in the Counties and/or
U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 120831013250

Database Last Updated: September 18, 2011

No quad species lists requested.

County Lists

Listed Species

Invertebrates

Branchinecta conservatio
Conservancy fairy shrimp (E)

Branchinecta lynchi
vernal pool fairy shrimp (T)

Euphydryas editha bayensis
bay checkerspot butterfly (T)
Critical habitat, bay checkerspot butterfly (X)

Haliotes cracherodii
black abalone (E) (NMFS)

Haliotes sorenseni
white abalone (E) (NMFS)

Icaricia icarioides missionensis
mission blue butterfly (E)

Lepidurus packardi
vernal pool tadpole shrimp (E)

Speyeria callippe callippe
callippe silverspot butterfly (E)

Speyeria zerene myrtleae
Myrtle's silverspot butterfly (E)

Syncaris pacifica
California freshwater shrimp (E)

Fish

Acipenser medirostris
green sturgeon (T) (NMFS)

Eucyclogobius newberryi
critical habitat, tidewater goby (X)
tidewater goby (E)

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus kisutch
coho salmon - central CA coast (E) (NMFS)
Critical habitat, coho salmon - central CA coast (X) (NMFS)

Oncorhynchus mykiss
Central California Coastal steelhead (T) (NMFS)
Central Valley steelhead (T) (NMFS)
Critical habitat, Central California coastal steelhead (X) (NMFS)
Critical habitat, Central Valley steelhead (X) (NMFS)

Oncorhynchus tshawytscha
California coastal chinook salmon (T) (NMFS)
Central Valley spring-run chinook salmon (T) (NMFS)
Critical habitat, winter-run chinook salmon (X) (NMFS)
winter-run chinook salmon, Sacramento River (E) (NMFS)

Amphibians

Ambystoma californiense
California tiger salamander, central population (T)
California tiger salamander, Sonoma Co. pop (E)

Rana draytonii
California red-legged frog (T)
Critical habitat, California red-legged frog (X)

Reptiles

Caretta caretta
loggerhead turtle (T) (NMFS)

Chelonia mydas (incl. agassizi)
green turtle (T) (NMFS)

Dermochelys coriacea
leatherback turtle (E) (NMFS)

Lepidochelys olivacea
olive (=Pacific) ridley sea turtle (T) (NMFS)

Masticophis lateralis euryxanthus
Alameda whipsnake [=striped racer] (T)
Critical habitat, Alameda whipsnake (X)

Thamnophis sirtalis tetrataenia
San Francisco garter snake (E)

Birds

Brachyramphus marmoratus
Critical habitat, marbled murrelet (X)
marbled murrelet (T)

Charadrius alexandrinus nivosus
Critical habitat, western snowy plover (X)
western snowy plover (T)

Diomedea albatrus
short-tailed albatross (E)

Pelecanus occidentalis californicus
California brown pelican (E)

Rallus longirostris obsoletus
California clapper rail (E)

Sternula antillarum (=Sterna, =albifrons) browni
California least tern (E)

Strix occidentalis caurina
northern spotted owl (T)

Mammals

Arctocephalus townsendi
Guadalupe fur seal (T) (NMFS)

Balaenoptera borealis
sei whale (E) (NMFS)

Balaenoptera musculus
blue whale (E) (NMFS)

Balaenoptera physalus
finback (=fin) whale (E) (NMFS)

Enhydra lutris nereis
southern sea otter (T)

Eubalaena (=Balaena) glacialis
right whale (E) (NMFS)

Eumetopias jubatus
Critical Habitat, Steller (=northern) sea-lion (X) (NMFS)
Steller (=northern) sea-lion (T) (NMFS)

Physeter catodon (=macrocephalus)
sperm whale (E) (NMFS)

Reithrodontomys raviventris
salt marsh harvest mouse (E)

Plants

Acanthomintha duttonii
San Mateo thornmint (E)

Alopecurus aequalis var. sonomensis
Sonoma alopecurus (E)

Arctostaphylos hookeri ssp. ravenii
Presidio (=Raven's) manzanita (E)

Arctostaphylos pallida
pallid manzanita (=Alameda or Oakland Hills manzanita) (T)

Arenaria paludicola
marsh sandwort (E)

Calochortus tiburonensis
Tiburon mariposa lily (T)

Castilleja affinis ssp. neglecta
Tiburon paintbrush (E)

Chorizanthe robusta var. robusta
robust spineflower (E)

Chorizanthe valida
Sonoma spineflower (E)

Cirsium fontinale var. fontinale
fountain thistle (E)

Clarkia franciscana
Presidio clarkia (E)

Cordylanthus mollis ssp. mollis
soft bird's-beak (E)

Cupressus abramsiana
Santa Cruz cypress (E)

Delphinium bakeri
Baker's larkspur (E)
Critical habitat, Baker's larkspur (X)

Delphinium luteum
Critical habitat, yellow larkspur (X)
yellow larkspur (E)

Eriophyllum latilobum
San Mateo woolly sunflower (E)

Hesperolinon congestum
Marin dwarf-flax (=western flax) (T)
www.fws.gov/sacramento/es_species/Lists/es_species_lists.cfm 6/9
Marin dwarf-flax (=western flax) (T)

Holocarpha macradenia
Critical habitat, Santa Cruz tarplant (X)
Santa Cruz tarplant (T)

Lasthenia conjugens
Contra Costa goldfields (E)
Critical habitat, Contra Costa goldfields (X)

Layia carnosa
beach layia (E)

Lessingia germanorum
San Francisco lessingia (E)

Lilium pardalinum ssp. pitkinense
Pitkin Marsh lily (E)

Limnanthes vinculans
Sebastopol meadowfoam (E)

Lupinus tidestromii
clover lupine [Tidestrom's lupine] (E)

Pentachaeta bellidiflora
white-rayed pentachaeta (E)

Potentilla hickmanii
Hickman's potentilla (=cinquefoil) (E)

Streptanthus niger
Tiburon jewelflower (E)

Suaeda californica
California sea blite (E)

Trifolium amoenum
showy Indian clover (E)

Proposed Species

Plants

Cordylanthus mollis ssp. mollis

Critical habitat, soft bird's-beak (PX)

Key:

(E) *Endangered* - Listed as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. C onsult with them directly about these species.
Critical Habitat - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. C ritical habitat is being proposed for it.
(C) *Candidate* - C andidate to become a proposed species.
(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, or may be affected by projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried
- to their habitat by air currents. Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We
recommend that your surveys include any proposed and candidate species on your list.
See our Protocol and Recovery Permits pages.
For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills orinjures wildlife by significantly impairing essential behavioral patterns, including breeding,feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service. During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take. If no Federal agency is involved with the project, and federally listed species may be taken as

part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal. Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts.

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be November 29, 2012.

Attachment 2: List of federally-listed species and their potential for occurrence within the Golden Gate National Recreation Area

Scientific Name	Common Name	Legal Status				Habitat requirement and/or association	Micro habitat	General Species Distribution / Range	Comments
		Federal	CNPS	State	In GGNRA Managed Area				
PLANTS									
Acanthomintha duttonii	San Mateo thornmint	FE	1B	E	X	Chaparral, valley and foothill grassland, coastal scrub. Serpentine grasslands.			
Alopecurus aequalis var. sonomensis	Sonoma alopecurus	FE	1B			Freshwater marshes and swamps, riparian scrub.			
Arctostaphylos montana ravenii (=Arctostaphylos hookeri ravenii)	Presidio (=Raven's) manzanita	FE			X	Maritime Chaparral			
Arctostaphylos franciscana	Franciscan manzanita	FE			X	Maritime Chaparral			

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Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
Arctostaphylos pallida	pallid manzanita (=Alameda or Oakland Hills manzanita)	FT				Chaparral	54 USC Section 100707		
Arenaria paludicola	marsh sandwort (E)	FE	1B	E	X	Marshes and swamps.			
Calochortus tiburonensis	Tiburon mariposa lily	FT	1B	T		Valley and foothill grassland.			
Castilleja affinis ssp. neglecta	Tiburon paintbrush	FE	1B		X	Valley and foothill grassland.			
Chorizanthe robusta var. robusta	Robust spineflower	FE	1B			Cismontane woodland, coastal dunes, coastal scrub.			
Chorizanthe valida	Sonoma spineflower	FE	1B	E		Coastal prairie.			
Cirsium fontinale var. fontinale	fountain thistle (E)					Serpentine seeps.			

Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
Clarkia franciscana	Presidio clarkia	FE			X	Serpentine grassland.			
Cordylanthus mollis ssp. mollis	Soft bird's-beak	FE, PCH	1B	R		Coastal salt marsh.			
Hesperocyparis abramsiana (=Cupressus abramsiana)	Santa Cruz cypress	FE							
Delphinium bakeri	Baker's larkspur	FE, CH	1B	R		Coastal scrub, grasslands.			
Delphinium luteum	Yellow larkspur	FE, CH	1B	R		Chaparral, coastal prairie, coastal scrub.			
Eriophyllum latilobum	San Mateo woolly sunflower (E)					Oak woodland and grassland on serpentine.			
Hesperocyparis goveniana (=Cupressus goveniana)	Gowen cypress				X	Coastal coniferous forest			
Hesperolinon congestum	Marin dwarf-flax "Marin Western Flax"	FT	1B	T	X	Chaparral, valley and foothill grassland.			

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Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
Holocarpha macradenia	Santa Cruz tarplant	FT	1B	E		Coastal prairie, valley and foothill grassland.			
Lasthenia conjugens	Contra Costa goldfields	FE, CH				vernal pools.			
Layia carnosa	Beach layia	FE	1B	E		Coastal dunes.			
Lessingia germanorum	San Francisco lessingia				X	Openings in old, stabilized dunes.			
Lilium pardalinum ssp. pitkinense	Pitkin Marsh lily	FE				freshwater wetlands.			
Limnanthes vinculans	Sebastopol meadowfoam	FE				vernal pools and wet meadows			
Lupinus tidestromii	Tidestrom's lupine	FE	1B	E		Coastal dunes.			

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Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
Malacothamnus fasciculatus var. nesioticus	Santa Cruz island bush mallow	FE	1B	E	X	Coastal scrub, chaparral.	54 USC Section 100707		
Pentachaeta bellidiflora	White-rayed pentachaeta	FE	1B	E		Valley and foothill grassland			
Potentilla hickmanii	Hickman's potentilla (=cinquef oil)	FE				grassland			
Streptanthus niger	Tiburon jewelflower	FE	1B	E		Valley and foothill grassland.			
Suaeda californica	California sea blite	FE				salt marsh			
Trifolium amoenum	Showy Indian clover	FE	1B			Valley and foothill grassland, coastal bluff scrub.			
INVERTEBRATES									
Callophrys mossii bayensis	San Bruno elfin butterfly	FE	n/a		X	Rocky outcrops and cliffs in coastal scrub habitat.			

Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
Haliotis cracherodii	black abalone	FE			X	Rocky intertidal habitats along the open coast			
Haliotis sorenseni	white abalone	FE	n/a			Subtidal marine habitat			
Icaricia icarioides ssp. missionensis	Mission blue butterfly	FE	n/a		X	Mission blue butterflies are closely tied to three lupine larval host plants—lupinus albifrons, l. Variicolor, and l. Formosus. These host plants tend to occur on grasslands on thin, rocky soils within broader coastal-scrub habitats.			
Speyeria callippe callippe	callippe silverspot butterfly	FE				Coastal grasslands, openings in coastal scrub.			
Speyeria zerene myrtleae	Myrtle's silverspot butterfly	FE	n/a			Coastal dunes, scrub, and grassland.			
Syncaris pacifica	Californian fresh water shrimp	FE	n/a	E	X	Streams of 12 -36 inches in depth with exposed live roots of trees along under cut banks >6" with over			

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Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
						hanging woody debris			
FISH									
Acipenser medirostris	Green sturgeon	FT	n/a		X	Spawn in the sacramento river and the klamath river.			
Eucyclogobius newberryi	Tidewater goby	FE, CH	n/a		X	Brackish water habitats along the calif coast from agua hedionda lagoon, san diego co. To the mouth of the smith river.			
Hypomesus transpacificus	delta smelt	FT	n/a			Spawning and rearing mostly in sacramento-san joaquin delta.			
Oncorhynchus kisutch	Coho salmon--Central California coast	FE,CH	n/a	E	X	Coastal streams and lagoons draining to ocean (including those to s.f. bay) with spawning, juvenile rearing habitat, and migratory corridor			
Oncorhynchus mykiss	Steelhead — Central California Coast	FT, CH	n/a		X	Coastal streams draining to ocean (including those to s.f. bay) with spawning , juvenile rearing habitat, and migratory corridor			
Oncorhynchus mykiss	Steelhead — Central Valley	FT, CH	n/a		X	Spawning and juvenile rearing habitat in Sacramento and San Joaquin Rivers and their tributaries.			

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Scientific Name	Common Name	Legal Status				Habitat requirement
Oncorhynchus tshawytscha	Chinook salmon — Sacramento River winter run	FE, CH	n/a		X	Spawning and juvenile rearing habitat in Sacramento River and tributaries
Oncorhynchus tshawytscha	Chinook salmon — California coastal	FT	n/a			Spawning and juvenile rearing in large coastal stream and rivers draining to ocean.
Oncorhynchus tshawytscha	Chinook salmon — Central Valley spring run	FT	n/a		X	Adult nos depend on pool depth & volume, amount of cover, & proximity to gravel. Water temps >27 c lethal to adults
REPTILES/AMPHIBIANS						
Ambystoma californiense	California tiger salamander, central population	***FT***				
Rana draytonii	California red-legged frog	FT, CH	n/a		X	Ponds and other permanent slow-moving waterbodies: lakes, reservoirs, slow streams, marshes, and bogs.
Caretta caretta	loggerhead turtle	FT	n/a			Marine
Chelonia mydas	green turtle	FT	n/a			Marine
Dermochelys coriacea	leatherback turtle	FE, CH	n/a			Marine

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Scientific Name	Common Name	Legal Status				Habitat requirement
Lepidochelys olivacea	olive (=Pacific) ridley sea turtle	FT	n/a			Marine
Masticophis lateralis euryxanthus	Alameda whipsnake [=striped racer]	FT, CH				
Thamnophis sirtalis tetrataenia	San Francisco garter snake	FE	n/a			Marine
BIRDS						
Brachyramphus marmoratus marmoratus	Marbled murrelet	FT, CH	n/a		X	Old growth forest for breeding and sheltered waters/open coast for foraging.
Charadrius alexandrinus nivosus	Western Snowy plover	FT, CH	n/a		X	Coastal beaches, sand spits, dune-backed beaches, beaches at river mouths, salt pans at lagoons and estuaries, mud flats, and man-made salt ponds.
Diomedea albatrus	short-tailed albatross	FE				Marine and near shore habitats for foraging. Breeds in South Pacific.
Haliaeetus leucocephalus	Bald eagle	FT (delisted)			X	Large trees near lakes, rivers, or estuaries for foraging. Disturbance intolerant

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Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
Pelecanus occidentalis	Brown pelican	FE (de list ed), FP	n/a		X	Forage over and near shore marine areas including open coast, San Francisco Bay, and Rodeo Lagoon. Utilize islands, rocks, cliffs, and some protected beach areas for roosting.			
Rallus longirostris obsoletus	California clapper rail	FE, FP	n/a			Salt marsh with tidal channels.			
Sterna antillarum browni	California least tern	FE, FP	n/a		X	Diked ponds or ditches along shorelines.			
Strix occidentalis caurina	Northern spotted owl	FT	n/a		X	Utilizes coniferous and mixed-hardwood forest areas for breeding in the project area, often in drainages.			
MAMMALS									
Arctocephalus townsendi	Guadalupe fur seal	FT, FP	n/a			Protected haul out sites.			
Balaenoptera borealis	Sei whale	FE	n/a			Offshore marine			
Balaenoptera musculus	Blue whale	FE	n/a			Offshore marine			
Balaenoptera physalus	Finback (=fin) whale	FE	n/a			Offshore marine			
Enhydra lutris nereis	Southern sea otter	FT FP	n/a		X	Near shore marine			
Eubalaena glacialis	Right whale	FE,	n/a			Offshore marine			

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Scientific Name	Common Name	Legal Status				Habitat requirement	Micro habitat	General Species Distribution / Range	Comments
		FP							
Eumetopias jubatus	Steller (=northern) sea lion	FT, CH	n/a		X	Protected haul out sites.			
Megaptera novaeangliae	Humpback whale	FE	n/a		X	Offshore marine			
Physeter catodon	Sperm whale	FE	n/a			Offshore marine			
Reithrodontomys raviventris	Salt marsh harvest mouse	FE, FP	n/a		X	Salt marsh, wetland.			

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KEY: FE (federally endangered), FT (federally threatened), CH (designated critical habitat)

Attachment 3- List of past USFWS consultations with GGNRA

Document Title	USFWS Ref. No.	Consultation Date	Status (C=completed; O=ongoing; I=indefinite; TBD=To Be Det'd; M=Merged ; NA=not applicable)	Informal	Formal/BO	Marbled Murrelet	Western Snowy Plover	Northern Spotted owl	Blue Copper butterfly	San Bruno elfin Butterfly	Mission blue Butterfly	California red-legged frog	San Francisco garter snake	tidewater goby	San Francisco Lessingia	Marsh sandwort	Raven's manzanita	Presidio clarkia	San Francisco Owl's-clover	Marin Dwarf Flax	California seablite	Salt Marsh Harvest Mouse	California Brown Pelican	Callippe Silverspot Butterfly	Geographic Location
Proposed Trail Construction at Fort Baker Near the Habitat of the Mission Blue Butterfly	1-1-88-I-351	6-Apr-88	c	x							x														Fort Baker
Formal Section 7 Consultation for the designation of the Bay Area Ridge Trail at Malagra Ridge, Golden Gate National Recreation Area	1-1-89-F-68	27-Sep-89	c		x					x	x														Milagra Ridge, Bay Area ridge Trail
Draft Biological Opinion for the Proposed Designation and Opening of the Bay Area Ridge trail at Milagara Ridge, Golden Gate National Recreation Area	1-1-89-I-1031	20-Nov-89	NA	x						x	x														Milagra Ridge Marin Co. Lands,
Section 7 Formal Consultation for the Butterfly Restoration Plan, Golden Gate National Recreation Area, San Mateo and Marin Counties, California	1-1-91-F-1	30-Nov-90	O		x					x	x														San Mateo Co. Lands Marin Headlands (SCA,
Reinitiation of Formal Section 7 Consultation for the Trails, Special Events, Resource Management, and Raptor Programs, Marin County, Golden Gate National Recreation Area, California	1-1-91-F-25R	6-Nov-91	TBD		x						x														New Coastal, Coastal/ Coastal Slacker, Coastal Julian)

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Request for Information Regarding Disturbance to Northern Spotted Owls and Marbled Murrelets as a Result of Management Activities	1-1-93-I-996	13-Apr-94	i	x		x		x																	Park Wide
Response to Request for Concurrence Regarding Rodeo Lagoon Cleanup	1-1-95-I-319	4-Jan-95	c	x										x											Rodeo Valley
Special Status Plants of the Presidio	1-1-95-I-467	7-Feb-95	TBD	x											x		x	x		x					Presidio
Formal Endangered Species Consultation and Conference on the National Park Service's Proposed Recreational and Resource Management Activities in the Golden Gate National Recreation Area, San Mateo Counties, California	1-1-95-F-31	15-Mar-95	O		x						x													x	"Notch Trail", San Mateo Co. Lands
Effects of Sand removal on Western Snowy Plovers (*Charadrius alexandrinus nivosus*) Wintering at Ocean Beach, San Francisco, California	1-1-95-I-1555	29-Sep-95	M?	x			x																		Ocean Beach
Milagra Ridge Draft Site Management Plan, Pacifica, San Mateo County, California	1-1-95-I-1595	11-Oct-95	TBD	x						x	x		x												Milagra Ridge
Formal Section 7 Consultation on the Proposed Sand Excavation Project at Ocean Beach, San Francisco, California	1-1-96-F-11	20-Nov-95	O		x		x																		Ocean Beach

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Proposed Temporary Revetment Between the North and South Parking Lots South of slat Boulevard at Ocean Beach, San Francisco, California	1-1-97-I-450	13-Feb-97	c	x			x																		Ocean Beach
Formal Endangered Species Consultation on the Proposed Milagra Ridge and Wolfback Ridge Site Management Plans, Golden Gate National Recreation Area, Marin and San Mateo Counties, California	1-1-96-F-159	10-Nov-97	TBD		x					x	x	x	x												Milagra Ridge, Wolfback Ridge
Draft Snowy Plover management Plan for Ocean Beach, San Francisco County, California	1-1-97-I-2344	10-Dec-97	c	x			x																		Ocean Beach
(Draft?) Response to Suggested Replacement Policy Regarding Public Access to the Peninsula Watershed for the Bay Area Ridge Trail Project	1-1-98-F-1754	14-Aug-98	TBD		x								x												San Mateo Co, Lands
Request for Consultation on the Barrier Construction Project at Ocean Beach Barrier, San Francisco, California	1-1-99-I-1910	8-Sep-99	c	x			x																		Ocean Beach
Comments on the Presidio Vegetation Management Plan	1-1-99-I-2019	29-Sep-99	m												x	x	x		x						
Comments on the Presidio Vegetation Management Plan	1-1-99-I-2109	29-Sep-99	TBD	x											x	x			x						Presidio

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Formal Endangered Species Consultation on the Proposed Fort Baker Plan, Golden Gate National Recreation Area, Marin County, California	1-1-99-F-21	29-Nov-99	TBD		x						x														Fort Baker
Presidio Vegetation Management Plan	1-1-99-X-2109	12-Apr-00	m																						Presidio
Informal Consultation on the City of San Francisco's Lincoln Outfall Maintenance on Ocean Beach, San Francisco County, California	1-1-00-I-3137	30-Oct-00	c	x			x																		Ocean Beach
Serpentine Coastal Bluff Restoration Projects at the Presidio, San Francisco, California	1-1-01-I-589	26-Dec-00	c	x													x	x		x					Presidio
Presidio Trust Implementation Plan	1-1-01-?-3019	29-Jan-01	m																						Presidio
Informal Consultation for Project at Presidio of San Francisco, San Francisco County, California	1-1-01-I-1272	14-Mar-01	c	x																	x				Presidio
Concurrence for Not Likely to Adversely Affect Determination for the Easkoot Creek Restoration Project, Marin County, California	1-1-01-I-2886	19-Sep-01	c	x								x													Stinson Beach
Request for Concurrence for Not Likely to Adversely Affect for Fill Site 5 Project, Presidio of San Francisco, San Francisco County, California	1-1-01-I-2894	10-Oct-01	c	x													x	x		x					Presidio

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Annual Report for the Endangered Mission Blue Butterfly at the Golden Gate Recreation Area, California	1-1-01-I-????	18-Oct-01		x					x		x														Park Wide
Request for Concurrence for the Milagra Ridge Oxidation Pond Management, San Mateo County, California	1-1-00-I-3115	9-Nov-01	c	x								x	x												Milagra Ridge
Concurrence with Not Likely to Adversely Affect Determination for the Threatened California Red-legged Frog as a result of the Removal of Branches and Other Debris in Redwood Creek at Muir Beach, Marin County, California	1-1-02-I-0814	7-Feb-02	c	x								x													Muir Beach
Reinitiation of Formal Endangered Species Consultation on the Proposed Trails, Special Events, and Resource Management Plan, Golden Gate National Recreation Area, Marin County, California	1-1-02-F-0080	10-Feb-02	TBD		x						x														Marin Co. Lands
Concurrence with Not Likely to Adversely Affect Determination for the Threatened California Red-legged Frog as a Result of the Flood Control Activities at Muir Beach, Marin County, California	1-1-02-I-2345	18-Jun-02	c	x								x													Muir Beach

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Formal Consultation on Four Projects at the Presidio of San Francisco and Golden Gate National Recreation Area, San Francisco, California	1-1-02-F-0228	23-Jul-02	TBD		x										x		x	x		x	x				Presidio
Concurrence with Not Likely to Adversely Affect Determination for the Threatened California Red-legged Frog and the Northern Spotted Owl as a Result of the Lower Redwood Creek Interim Flood Reduction measures and Floodplain/Channel Restoration Project, Near Muir Beach, Marin County, California	1-1-02-I-2747	4-Sep-02		x				x				x													Muir Beach
Endangered Species Consultation on the Proposed Removal of Haypress Dam in Tennessee Valley, Marin County, California	1-1-02-F-0219	17-Sep-02	c		x							x													Tenness ee Valley
Concurrence with Not Likely to Adversely Affect Determination for the Endangered Mission Blue Butterfly as a Result of the Broom Removal Project at Fort Baker in Marin County, California	1-1-02-I-3390	26-Nov-02		x							x														Fort Baker
Review of Proposed French Broom Control at Fort Baker, Marin County, California	1-1-03-I-2614	4-Aug-03		x							x														Fort Baker

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Concurrence with Not Likely to Adversely Affect Determination for Seven Listed Species and Proposed Critical Habitat as a Result of the Cape Ivy Removal Project, Point Reyes National seashore, and Golden Gate National Recreation Area, Marin and San Mateo Counties, California	1-1-04-I-1608	29-Apr-04	o	x				x		x	x	x	x												Park Wide
Threatened California Red-legged Frog, Proposed Critical habitat for the Threatened California Red-legged Frog, and the Endangered Mission Blue Butterfly, and the Marine Mammal Center Site and Facilities Improvements Project, GGNRA, Marin County, California	1-1-04-I-2560	31-Aug-04		x							x	x													Rodeo Valley
Informal Endangered Species Consultation on the Ralston White Estate Fuels Reduction Project, Mill Valley, Marin County, California	1-1-04-I-2616	9-Sep-04		x				x																	Muir Woods?
Concurrence with Not Likely to Adversely Affect Determination for the Threatened California Red-legged Frog as a result of the Construction of Habitat for This Listed Animal at Muir Beach, Marin County, California	1-1-05-I-0035	12-Oct-04		x								x													Muir Beach

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Section 7 Formal Consultation on the Proposed Enhancement of San Francisco Garter Snake Foraging Habitat at Mori Point in Pacifica, San Mateo County, California	1-1-05-F-0063	27-Oct-04	TBD		x							x	x												Mori Point
Concurrence with Not Likely to Adversely Affect Determination for the Threatened California Red-legged Frog as a result of the Project to Reduce Flooding of a Road at Redwood Creek at Muir Beach, Marin County, California	1-1-04-I-2833	23-Nov-04		x								x													Muir Beach
Informal Consultation on the proposed Stinson Beach Power Pole Removal Project located on the Shoreline Highway, Marin County, California	8-14-2005-2591	4-Feb-05		x				x																	Stinson Beach
Amendment to Biological Opinion for the Modification of Three Environmental Remediation Sites, and the Presidio Trails and Bikeways management Plan, The Presidio, San Francisco, California (USFWS file 1-1-02-F-0228)	1-1-05-F-0225	31-Aug-05	TBD		x										x										Presidio
Concurrence with Not Likely to Adversely Affect Determination for the Threatened California Red-legged Frog as a result of the Interim Project to Reduce Flooding at Lower Redwood	1-1-05-I-2043	5-Oct-05		x								x													Muir Beach

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Creek at Muir Beach, Marin County, California																									
Formal Consultation on the Fire Management Plan for Muir Woods National Monument, Golden Gate National Recreation Area, and Fort Point National Historic Site in Marin, San Francisco, and San Mateo Counties, California	1-1-05-F-0104	7-Oct-05	TBD		x	x	x	x		x	x	x	x	x	x		x	x		x		x	x		Park Wide
Formal Consultation on the Mori Point Restoration and Trail Plan in the Golden Gate National Recreation Area in the City of Pacifica, San Mateo County, California	1-1-06-F-1575	13-Jul-06	O		x							x	x													Mori Point
Concurrence with Not Likely to Adversely Affect Determination for the Threatened Pacific Coast Populations of the Western Snowy Plover as a result of the Compendium Amendment Public Use Limit for Dogs at Crissy Field and Ocean Beach at the Golden Gate National Recreation Area in San Francisco County, California	1-1-07-I-0106	31-Oct-06	O	x			x																			Crissy Field, Ocean Beach

Document Title	USFWS Ref. No.	Consultation Date	Status (C=completed; O=ongoing; I=indefinite; TBD=To Be Det'd; M=Merged ; NA=not applicable)	Informal	Formal/BO	Marbled Murrelet	Western Snowy Plover	Northern Spotted owl	Blue Copper butterfly	San Bruno elfin Butterfly	Mission blue Butterfly	California red-legged frog	San Francisco garter snake	tidewater goby	San Francisco Lessingia	Marsh sandwort	Raven's manzanita	Presidio clarkia	San Francisco Owl's-clover	Marin Dwarf Flax	California seablite	Salt Marsh Harvest Mouse	California Brown Pelican	Callippe Silverspot Butterfly	Geographic Location
Amendment to Concurrence with Not Likely to Adversely Affect Determination for the Threatened Pacific Coast Populations of the Western Snowy Plover as a result of the Compendium Amendment Public Use Limit for Dogs at Crissy Field and Ocean Beach at the Golden Gate National Recreation Area in San Francisco County, California (1-1-07-I-106)	1-1-07-I-0117	2-Nov-06	O	x			x																		Crissy Field, Ocean Beach
Biological Opinion on the 2002 Flood Reduction Actions, and proposed Creek and Floodplain Restoration Actions at the Banducci site on Redwood Creek at Muir Beach in the Golden Gate National Recreation Area, Marin County, California	1-1-07-F-0062	22-Dec-06	TBD		x							x													Muir Beach
Formal Consultation and Conference on the Marin Headlands/Fort Baker Transportation Management Plan and the Coastal Corridor Enhancement Plan for the Golden Gate National Recreation Area in Marin County, California (National Park Service File No. L76 (GOGA-Plan))	1-1-06-F-0163	17-Apr-07	O		x		x				x	x		x								x	x		Marin Headlands

Document Title	USFWS Ref. No.	Consultation Date	Status (C=completed; O=ongoing; I=indefinite; TBD=To Be Det'd; M=Merged ; NA=not applicable)	Informal	Formal/BO	Marbled Murrelet	Western Snowy Plover	Northern Spotted owl	Blue Copper butterfly	San Bruno elfin Butterfly	Mission blue Butterfly	California red-legged frog	San Francisco garter snake	tidewater goby	San Francisco Lessingia	Marsh sandwort	Raven's manzanita	Presidio clarkia	San Francisco Owl's-clover	Marin Dwarf Flax	California seablite	Salt Marsh Harvest Mouse	California Brown Pelican	Callippe Silverspot Butterfly	Geographic Location
Formal Consultation on the Connemara Conservation Easement Dedications Development Project, City of Pacifica, San Mateo County, California (National Park Service File No. N1621 (GOGA-Plan))	1-1-07-F-0169	29-Jun-07	O		x					x	x	x	x												Milagra Ridge, Connemara dedication parcel
Concurrence with Not Likely to Adversely Affect Determination for the Threatened Pacific Coast Populations of the Western Snowy Plover as a result of the Compendium Amendment Public Use Limit for Dogs at Crissy Field and Ocean Beach at the Golden Gate National Recreation Area in San Francisco County, California	1-1-07-I-1240	29-Jun-07		x			x																		Crissy Field, Ocean Beach
Biological Opinion on the Wetland and Creek Restoration at Big Lagoon Project at the Golden Gate National Recreation Area in Marin County, California	81420-2008-0860	5-Feb-08	TBD		x							x													Muir Beach
Biological Opinion on the Dias Ridge Restoration and Trails Improvement Project in the Golden Gate National Recreation Area, Marin County, California	81420-2008-F-1066	1-May-08	C		x							x													Muir Beach, Mt. Tamalpais
Consultation on the Vincente Outfall Repair Project on Ocean Beach at GGRNA, San Francisco, San Francisco County, California	81420-2008-I-1647	16-Jul-08		x			x																		Ocean Beach

Document Title	USFWS Ref. No.	Consultation Date	Status (C=completed; O=ongoing; I=indefinite; TBD=To Be Det'd; M=Merged ; NA=not applicable)	Informal	Formal/BO	Marbled Murrelet	Western Snowy Plover	Northern Spotted owl	Blue Copper butterfly	San Bruno elfin Butterfly	Mission blue Butterfly	California red-legged frog	San Francisco garter snake	tidewater goby	San Francisco Lessingia	Marsh sandwort	Raven's manzanita	Presidio clarkia	San Francisco Owl's-clover	Marin Dwarf Flax	California seablite	Salt Marsh Harvest Mouse	California Brown Pelican	Callippe Silverspot Butterfly	Geographic Location
Consultation on the Rulemaking to Require Dogs be Walked on Leash at Crissy Field Wildlife Protection Area and Ocean Beach Snowy Plover Protection Area at Golden Gate National Recreation Area, San Francisco, San Francisco County, California	81420-2009-I-0079	6-Nov-08		x			x																		Crissy Field, Ocean Beach
Reinitiation of Formal Consultation for the Environmental Remediation, Trails and Bikeways, and Presidio Trust Implementation Plan at the Presidio and the Golden Gate national Recreation Area in San Francisco, California	1-1-05-I-0035	13-Apr-09		x											x										Presidio
Assessment of Effects to the Threatened California Red-legged Frog for the Proposed Old Springs trails Rehabilitation Project, Tennessee Valley, Golden Gate National Recreation Area, Marin County, California (GGNRA File Number N1621 (GOGA-MRMR))	81420-2009-I-0744	17-Sep-09	C	x								x													Tennessee Valley
Enhancement of Baker Beach Corridor Area and Duff Removal at Landfill 10 and the Biological Opinion for the Environmental Remediation, Trails and Bikeways, and Presidio Trust Implementation Plan at the	81420-2009-I-0664-4	13-Aug-10		x											x										Presidio

Document Title	USFWS Ref. No.	Consultation Date	Status (C=completed; O=ongoing; I=indefinite; TBD=To Be Det'd; M=Merged ; NA=not applicable)	Informal	Formal/BO	Marbled Murrelet	Western Snowy Plover	Northern Spotted owl	Blue Copper butterfly	San Bruno elfin Butterfly	Mission blue Butterfly	California red-legged frog	San Francisco garter snake	tidewater goby	San Francisco Lessingia	Marsh sandwort	Raven's manzanita	Presidio clarkia	San Francisco Owl's-clover	Marin Dwarf Flax	California seablite	Salt Marsh Harvest Mouse	California Brown Pelican	Callippe Silverspot Butterfly	Geographic Location
Presidio and the Golden Gate National Recreation Area in San Francisco, California																									
Reinitiation of Formal Consultation on the Wetland and Creek Restoration at Big Lagoon Project at the Golden Gate National Recreation Area in Marin County, California (Service File #81420-2008-F-0860)	81420-2008-F-0860-R001	27-Aug-10	TBD		x							x													Muir Beach
Biological Opinion on the Headlands Institute in the Golden Gate National Recreation Area, Marin County, California	81420-2001-F-0095	1-Dec-10	TBD		x							x		x											Rodeo Valley
Biological Opinion for the State Route 1, Postmile 6.6, Soldier Pile Tieback Retaining Wall Project, Marin County, California (Caltrans EA 04-3S900) on the California Red-Legged Frog	81420-2010-F-0147-3	21-Dec-10	TBD		x							x													Banducci
Endangered Species and the Proposed Testing for Lead and Other Contaminants at the Former Pistol Range at Fort Funston in the Golden Gate National Recreation Area in San Francisco County, California	81420-2011-I-0165	23-Dec-10			x										x										Fort Funston

Document Title	USFWS Ref. No.	Consultation Date	Status (C=completed; O=ongoing; I=indefinite; TBD=To Be Det'd; M=Merged ; NA=not applicable)	Informal	Formal/BO	Marbled Murrelet	Western Snowy Plover	Northern Spotted owl	Blue Copper butterfly	San Bruno elfin Butterfly	Mission blue Butterfly	California red-legged frog	San Francisco garter snake	tidewater goby	San Francisco Lessingia	Marsh sandwort	Raven's manzanita	Presidio clarkia	San Francisco Owl's-clover	Marin Dwarf Flax	California seablite	Salt Marsh Harvest Mouse	California Brown Pelican	Callippe Silverspot Butterfly	Geographic Location
Formal Consultation for the Outplanting of Marsh Sandwort Project in the Rodeo Valley Wetland Complex in the Golden Gate National Recreation Area, Marin County, California (8-8-12-FW-03)	08EVEN00-2012-F-0015	6-Dec-11	TBD		x							x				x										Rodeo Valley

Attachment 4

GOLDEN GATE NATIONAL RECREATION AREA
USFWS-GGNRA T&E EVALUATION MATRIX
PEPC NUMBER:_____

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1) What Federally-listed species and functional habitat (e.g., breeding, rearing, or dispersal habitat) are in the project area (use the most recent T&E habitat maps provided by NR)?

2) Is the proposed activity considered a routine park operation as described in the Biological Opinion?

3) Does the proposed activity provide mitigation equivalent to measures described in the terms and conditions of the Biological Opinion?

4) Does proposed project impact potential T&E habitat and if so, what is the impacted acreage by effect type (permanent or temporary) (Fill out table)

Example

Activity	Species	Affected Habitat	Permanent (acres)	Temp Habitat (acres)	Temp Disturb (y/n)?
Reroute Donut Trail	CRLF	Upland	0.1	0.2	Y
CRLF interpretive walk at Mori Pt	CRLF	n.a	0	0	Y

CRLF habitats categorized as aquatic breeding, non-breeding aquatic/riparian, upland, and dispersal habitats

5) What is proposed compensatory mitigation (type, acreage)?
Example

Activity	Species	Affected Habitat	Permanent (2:1 acres)
Reroute Donut Trail	CRLF	Upland	0.2

Determination Options

1. Does the proposed activity have the potential to adversely affect listed species and/or critical habitat? ☐ No ☐ Yes

    a. If Yes, what listed species or critical habitat may be affected?

    b. If YES, does the proposed activity conform with the terms of the BO such that it would be covered under this consultation? ☐ No ☐ Yes

    c. If NO, does proposed project achieve compliance if additional measures from the BO are implemented or if project activities are changed?

    ☐ No ☐ Yes (Recommend separate informal or formal consultation to project manager)

Additional Determination Comments

Reviewed By Natural Resource Staff:

Name:_____ Date:_____
Title:

Attachment 4 (from Erler &Kalinowski Inc. 2002)

TABLE 7-2
SUMMARY OF SELECTION OF PRELIMINARY REMEDIATION GOALS AND PROPOSED CLEANUP LEVELS FOR NON-PETROLEUM COMPOUNDS IN SOIL

Presidio of San Francisco, California

Potential Chemical of Concern	Ecological: Summary of Plant and Soil Fauna PRGs (mg/kg); (a)			Ecological: Summary of Wildlife PRGs (mg/kg); (a)			Ecological: Proposed Buffer Zone PRGs (mg/kg); (b)	Ecological: Proposed Special Status PRGs (mg/kg); (c)	Human Health: Proposed PRGs (mg/kg); (d)			Lithology: Presidio Background Metals Concentrations by Lithology (mg/kg); (e)				Notes (f)
	PRG_{low}	PRG_{tech}	Arithmetic Mean	PRG_{low}	PRG_{high}	Arithmetic Mean			Residential	Recreational	Comm/Ind.	Serpentinite	Colma	Beach/Dune	Chert/Shale	
Inorganic Chemicals																
Antimony	5	5	5	162	490	326	5	5	20	70	760	$3.0^{(BK)}$	$3.0^{(BK)}$	$3.0^{(BK)}$	$3.0^{(BK)}$	1
Arsenic	10	224	117	46	692	369	64 (g)	10	0.36	0.88	3.3	$5.8^{(95\%UCL)}$	$6.2^{(95\%UCL)}$	$5.9^{(95\%UCL)}$	$3.2^{(Max)}$	2
Barium	500	500	500	320	3,200	1,760	500	320	5,000	12,000	130,000	$230^{(95\%UCL)}$	$180^{(95\%UCL)}$	$120^{(95\%UCL)}$	$900^{(95\%UCL)}$	3
Beryllium	10	10	10	160	8,800	4,080	10	10	140	350	3,800	$1.3^{(Max)}$	$0.99^{(95\%UCL)}$	$0.89^{(95\%UCL)}$	$0.72^{(95\%UCL)}$	1
Cadmium	4	100	52	0.017	0.44	0.23	0.23	0.017	1.7	4.2	16	$1.9^{(Max)}$	$0.8^{(BK)}$	$1.7^{(Max)}$	$1.7^{(Max)}$	2
Chromium	5	200	103	4	42	23	23	4	1,200 (h)	3,800 (h)	18,000 (h)	$8,700^{(95\%UCL)}$	$140^{(95\%UCL)}$	$120^{(95\%UCL)}$	$41^{(95\%UCL)}$	2
Cobalt	20	75	48	220	3,300	1,760	48	20	4,000	10,000	110,000	$170^{(95\%UCL)}$	$21^{(95\%UCL)}$	$16^{(95\%UCL)}$	$37^{(95\%UCL)}$	3
Copper	50	400	225	30	200	115	120	30	- (i)	-	-	$85^{(95\%UCL)}$	$40^{(95\%UCL)}$	$43^{(95\%UCL)}$	$360^{(95\%UCL)}$	3
Cyanide	-	-	-	6,298	18,894	12,596	13,000	6,300	1,000	2,500	23,000	-	-	-	-	4
Lead (j)	-	-	-	-	-	-	300	160	400	800	3,500	$65^{(95\%UCL)}$	$7.5^{(95\%UCL)}$	$57^{(95\%UCL)}$	$45^{(Max)}$	1
Tetraethyl Lead	-	-	-	1.1	52	27	27	1.1	0.0052	0.013	0.11	-	-	-	-	4
Mercury	0.3	10	5.15	0.038	12	6	1.6 (g)	0.4 (k)	20	52	570	$0.2^{(BK)}$	$0.2^{(BK)}$	$0.2^{(BK)}$	$0.2^{(BK)}$	1
Molybdenum	-	-	-	11.5	582	297	300	12	360	870	9,400	$2.0^{(BK)}$	$2.0^{(BK)}$	$2.0^{(BK)}$	$2.0^{(BK)}$	1
Nickel	30	500	265	58	1,440	749	71 (g)	30	1,600	3,800	38,000	$4,500^{(95\%UCL)}$	$110^{(95\%UCL)}$	$70^{(95\%UCL)}$	$71^{(95\%UCL)}$	2
Selenium	1	70	35.5	0.29	2	1	1.1	0.2	360	870	9,400	$0.5^{(BK)}$	$0.5^{(BK)}$	$0.75^{(Max)}$	$0.5^{(BK)}$	1
Silver	2	2	2	6	144	75	2	2	360	870	9,400	$1.7^{(Max)}$	$1.0^{(BK)}$	$1.0^{(BK)}$	$1.0^{(BK)}$	1
Thallium	1	1	1	0.15	39	20	1	0.15	5.7	14	150	$1.0^{(BK)}$	$1.0^{(BK)}$	$1.0^{(BK)}$	$1.0^{(BK)}$	2
Vanadium	2	20	11	2	8	5	5	2	650	1,600	17,000	$74^{(Max)}$	$90^{(95\%UCL)}$	$92^{(95\%UCL)}$	$61^{(95\%UCL)}$	2
Zinc	50	864	457	4	97	51	50	4	22,000	52,000	570,000	$160^{(95\%UCL)}$	$60^{(95\%UCL)}$	$66^{(95\%UCL)}$	$120^{(95\%UCL)}$	2
Semivolatile Organic Compounds																
Acenaphthene	30	50	40	84	2,547	1,316	40	30	2,700	6,600	55,000	-	-	-	-	3
Acenaphthylene	30	50	40	84	2,547	1,316	40	30	-	-	-	-	-	-	-	3
Anthracene	30	50	40	84	2,547	1,316	40	30	14,000	33,000	280,000	-	-	-	-	3
Benzo(a)anthracene	30	50	40	84	2,547	1,316	40	30	0.27	0.65	2.3	-	-	-	-	4
Benzo(a)pyrene	30	50	40	84	2,547	1,316	40	30	0.027	0.065	0.23	-	-	-	-	4
Benzo(b)fluoranthene	30	50	40	84	2,547	1,316	40	30	0.27	0.65	2.3	-	-	-	-	4
Benzo(g,h,i)perylene	30	50	40	84	2,547	1,316	40	30	-	-	-	-	-	-	-	1
Benzo(k)fluoranthene	30	50	40	84	2,547	1,316	40	30	0.27	0.65	2.3	-	-	-	-	4
Benzyl Alcohol	-	-	-	1	164	83	40 (j)	1	14,000	33,000	280,000	-	-	-	-	1
Chrysene	30	50	40	84	2,547	1,316	40	30	2.7	6.5	23	-	-	-	-	4
Dibenzo(a,h)anthracene	30	50	40	84	2,547	1,316	40	30	0.078	0.19	0.67	-	-	-	-	4
Dibenzofurans	-	-	-	-	-	-	-	-	910	2,200	18,000	-	-	-	-	4
Fluoranthene	30	50	40	84	2,547	1,316	40	30	1,800	4,400	37,000	-	-	-	-	3
Fluorene	30	50	40	84	2,547	1,316	40	30	1,800	4,400	37,000	-	-	-	-	1

Potential Chemical of Concern	Ecological						Proposed Buffer Zone PRGs (mg/kg); (b)	Proposed Special Status PRGs (mg/kg); (c)	Human Health			Lithology				Notes (f)
	Summary of Plant and Soil Fauna PRGs (mg/kg); (a)			Summary of Wildlife PRGs (mg/kg); (a)					Proposed PRGs (mg/kg); (d)			Presidio Background Metals Concentrations by Lithology (mg/kg); (e)				
	PRG_{low}	PRG_{high}	Arithmetic Mean	PRG_{low}	PRG_{high}	Arithmetic Mean			Residential	Recreational	Comm/Ind.	Serpentinite	Colma	Beach/Dune	Chert/Shale	
Semivolatile Organic Compounds																
Indeno(1,2,3-cd)pyrene	30	50	40	84	2,547	1,316	40	30	0.27	0.65	2.3	-	-	-	-	4
2-methylnaphthalene	30	50	40	84	2,547	1,316	40	30	-	-	-	-	-	-	-	1
4-methylphenol (p-Cresol)	50	50	50	11,167	55,782	33,474	50	50	260	640	5,600	-	-	-	-	1
Naphthalene	30	50	40	84	2,547	1,316	40	30	910	2,200	18,000	-	-	-	-	1
n-nitrosodiphenylamine	20	109	65	16,983	50,942	33,962	65	20	43	104	380	-	-	-	-	5
Pentachlorophenol	3	4	3.5	22	660	341	3.5	3	5	12	42	-	-	-	-	1
Phenanthrene	30	50	40	84	2,547	1,316	40	30	-	-	-	-	-	-	-	1
Phenol	30	188	109	2,547	7,641	5,094	109	30	27,000	76,000	550,000	-	-	-	-	1
Pyrene	30	50	40	84	2,547	1,316	40	30	1,400	3,300	28,000	-	-	-	-	1
Volatile Organic Compounds																
Acetone	-	-	-	8,490	127,356	67,923	68,000	8,500	0.24 (m)	0.24 (m)	0.24 (m)	-	-	-	-	4
2-butanone (MEK)	-	-	-	4,245	25,471	14,858	15,000	4,200	3.8 (m)	3.8 (m)	3.8 (m)	-	-	-	-	4
Carbon disulfide	-	-	-	934	28,018	14,476	14,000	934	200 (m)	200 (m)	200 (m)	-	-	-	-	4
1,4-dichlorobenzene	20	128	74	2,123	12,736	7,429	74	20	0.13 (m)	0.59 (m)	0.49 (m)	-	-	-	-	4
p-isopropyltoluene (p-cymene)	200 (a)	1,900 (a)	600 (a)	2,207 (a)	22,075 (a)	12,141 (a)	600 (a)	200 (a)	130 (m)	130 (m)	130 (m)	-	-	-	-	4
Methylene Chloride	-	-	-	459	34,377	17,418	17,000	459	0.076 (m)	0.076 (m)	0.076 (m)	-	-	-	-	4
1,2,3-trichlorobenzene (o)	20	115	67.5	-	-	-	68	20	15 (m)	15 (m)	15 (m)	-	-	-	-	4
1,2,4-trichlorobenzene	20	127	73.5	-	-	-	74	20	15 (m)	15 (m)	15 (m)	-	-	-	-	4
Trichlorofluoromethane	-	-	-	-	-	-	-	-	40 (m)	80 (m)	80 (m)	-	-	-	-	4
1,1,1-trichloroethane	-	-	-	9,679	1,451,858	730,768	730,000	9,700	8 (m)	8 (m)	8 (m)	-	-	-	-	4
PCBs, Pesticides, and Herbicides																
PCBs (Aroclor 1254)	40	240	140	0.010	0.45	0.23	0.23	*0.033*	0.16	0.39	1 (p)	-	-	-	-	1
Aldrin	-	-	-	0.0039	0.19	0.1	0.1	0.0039	0.029	0.07	0.26	-	-	-	-	5
alpha-BHC	-	-	-	0.062	9.8	4.9	2.4 (g)	0.062	0.18	0.44	1.6	-	-	-	-	5
beta-BHC	-	-	-	0.062	9.8	4.9	2.4 (g)	0.062	0.32	0.79	2.9	-	-	-	-	5
delta-BHC	-	-	-	0.062	9.8	4.9	2.4 (g)	0.062	0.18	0.44	1.6	-	-	-	-	5
Chlordane	-	-	-	0.0090	0.071	0.04	0.04	0.0090	0.37	0.91	3.4	-	-	-	-	1
2,4-D	-	-	-	-	-	-	5	*0.025*	620	1,500	15,000	-	-	-	-	1
Dieldrin	-	-	-	-	-	-	5	*0.01*	1,890	4,500	44,000	-	-	-	-	1
4,4'-DDD	40	200	120	0.049	2.4	1.2	0.53 (g)	0.049	2.0	4.9	18	-	-	-	-	1
4,4'-DDE	40	200	120	0.098	2.4	1.3	0.61 (g)	0.098	1.4	3.5	13	-	-	-	-	1
4,4'-DDT	40	200	120	0.0082	2.4	1.2	0.53 (g)	0.0082	1.4	3.5	13	-	-	-	-	1
Dieldrin	50	100	75	0.039	0.48	0.26	0.26	0.039	0.030	0.074	0.27	-	-	-	-	5
Endosulfan	-	-	-	1.1	5.5	3.3	3.3	1.1	370	900	8,700	-	-	-	-	1
Endosulfan Sulfate (o)	-	-	-	1.1	5.5	3.3	3.3	1.1	370	900	8,700	-	-	-	-	1
Endrin	-	-	-	0.0035	0.50	0.25	0.11 (g)	*0.004*	18	45	440	-	-	-	-	1
Endrin Aldehyde (o)	-	-	-	0.0035	0.50	0.25	0.11 (g)	*0.004*	18	45	440	-	-	-	-	1
Endrin Ketone (o)	-	-	-	0.0035	0.50	0.25	0.11 (g)	*0.004*	18	45	440	-	-	-	-	1

Potential Chemical of Concern	Ecological								Human Health			Lithology				Notes (f)
	Summary of Plant and Soil Fauna PRGs (mg/kg); (a)			Summary of Wildlife PRGs (mg/kg); (a)			Proposed Buffer Zone PRGs (mg/kg); (b)	Proposed Special Status PRGs (mg/kg); (c)	Proposed PRGs (mg/kg); (d)			Presidio Background Metals Concentrations by Lithology (mg/kg); (e)				
	PRG_{low}	PRG_{high}	Arithmetic Mean	PRG_{low}	PRG_{high}	Arithmetic Mean			Residential	Recreational	Comm/Ind.	Serpentinite	Colma	Beach/Dune	Chert/Shale	
PCBs, Pesticides, and Herbicides																
gamma-BHC (Lindane)	-	-	-	0.016	1.6	0.8	0.37 (g)	0.016	0.44	1.1	4.0	-	-	-	-	5
Heptachlor	-	-	-	0.017	7.4	3.7	3.7	0.017	0.12	0.29	1.1	-	-	-	-	5
Heptachlor Epoxide	-	-	-	0.017	7.4	3.7	3.7	0.017	0.088	0.21	0.79	-	-	-	-	5
Iodrin (a)	-	-	-	0.0039	0.19	0.1	0.1	0.0039	0.029	0.069	0.26	-	-	-	-	5
MCPP	-	-	-	-	-	-	-	5.6	-	-	-	-	-	-	-	1
Methoxychlor	-	-	-	0.44	35	18	18	0.44	310	750	7,300	-	-	-	-	1

Message

From: mary355[Exemption 6]t [mary355@g[Exemption 6]]
Sent: 8/9/2013 3:36:21 PM
To: Susie Bennett [srbennett@nps.gov]
CC: Merkle, William [bill_merkle@nps.gov]; Darren Fong [Darren_Fong@nps.gov]
Subject: Re: Mori pet flyer

Hi Susie,
Here's another go at it, taking into account the suggestions of Alex and Shirwin.
Please feel free to forward this on to them.
Comments are in the attached text and below in **bold**.
Thanks,
Mary

From: Susie Bennett
Sent: Monday, July 22, 2013 5:02 PM
To: Mary Petrili
Cc: Merkle, William ; Darren Fong
Subject: Re: Mori pet flyer

Hi all,
I spoke to Alex Picavet today about the flier. (She happened to be talking with Shirwin Smith, who also weighed in on the flier.) Alex has actually led workshops about "Living with Wildlife" in Washington and had a lot of good insight for us. I'm attaching the word document with my proposed edits based on her/Sherwin's thoughts.

General:
We should consider offering slide shows for people to understand the issues. (Alex offered to lead them.)
Okay...but once you set up a "Neighborhood Meeting" you are making it a bigger issue, but if Alex is ready for it, great.
We should see if we can have anyone from the Humane Society join us on the ground for the outreach.
Let's get their feedback on the flyer. I think if they were with me on the door to door it would change the casual tone, but if at Alex's presentation, great.
We don't want to sound "preachy."
Removed preachy stuff.
Expect anything we write to be published elsewhere in future years, and potentially used "against us" in a PR battle. to minimize this risk, reduce text and keep it basic and keep it local focused. **Made more specific to Mori.**
Reduce text whenever possible. **Yep.**
Would be nice to include rodenticide impacts on rodent-eating birds if possible.
I don't think this is a problem at Mori – perhaps b/c of all those roaming cats? Would be happy to discuss further.

Items below addressed within revised text attached, tx.

Intro paragraph-- make this more local and less over-arching since we have different rules/expectations at different parts of the park. (Again, keep it in geographic context.) Don't make the judgement call that living by the park is a privilege. Let people make that assumption so we're not pushing it in their face this soon in the flier if they don't already think that living so close to the park is less of a privilege than a sentence. Highlight successes--numbers of spp. rebounding, but still being threatened. Ask for help.

Predator paragraph-- to avoid the chance that people may want to hunt raptors to protect their pets, we should not call out the impacts of raptors specifically.
"Keep dogs on leash paragraph"--Must say dogs at "Mori Point should be on leash" or similarly focused sentence. Recommend people pick up small children and pets, not "dogs" in particular. Emphasize throwing small rocks toward predators to reduce likelihood of hurting animals.

Abandoned Pets paragraph--almost reads like we're giving people a death sentence for releasing their unwanted pets if you don't read it carefully.

2nd page, predators paragraph--remove "off-leash" description and replace with roaming pets to include impacts of cats.

bolded CFR sentence-- this CFR also allows for the killing of animals, so we need to tone it down by adding in that we are trying to encourage people to keep their pets out of the park to avoid enforcing this.

Feeding stations-- change to feeding animals outside to minimize the thouyghts of feral cat feeding stations. This is beyond feral cats.

Even wild birds paragraph--not necessary if we're low on space. the not feeding animals in the park CFR is the one we'd be more likely to enforce on the ground, so we should list that as well.

So, thoughts?

-Susie

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540
email: susie_bennett@nps.gov

On Mon, Jul 15, 2013 at 8:39 PM, <mary355@[Exemption 6]> wrote:
Great! Thanks Bill!
Suz, please call when you have a chance to get this rolling...~M.

From: Merkle, William
Sent: Monday, July 15, 2013 6:09 PM
To: Mary Petrili
Cc: Susie Bennett ; Darren Fong
Subject: Re: Mori pet flyer

Looks good to me!

Thanks Mary!

Let's hit the street with it.

-b

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Fri, Jul 12, 2013 at 8:05 PM, <mary355 **Exemption 6** wrote:
Attached are comments on your comments...
If you're ready to let this go, Bill, then Susie and Michelle can get this out to a few more folks for their comments.
Mary

p.s. Hey, if "wipe out" is too much drama, how about "devastate?" I didn't want to water it down (ugh, no pun intended)
too much – and "harm" used already, "significantly reduce" too boring, etc...I do worry about bullfrogs being dropped over that bridge and people are still dumping stuff there. Makes me crazy.

From: Merkle, William
Sent: Monday, July 01, 2013 6:00 PM
To: Susie Bennett
Cc: Mary Petrili ; Darren Fong
Subject: Re: Fw: Mori pet flyer

I made two small comments on attached.

And want to think through use of "wipe out" for the native frog example--think it is ok--but trying to channel Darren while he is out too.

Good job!
-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Jul 1, 2013 at 1:13 PM, Susie Bennett <srbennett@nps.gov> wrote:
Thanks, Mary! Michelle is super busy right now, but I'll see what I can do to get these edits back into the flier format.

FYI--we're going to create a straight-to-voicemail hotline for this with the NPS IT department and I think I'll probably be checking that.
-Susie

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540
email: susie_bennett@nps.gov

On Fri, Jun 28, 2013 at 9:46 PM, <mary355@c Exemption 6 wrote:
Hi Susie,
Attached is the revised text for the Mori pet flyer with many of the great suggestions from Bill and Darren. (Thank you! I have responded to your comments below in **bold** to give you an understanding of the changes.) I think it would be great if Michelle could work her magic again in re-cutting and pasting this (with your new picture too, Suz.) Then perhaps we could release this to the last group for final edits so that I have this all in hand soon for my door-to-door duty.
Thanks again,
Mary
p.s. I had to rework the first paragraph due to the deletion of those environmental hazards. I also tried to make it more inspiring for Bill. AACK - I don't think I succeeded, sorry! – but I'm sure someone will change it anyway. haha

From: Susie Bennett
Sent: Tuesday, June 04, 2013 3:55 PM
To: Merkle, William
Cc: mary355@c Exemption 6
Subject: Re: Mori pet flyer

Hi--
Thanks for working on these! Mary, I know you wanted to take a stab at these before handing edits over to Michelle to incorporate into the formatted version. Let us know when you've done that and I'll send revisions over to Michelle.

As for documentation of the hawks picking up cats, I've personally seen it twice. (Once during the project at Mori--several construction guys and biomonitors saw it too. The more recent time was Christina and me. I can't recall what we were doing specifically, but we were too flabbergasted to take a photo or anything formal.)

-Susie

On Fri, May 31, 2013 at 11:24 AM, Merkle, William <bill_merkle@nps.gov> wrote:

Hi,

Darren was timely in getting his comments to me--and I am just getting back to this.

Title:

what about "Your pet(s) in National Parks" **Could be construed as a guide for bringing your pet to the park.**

Predators:

1st paragraph: Coyotes, bobcats, and mtn. lions all will prey on cats and dogs—foxes may take small cats or kittens. Think general message is that domesticated animals are easy (pickings) prey for these predators. **Yes – I included foxes b/c people see and know of at least one around here so it's more real.**

Outdoor feeding has its own suite of problems. Primarily attracting wild animals and food conditioning/habituation. Outdoor feeding attracts coyotes, foxes, raccoons, skunks, opossums, ravens, crows, and even rats. **Thanks, I couldn't add them all, but just saw a rat running along a neighbor's fence the other day, so put that in.**

For the coyote example: coyotes will eat cats and dogs even without feeding. Feeding does attract them to an area—so probably makes it more likely of a pet getting attacked. Loss of fear is fine—think this is also related to increased chance of an encounter near house and because animal may be regularly checking and expecting to find food. **O.K.**

I would move hawk paragraph up to second, then follow with what to do when approached by threatening animal. **O.K.**

> Darren wanted to make sure we had documentation of hawks snatching up cats—that we weren't going to be accused of sensationalizing this. Pretty sure that we do have this. **See Susie's note above.**

I think another issue is that outdoor cats are frequently injured in fights with other outdoor cats. **O.K. emphasized in "Abandoned Pets"**

Diseases:

Think we should italicize Toxoplasma. **O.K.**

We suggest dropping the title and sentence on Environmental hazards. **O.K... changed to Abandoned Pets and dropped environmental hazards**

Retitle: Don't Release Pets in National Parks **Changed to Abandoned Pets**

Lead in with Regulations prohibit release of pets into the park. Then keep info about release of pets. **Already have regulation for removal of pets in parks...think that's more important for this flyer.**

Threats to Wildlife

Predators

Do we want to say Even well fed cats will follow their instincts ... **Yes! Thank you.**

Off-leash dogs can disturb (through chasing), displace, and even hunt wildlife. **O.K.**

Animals such as, pet turtles and fish....upset the delicate balance of nature as they feed upon or compete with native wildlife. Our park provides important habitat for many rare, threatened and endangered wildlife: pets can adversely impact them. **O.K. partially changed :)**

Diseases

For first sentence, Darren suggests that you may need to generalize. Chytrid already present and example too specific for the public. **O.K.**

Who is the contact number? **That's Jennifer Greene-Ringold. I think her title is Community Engagement Manager. Bless her!**

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 8/15/2013 3:04:44 PM
To: Sunil Rajappa [sunil_rajappa@partner.nps.gov]
Subject: Fwd: Dogs - and Coyotes, too.

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

---------- Forwarded message ----------
From: **Smith, Shirwin** <shirwin_smith@nps.gov>
Date: Thu, Aug 15, 2013 at 9:45 AM
Subject: Re: Dogs - and Coyotes, too.
To: Bill Merkle <Bill_Merkle@nps.gov>
Cc: Hilary Hobbs <Hilary_Hobbs@nps.gov>, Alice Steele <alicecsteele@[exemption 6]>, Judy Braznell <judybraznell@miwokstables.com>, Livery Office <liveryoffice@miwokstables.com>

Bill - see info from Miwok stables about a possible coyote issue (aggressive response to attempts to discourage its presence.
Your advice would be appreciated!

Christine - Bill Merkle is the park's wildlife ecologist and the best one to provide advice.

Shirwin

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

On Wed, Aug 14, 2013 at 6:37 PM, Livery Office <liveryoffice@miwokstables.com> wrote:
Hi Hilary, Shirwin,
Linda asked that I take a moment to send a log of recent "dog sightings" around the barn - when they're on trails they shouldn't be on, or unleashed when they should be on leash, just to keep you posted. The attachment follows.

Also wanted to let you know that we've got at least one Coyote (possibly with pups) that seems to be living in CLOSE proximity to the back of the barn. Earlier this week, it bared its teeth and growled at a staff member who attempted to shoo it away from summer camp kids having lunch. Two mounted park patrol staff rode by the barn today, and were

able to see the coyote and it's proximity to all of us. We're a little worried - not only about how close they are, but also because it seems that pups raised so close to people might not learn to be as cautious of humans as they should be? Any suggestions on this one? In the past we've made a big ruckus when a coyote comes too close, so that it doesn't become entirely comfortable being near people, but when they growl back, it's a game changer! :-) Thanks in advance for any help you might provide.

Best Regards,
Christine Pearson
for Linda Rubio, Owner, Miwok Livery, Inc.
at Miwok Stables

Begin forwarded message:

From: "Hobbs, Hilary" <hilary_hobbs@nps.gov>
Date: April 16, 2013 11:32:34 AM PDT
To: Livery Office <liveryoffice@miwokstables.com>
Subject: **Re: DOGS**

Hi Linda-
Sorry to hear about this recent incident, and thanks for letting us know.

I checked in with Shirwin Smith, our Dog Management project manager, to let her know about this incident. Her response is below:

9:25 AM (2 hours ago)

>>Smith, Shirwin <shirwin_smith@nps.gov>



to me, Jessica, Kevin, Randolph

Hi Hilary, please have the rider involved call park dispatch non-emergency number (561-5505) to have a report taken on the incident, and pls let Linda know we really need to have any incidents reported to alert us to problems. They can call for a ranger when the incident occurs (561-5656) or use the non-emergency number above to have a report taken even a day or more after. Sooner is better, of course.

Hilary Hobbs
Business Management Division
Golden Gate National Recreation Area

(415) 561-4943

On Mon, Apr 15, 2013 at 3:47 PM, Livery Office <liveryoffice@miwokstables.com> wrote:
Hi Hilary
I just wanted you to be aware of this
On Sunday a dog was lose inn the parking lot/trail? and it ran into the arena will we were having a class, chased the horses and a lady fell off, she has a black eye and a bruised tailbone and is pretty sore.
I was not here, but the dog thing is getting out of control, because there is never anyone here to enforce the rules.
Any suggestions
Linda

Miwok Livery, Inc.
701 Tennessee Valley Road
Mill Valley, CA 94941
415.389.9414 or 415/383-8048
liveryoffice@miwokstables.com
www.miwokstables.com
www.facebook.com/miwokstables - like us!

www.facebook.com/miwokstables - like us!

Message

From: Susie Bennett [srbennett@nps.gov]
Sent: 8/20/2013 9:29:41 PM
To: Georgeades, Andrew [andrew_georgeades@nps.gov]
CC: William Merkle [bill_merkle@nps.gov]; Sunil Rajappa [sunil_rajappa@partner.nps.gov]; Christina Crooker [CCrooker@parksconservancy.org]
Subject: Re: My Mom had a close encounter of the coyote kind at Rancho

Hi all,

Andrew--can you ask your mom if she's feel likes her encounters with coyotes have increased within the past few weeks/months? One person on the "friends of Rancho" facebook page thinks the coyotes have been problematic for a while. Here's his comment in a thread started when someone posted about the new sign we put out (saying not to feed coyotes and to report encounters):

" Susan, I take your point, but the encounters you are describing are not new. In general the coyotes in this area have become more brazen in recent years. I will see them lolling around on my lawn in broad daylight eating apples fallen from our trees. They will often be lurking near our horse pasture and will not run away when they are approached by people. Missing cat notices in our neighborhood are becoming a daily event. Having said all that, I absolutely agree that people should not be feeding the coyotes, but I doubt the current signage will have much of an effect on coyote behavior. I think posting some tips such as making noise, and tossing rocks (in their general direction) would be a good thing to do."

I'm curious if other Montara folks have made similar observations.

Bill--think we should switch out the sign to a more interpretive piece about how to deal with coyotes? If so, Christina, can I get a copy of your coyote poster you made for Mori?

Thanks guys!

Susie Bennett
San Mateo County Natural Resource Management Specialist
Golden Gate National Recreation Area
cell: 415 265-1540
email: susie_bennett@nps.gov

On Tue, Aug 6, 2013 at 9:30 AM, Georgeades, Andrew <andrew_georgeades@nps.gov> wrote:
Thought I'd share this with you...

On Saturday, my Mom was waking her dog close to the end of trail down by 2nd and Farallone in Montara, when:

"A coyote came out of the grass and barked at us, then another one came and together they barked at us, from about 150 yards away. I'm thinking, it's nice to see the wildlife so close. So I turned around and started walking and the barking stopped. A couple of minutes later I turned around and what do you know, the were actually following us and being much closer. They must have thought that either the dog or I could maybe make a tasty evening meal. As soon as I turned around they stopped and started barking again. So, using the bear/cougar deterrent method, I opened my jacket, waved it furiously and clanked my car keys. Then one of them turned and walked away and then the other followed a short time later. Is this the time for them to have pups that they might have been just protective of their young?"

Thanks,

Andrew Georgeades
Natural Resource Specialist (Pathways Intern)
National Park Service, Golden Gate National Recreation Area
Fort Mason Bldg. 201, San Francisco, CA 94123
andrew_georgeades@nps.gov (415) 289-1847

Message

From: Alvarez Trouse [henry75@ Exemption 6
Sent: 8/20/2013 9:24:42 PM
To: Merkle, William [bill_merkle@nps.gov]
Subject: Re: idea about predation!

Wonderful! Thanks for the update! Maria
On 8/20/2013 5:57 PM, Merkle, William wrote:
Hi,

Walked through with Michael this pm.

Had good discuss with Daphne at noon--then we hit it again at start of projects meeting. Are going with fence further out as preferred :)

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Aug 19, 2013 at 8:50 PM, Alvarez Trouse <henry75@ Exemption 6 wrote:
Bill, it dawned on me that fences provide roosts for predators, and runs/walls for rats....
The fencing needs to be placed farther west to avoid causing this problem.
maybe the type of fencing needs to be explored as well. Someone in the service/field can provide data
PORE with plover fencing, Funston with swallow fencing....

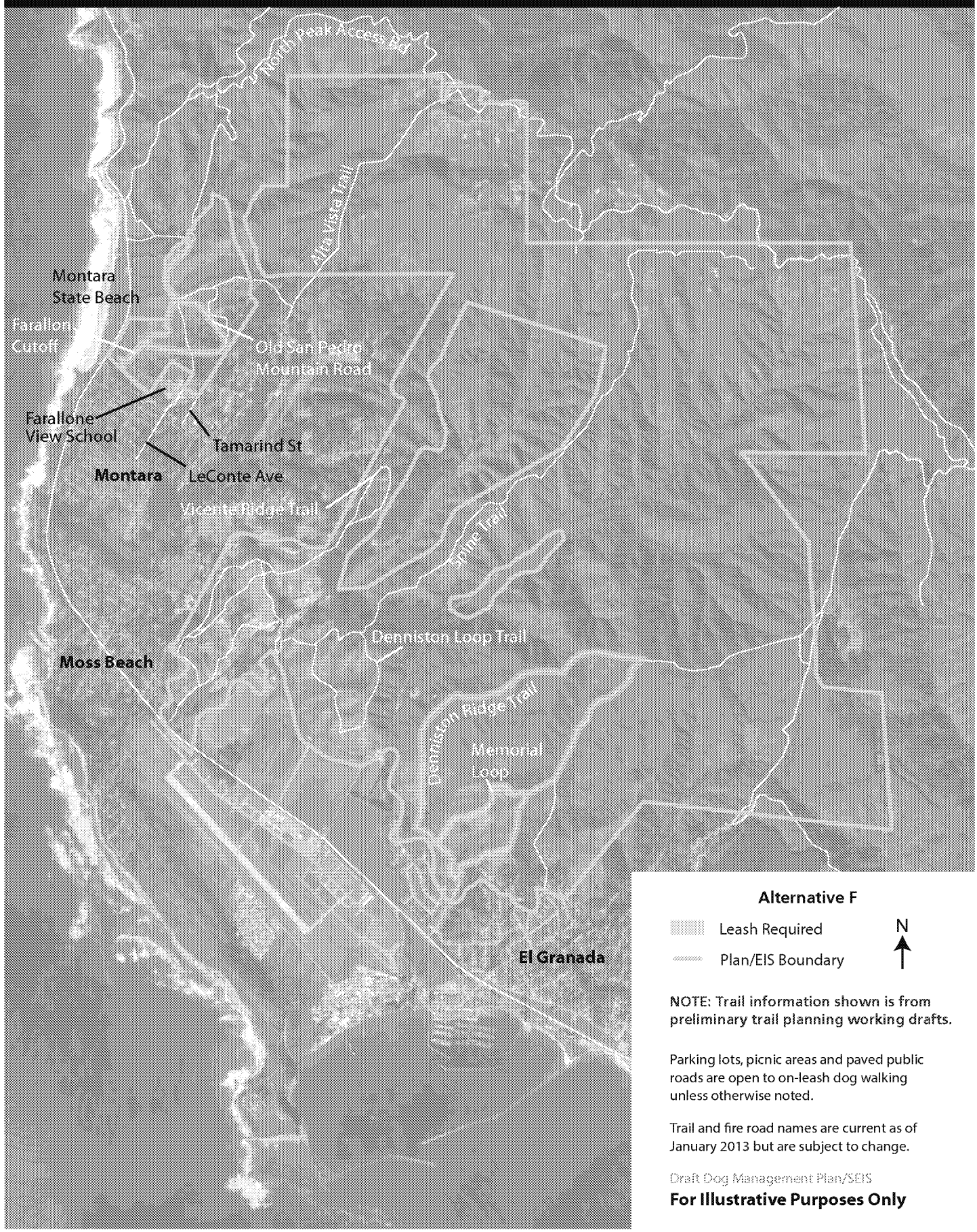
Self guided nature walks- the wave of the near future! seasonal access?
self closing gates (springs) no dogs allowed inside

Daphne's 'experience" envisioned for others will be protected by the fencing not excluded
Our job is to protect the resources for future generations to enjoy....and this fence will do that.
Best, Maria

National Park Service
U.S. Department of the Interior

Golden Gate National Recreation Area

Map 21-F: Rancho Corral De Tierra



Alternative F

Leash Required

Plan/EIS Boundary

N

NOTE: Trail information shown is from preliminary trail planning working drafts.

Parking lots, picnic areas and paved public roads are open to on-leash dog walking unless otherwise noted.

Trail and fire road names are current as of January 2013 but are subject to change.

Draft Dog Management Plan/SEIS

For Illustrative Purposes Only

GGNRA192220

Message

From: Smith, Shirwin [shirwin_smith@nps.gov]
Sent: 8/20/2013 5:18:21 PM
To: Merkle, William [bill_merkle@nps.gov]
Subject: Re: Alt F Rodeo

Sorry was on the phone and all Rs looked alike...

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

On Tue, Aug 20, 2013 at 5:13 PM, Merkle, William <bill_merkle@nps.gov> wrote:
Hi,

Looking for Rodeo Beach preferred alt.

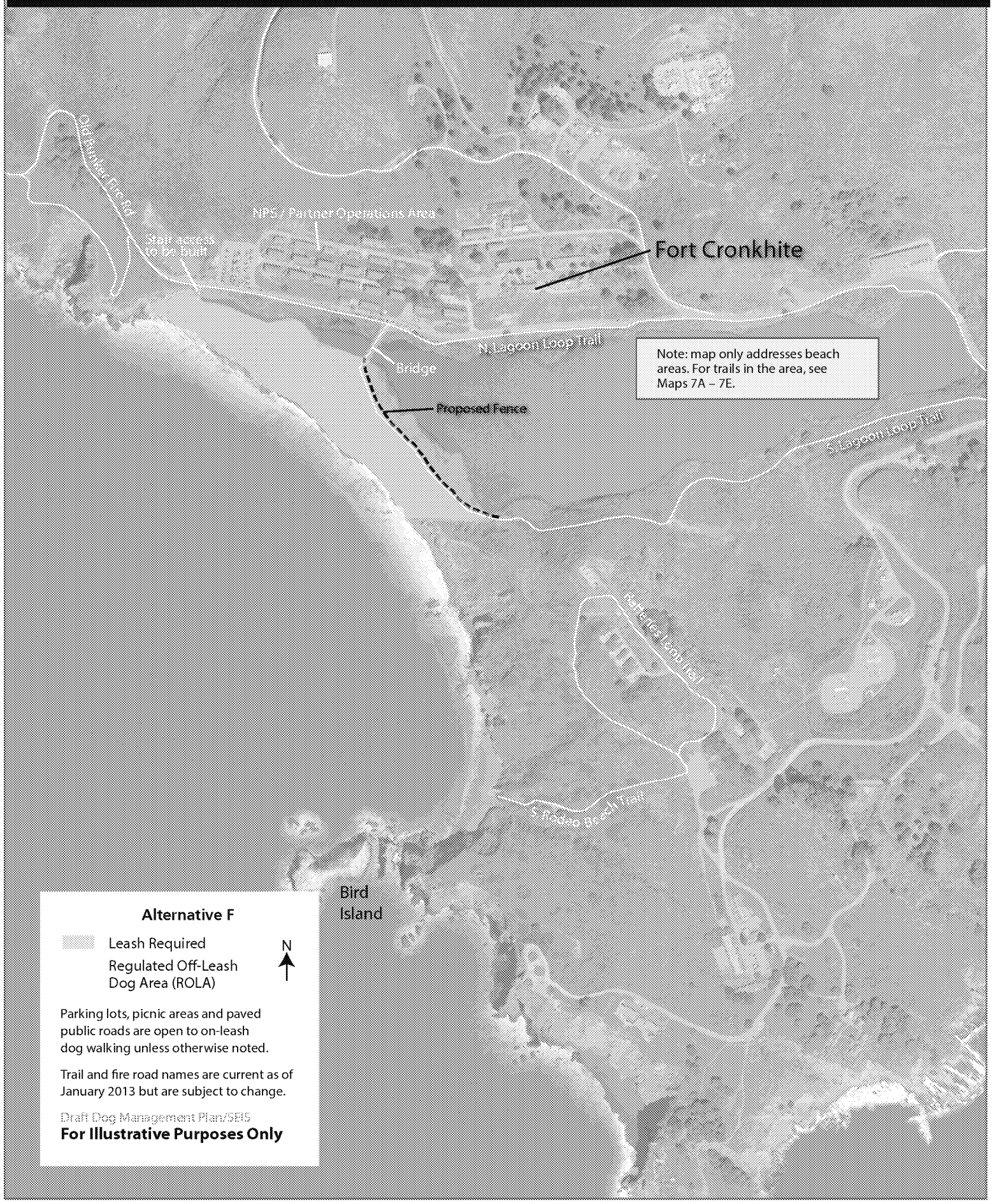
Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

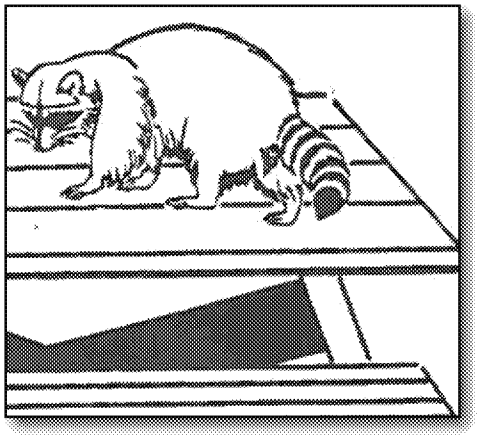
On Tue, Aug 20, 2013 at 5:04 PM, Smith, Shirwin <shirwin_smith@nps.gov> wrote:

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

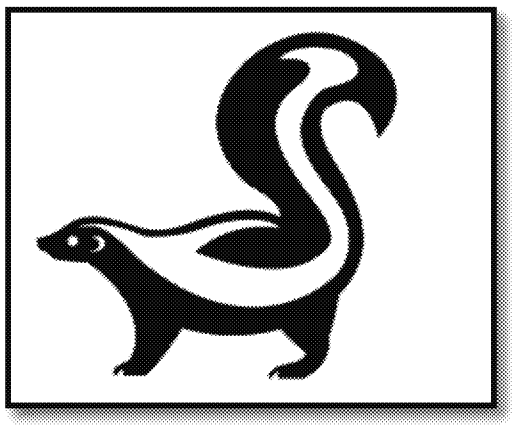
National Park Service
U.S. Department of the Interior
Golden Gate National Recreation Area

Map 6-F: Rodeo Beach

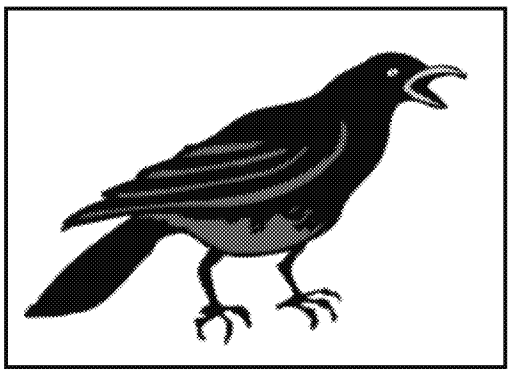




Small crumbs lead to big problems.
Keep a clean site.



Don't invite wildlife to your picnic.
Keep a clean site.

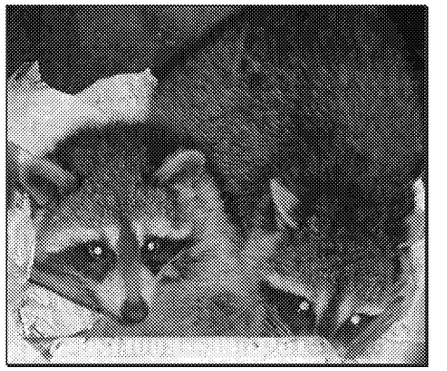


Human food is not good for me.
Keep a clean site.

Did you know ...

- Raccoons can open coolers with their super-flexible hands!
- Raccoons eat almost anything, including worms, berries, rodents, bird eggs, fish, carrion, and your lunch!
- Raccoons and other wildlife can rip into tents and packs if they smell a treat.
- Raccoons can drop 30 – 40 ft without harm.
- Their scientific name (*Procyon lotor*) means "little washing dog", although contrary to popular belief, raccoons generally do not wash their food
- Most raccoons live on tropical islands. Only one of 7 species lives in the U.S.

PLEASE DO NOT FEED ME!!



Keep all your food, trash, and scented products in the food locker. Wildlife will seek out and eat your food, drinks, wrappers, and other scented products.

Raccoons and other wildlife in the Marin Headlands are naturally curious, and almost always eager for a snack. With access to human food, trash, or scented toiletries, they quickly learn to associate the area and people with food. These animals can become aggressive, and possibly dangerous to you and other visitors.

Help us keep our wildlife healthy, and our visitors safe. **You are responsible for knowing and following the guidelines inside this brochure**.

RACCOON ADVISORY

Raccoons in this area may be aggressive when searching for food. For your safety follow these guidelines:

Do	Don't
• Use food locker or car trunk to store food, coolers, cooking equipment, and scented personal products. If your car does not have a trunk, cover any food or coolers left in your car. • Keep car windows, doors and trunks closed at all times. • Keep you site clean and no food traces are left. • Clean cookware at least 200 yards from a campsite and dispose of water in toilets. • Place all trash in a secured dumpster. If full, pack trash out with you. • Trash facilities are limited in the campsite. Minimize the packaging and material brought with you from home.	• Do not feed or approach wildlife. • Never leave food unattended including on grills, in tents, back-packs and coolers. • Do not use fire pit to dispose of food scraps. • Do not cook, eat, or store food or scented products in your tent. 

Report aggressive wildlife to park rangers at (415) 561 - 5510

Message

From: Smith, Shirwin [shirwin_smith@nps.gov]
Sent: 8/29/2013 3:30:20 PM
To: Rajappa, Sunil [sunil_rajappa@partner.nps.gov]
CC: William Merkle [bill_merkle@nps.gov]
Subject: Re: Garmin Dog Trainers

Thanks, Sunil. The special regulation requiring the seasonal leash restriction in the WPA and the Ocean Beach Plover Protection Area states that "Dogs must be restrained on a leash not more than 6' in length starting July 1 and ending May 15.....

So yes, the 6 ft. requirement is the law and thus the person you spoke to could have received a citation.

Thanks for checking - and those brochures are still here if you can use them!

Shirwin

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

On Thu, Aug 29, 2013 at 3:21 PM, Rajappa, Sunil <sunil_rajappa@partner.nps.gov> wrote:
Shirwin,

I approached a man with 2 off leash dogs in the Plover Protection Area at Ocean beach yesterday. He was using a Garmin dog trainer like this one: https://buy.garmin.com/en-US/US/prod114024.html

He told me "This is a leash..." and "I can call them back..." even though I had observed them chase a gull.

I thought I would bring this to your attention just in case there are some legal implications about the definition of "leash."

Sunil

Sunil Rajappa
Wildlife Intern
Golden Gate National Recreation Area

Office: 415.289.1848
Cell: 916.276.6342

Monitoring Overwintering Snowy Plovers at Golden Gate National Recreation Area

- 2014 (July-June 2015) was an above average year for snowy plovers at Ocean Beach in GGNRA. Numbers increased dramatically from 2013 to an average of nearly 52 plovers per survey during the winter season (Figure 1)
- Max count was 74 plovers, numbers not seen since the first year monitoring began in 1994
- On a survey in August of this season (2015), observed 97 plovers, a record high since monitoring began
- Snowy plovers remained toward the northern end of the snowy plover protection area, where the beach was wider
- We still had 74% of dogs off leash (not following leash regulation) in the snowy plover protection area

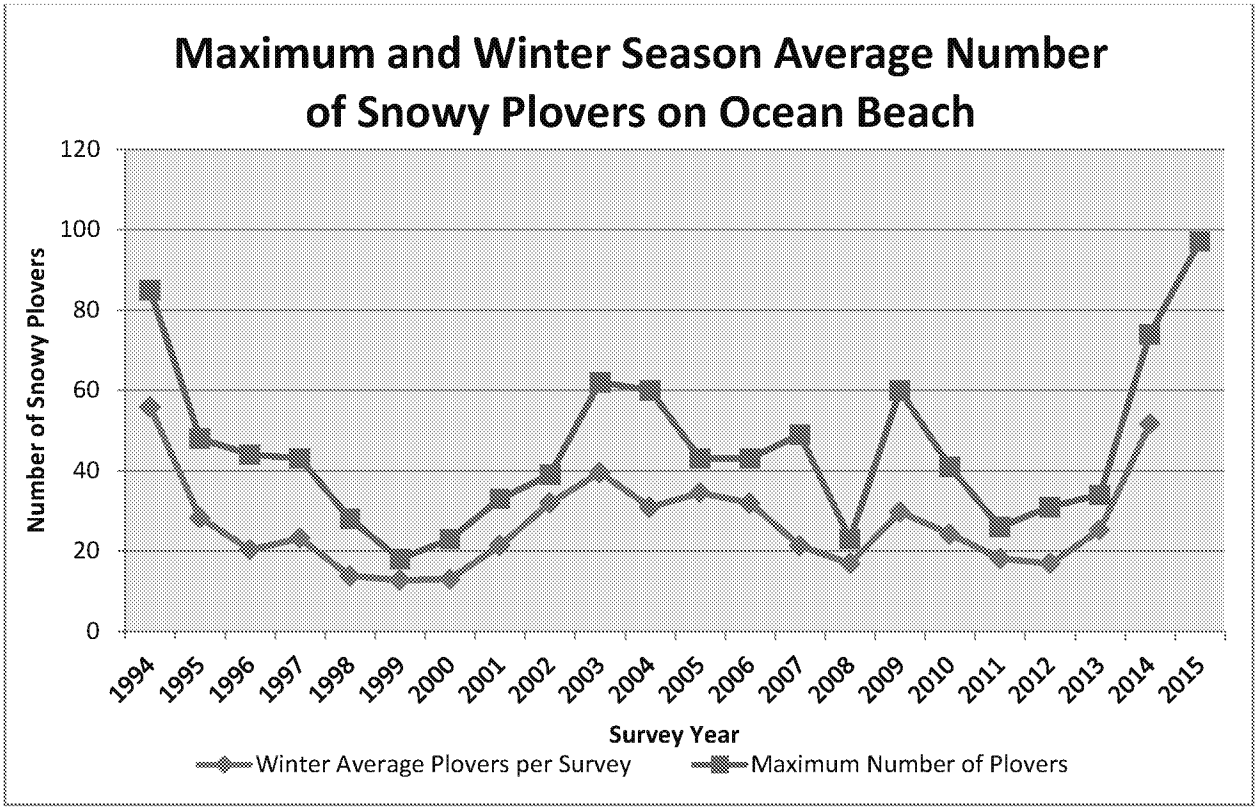


Figure 1.

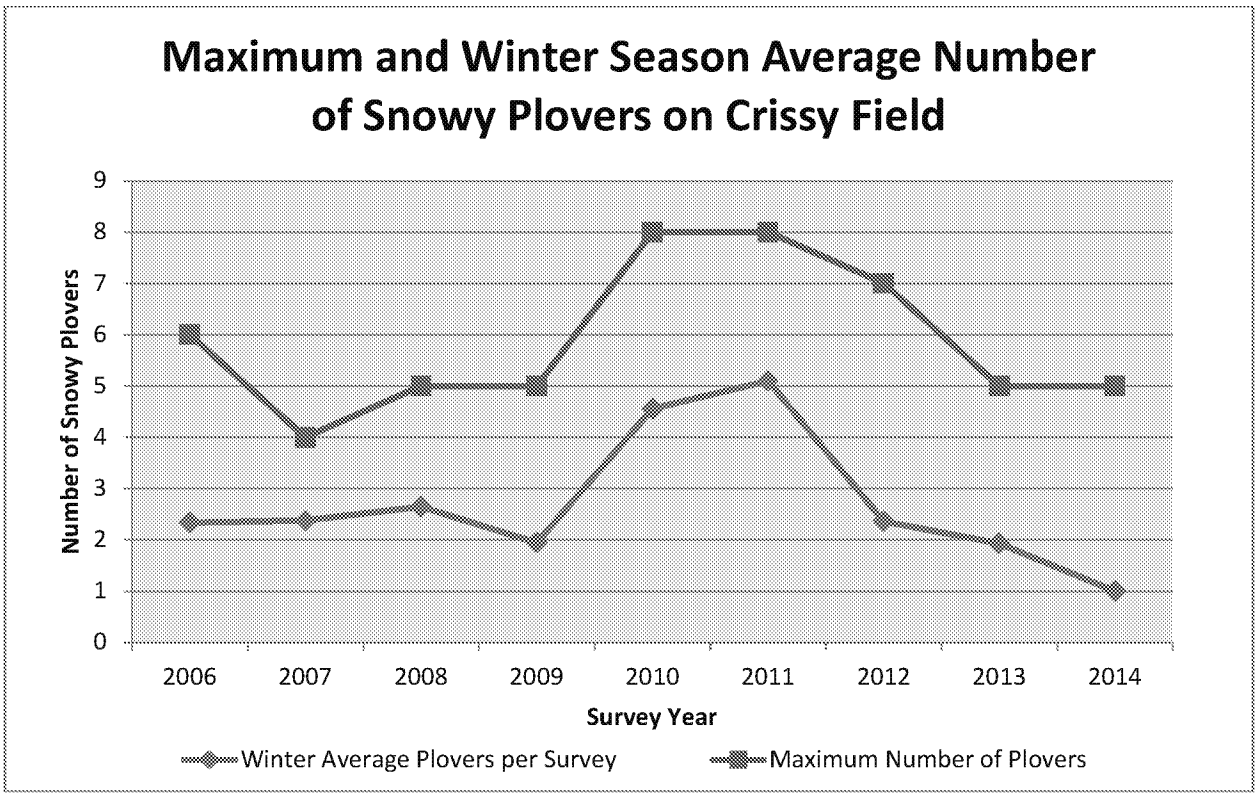


Figure 2.

Crissy Field

- In 2014, we had a maximum count of five snowy plovers at Crissy Field, with an average winter season count of one plover (Figure 2).
- Dune habitat is continuing to spread and improve at Crissy--this seems to be the result of fencing the area (many dog walkers turn around at the fence rather than leash their dogs). Only 4% median dogs off leash per hour within WPA in 2014.
- Caltrans project to extend the storm outfall on Crissy WPA beach (so that we won't have heavy equipment on the beach every time it rains) – was completed Summer 2015.

Dog Management Plan Update: We have taken final comments on our Supplemental EIS and are in the process of rulemaking to establish the regulations at each site. We will likely publish dog rule sometime this winter and will have a series of public meetings to take comment. The plan establishes no dog zones for snowy plover areas at Ocean Beach and Crissy Field.

For additional information contact: Bill Merkle, 415-289-1843, bill_merkle@nps.gov

Message

From: Savidge, Michael [michael_j_savidge@nps.gov]
Sent: 11/5/2015 10:00:26 AM
To: Merkle, William [bill_merkle@nps.gov]
CC: Jesse Barber [jessebarber@boisestate.edu]; Clinton David Francis [cdfranci@calpoly.edu]; PETER B NEWMAN [pbn3@psu.edu]; BRENDAN D TAFF [bdt3@psu.edu]
Subject: Re: MUWO research and collecting permit app.

Have not seen the recent permit request(only talked to folks last at George Wright), nor can we commit at this point to any use of monitoring staff(not even on board yet) until we further flesh out our own program requirements. The MUWO sound monitoring that would be done, as stipulated in the Draft Monitoring plan, is one piece of a much broader monitoring program parkwide that could not take on added outside monitoring only that specific to our needs at MUWO, Alcatraz and parkwide for dog mgt.

If you are still thinking of trying to get road closures that is a very long shot given the political climate. My suggestion had been to have researchers do some early community work a year prior to research set up with public meetings at Muir beach, Stinson and Panoramic highway communities to talk about the value of the research and see if they can get some buy-in.

Mike

On Wed, Nov 4, 2015 at 4:30 PM, Merkle, William <bill_merkle@nps.gov> wrote:
Great, thank you!

The monitoring pieces of this should be easy-- the trail manipulations are going to be more challenging.

As I am reaching out to see how these could be approved, I am getting a lot of questions about the trail manipulations:

- Quiet zone signage should not be a problem.
- On the closures, I am getting questions on how these would be implemented (ie how would you keep people out)? How long would closures last? How frequently would they be implemented?
- Similar questions on partial closures: (how implemented? for how long? and how frequent?)

I am also unclear as to whether this is a part of our MUWO visitor monitoring program? Or just complementary work? Mike Savidge could probably answer this one.

-Bill

Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

On Wed, Nov 4, 2015 at 10:44 AM, Jesse Barber <jessebarber@boisestate.edu> wrote:
Hi Bill,

Glad to see the permit moving forward. In answer to your questions:

1) We may lock up a decibel meter in a pelican box, locked with a cable around the base of a tree. The other acoustic monitoring units will not be locked and we will make sure to keep everything as camouflaged as possible.

2) We are in process with visitor surveys. I have cc'd my social science colleagues here (Derrick Taff and Peter Newman) who can give you an update.

Thanks for the heads up on the collaborative opportunities. If any of the camera traps end up near our acoustic monitoring stations there might be some interesting data. It would be great to see any bird monitoring data for the park that you are willing to share!

Glad to answer more questions.

Jesse

On Mon, Nov 2, 2015 at 4:12 PM, Merkle, William <bill_merkle@nps.gov> wrote:
Hi Jesse and Clint,

I am working on getting language together for this permit.

I have a few questions for you:
1.) Are you planning to use any sort of security devices or locks on acoustic monitoring equipment or cameras? Mainly interested in whether you want to put large stakes in the ground or affix equipment to signs, fencing, or trees?

Pretty high visitation site, but equipment could be subject to vandalism or theft if left out unattended or unlocked.

2.) Do you have or are you in process with OPM on the visitor surveys? We will need that approval for survey work.

I can provide guidance on cameras and acoustic devices and off-trail bird monitoring; however, the park leadership team will need to weigh in on trail use manipulations.

A few other points of coordination for you:
1.) We are planning to start Phase II of a wildlife camera study in the Redwood Creek Watershed with camera deployment in winter or spring 2016. We likely will have cameras at central points on either 1 km or possibly 0.5 km grid overlay for MUWO, and surrounding area.
2.) We have information from landbird inventory work for MUWO, as well as Grinell transects that were recently revisited for lanbirds.

Thank you, Bill

Bill Merkle, Ph.D.
Acting Program Manager
SFAN Inventory & Monitoring
415-289-1850
cell 415-509-2844

--

Jesse R. Barber
Assistant Professor
Dept. of Biological Sciences
Boise State University
Boise, ID 83725-1515
Office: 208-426-3202
website

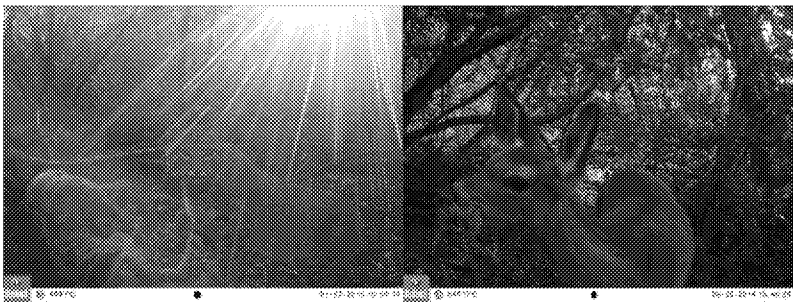
"Get a bicycle. You will certainly not regret it, if you live."
- Mark Twain

Final Administrative Draft
Revised November 4, 2015

The Marin Wildlife Picture Index Project

Pilot for Monitoring Wildlife in Marin County:
Interim Analysis

Marin County Parks
Marin Municipal Water District
State Parks Samuel P. Taylor
Golden Gate National Recreation Area



Prepared by
Susan E. Townsend, PhD.
Wildlife Ecology and Consulting
July 31, 2015

Prepared for
Marin County Parks
Marin Municipal Water District
Sharon Farrell, Golden Gate National Parks Conservancy

MARIN MUNICIPAL WATER DISTRICT

MARIN COUNTY PARKS

GOLDEN GATE NATIONAL PARKS CONSERVANCY

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ACKNOWLEDGEMENTS

A special thanks to Janet Klein, MMWD, for her vision (and setting aside funding) for this project as far back as 2012 and to Sam Abercrombie, MCP, for taking on this task and basically propelling it forward. An additional thanks to Sharon Farrell (Golden Gate National Parks Conservancy) for providing the additional funding needed to procure equipment in a timely fashion, staff needed for the GGNRA and SP study sites and to fill in funding gaps. The main funding for this project was provided by MCP, MMWD and the Parks Conservancy. Additional thanks to Dave Press (PORE), Bill Merkle (NPS), Rachel Townsend (GGNPC), MCP Staff and Rangers, and MMWD Staff, Rangers, Interns, and Volunteer Coordinators for your participation, enthusiasm and for following the protocols.

INTRODUCTION

Ecosystem health and how it is affected by climate change, connectivity in the landscape and implementation of restoration activities can be measured by monitoring the top trophic levels (mammals) through the Wildlife Picture Index (hereafter, "WPI"). The WPI camera trapping protocol is based on a community-level 'biodiversity-based' approach for monitoring terrestrial vertebrates using presence/absence based occupancy statistics and indices of abundance (O'Brien et al. 2010, O'Brien 2010).[1]

Monitoring with camera traps was traditionally limited to single charismatic species such as tigers or leopards. However, with recent advances in camera trapping methods, it is now possible to monitor trends in the diversity, abundance, and distribution of a broad range of terrestrial mammals and birds in a variety of habitats ranging from savannah to deserts to tropical ecosystems (Ahumada et al. 2011, Burton et al. 2011, O'Connell et al. 2011, and Petorelli et al. 2010). Camera trapping is a particularly attractive approach for monitoring because it is non-obtrusive, has low observer error, is comparable across sites, data can be aggregated and disaggregated for various indices, and photographs allow for verifiability. Setting and maintaining camera traps do not require highly skilled staff and it is lower in cost when compared to other approaches of equal rigor (O'Brien, unpublished data).

Landscape level wildlife monitoring with camera traps has generally been implemented in tropical ecosystems [Ahumada et al. 2011; see TEAM Network (Tropical Ecosystem Assessment & Monitoring Network) [HYPERLINK "http://www.teamnetwork.org"]; O'Brien et al. 2011], parts of Africa (Collen et al. 2011, Petorelli et al. 2010, Burton et al. 2011) and for certain trophic levels (such as carnivores, see Pettorelli et al. 2009 & Burton et al. 2011). Landscape-level camera trapping is increasingly expanding into the temperate zones such as in Canada (Burton, pers. comm.), Mongolia (Townsend et al. 2014), southeast U.S. (Kays, North Carolina Museum of Natural Sciences) with E-mammal, and elsewhere.

The WPI baseline is set at the earliest date of camera trapping (first year, in this case); these data are then used to produce the index and follow the geometric mean biodiversity measure as per Buckland et al. 2005. Because we are interested in species occurrence and distribution, camera trapping is a logical choice for documenting occupancy over large areas. Occupancy modeling allows for estimating true occupancy and provides detection probabilities. A species may go undetected in a sample unit even if that species is actually present. This "false absence" leads to underestimation of true occupancy. In addition, unless the probability of detection is determined, measures of occupancy over time are invalid (MacKenzie 2005). This occupancy modeling is the basis for the Wildlife Picture Index (O'Brien et al. 2010).

With multiple years of data, the processes underlying observed rates of change in vertebrate communities can be examined. Disaggregated trends for particular species groups (e.g. exploited, threatened and rare species) can be reported to accurately represent patterns of change in the

[1] The WPI protocol was developed at a series of National Environmental Research Council (NERC) funded workshops that brought together the world's leading experts on camera trapping methods. The process was led by the Zoological Society of London (ZSL) and the Wildlife Conservation Society (WCS), but involved all major organizations that use camera trapping as a monitoring tool such as World Wildlife Fund (WWF), Conservation International, and Fauna and Flora International.

communities monitored. Metrics collected by landscape level implementation of camera trapping include species detections and detection rates, biodiversity and occupancy estimates (by species, trophic level or guild). The WPI is a reliable way to measure trends in biodiversity in the top trophic levels, generate species specific occupancy estimates (abundance), and species lists. Probability of detection is generated by occupancy modeling allowing for annual and site to site comparisons.

The value of implementing the WPI is 1) to provide baseline occupancy estimates and subsequent years of data will establish trends in biodiversity and individual species; 2) to test hypotheses about connectivity on the landscape by providing empirical data about species presence and diversity in areas designated as cores and corridors, and 3) to assess how environmental drivers and management strategies in the region are affecting wildlife distribution and abundance. By conducting landscape level efforts such as the WPI, we can generate statistically reliable estimates of abundance. The assemblage of species within the MWPIP study will allow us to assess ecosystem health. By piecing together the presence and prevalence of species, we can examine how wildlife is utilizing the landscape and how well this reflects regional connectivity models.

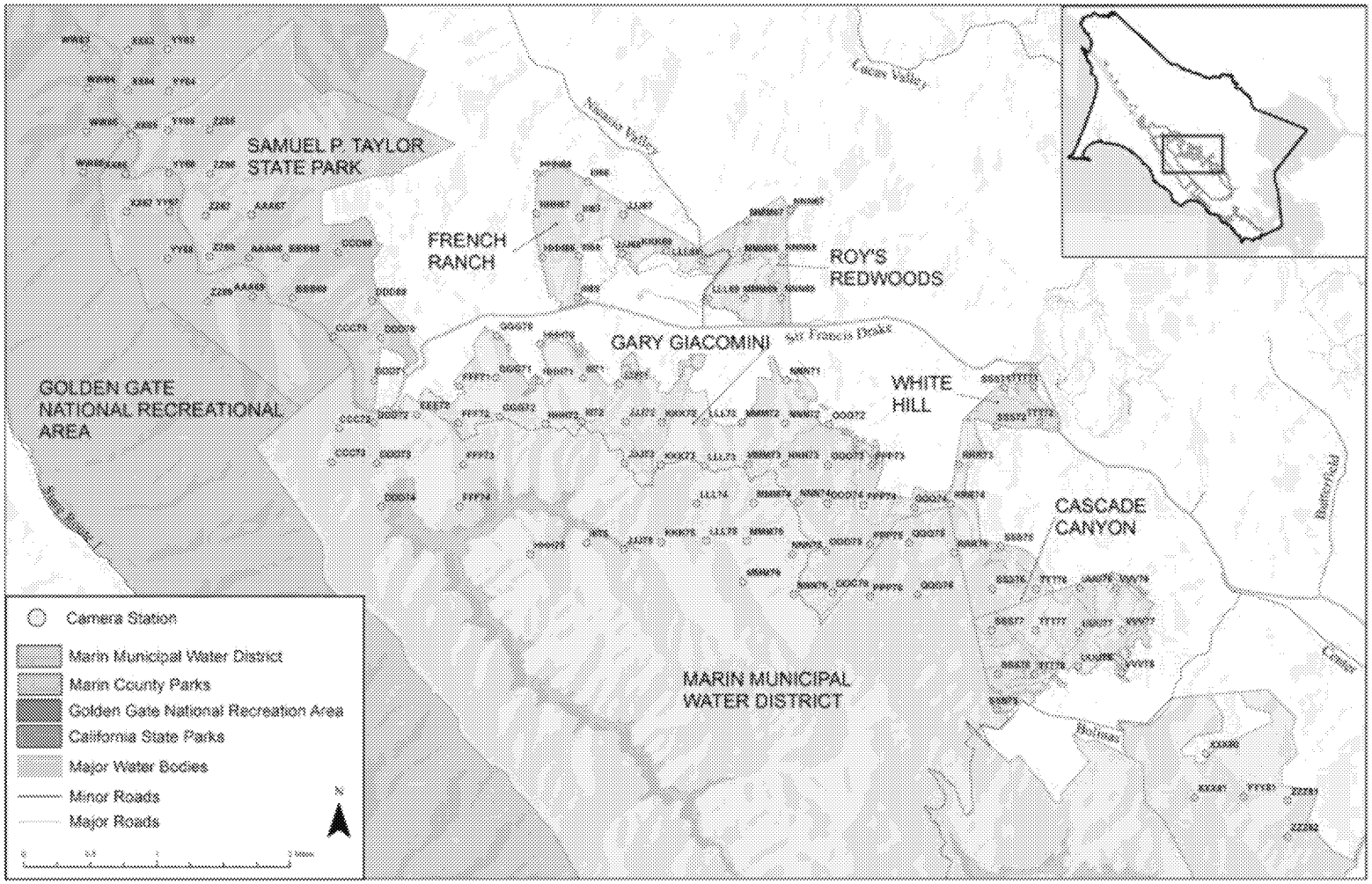
The San Francisco Bay Area is one of the most ecologically diverse places on Earth. It is one in only five regions worldwide featuring a Mediterranean climate. These regions support many species found nowhere else (BAOSC 2011). Marin County has a diverse climate and topography and extensive undeveloped open space that spans from the coastline inland to the top of Mt. Tamalpais and up the northeast toward Sonoma County. Due to the variety of habitats, climatological and topographical variation and close proximity to human development and human recreation, the study area for this project provides important information on how these ecosystems are functioning and how well wildlife is able to persist along the edge of human development, and alongside human recreational use with access to patches of open undeveloped landscape.

The study area was selected in order to obtain baseline wildlife abundance estimates across a number of jurisdictions. The study area interfaces with human development to the east and becomes more rural and less densely populated to the west and spans a major road in the area, Sir Frances Drake Boulevard. Wildlife community composition and abundance was the focus of this study with emphasis on the upper trophic level (terrestrial vertebrates) as an indicator of overall ecosystem health. Cameras were set to sample across the variety of habitats that characterized each park or "study sites." No private lands were included in this study. Monitoring open space within Marin County provides information on the diversity of wildlife and the distribution, ecology and behavior of these species. The photographs generated by this study provide captivating images of the local fauna, much of which are rarely seen by the general public. Images can be a powerful tool in persuading the general public and decision makers to take necessary action to co-exist with and conserve wildlife.

The study area includes four different jurisdictions, the Golden Gate National Recreational Area's (GGNRA) Cheda and Jewel subregions, State Park's Samuel P. Taylor (SPT), the Marin Municipal Water District (MMWD), and Marin County Parks (MCP) including Roy's Redwood (RR), French Ranch (FR), Cascade Canyon (CC), White Hill (WH), and Gary Giacomini (GG) (referred to as the Study Sites; Fig. 1). The study area covered by the camera stations was approximately 32 sq km and located both north and south of Sir Francis Drake Boulevard, west of the Town of Fairfax in Marin County, California. This report provides a interim analysis of catalogued data collected from the initial set up of the camera stations in late September 2014 catalogued through at least December 31, 2014 and, for two of the sites (GGNRA and SPT), until

February 4, 2015. This report provides a basic understanding of the methods and analysis and presents findings that include a pilot summary (what was detected, how many, and rates of detection) and species specific occupancy estimates for 2 seasons for each site spanning the first 3 to 4 months of this study.

Figure 1: Location of study area, Marin County, California



METHODOLOGY

Study Area

The study area included the Golden Gate National Recreational Area's (GGNRA) Cheda and Jewel Subregions, State Park's Samuel P. Taylor (SPT), the Marin Municipal Water District (MMWD), and Marin County Parks (MCP) including Roy's Redwoods (RR), French Ranch (FR), Cascade Canyon (CC), White Hill (WH), and Gary Giacomini (GG; referred to as the study sites; see Appendix A for public use and access). The study area covered by the camera stations was approximately 32 sq km and located both north and south of Sir Frances Drake Road, west of the Town of Fairfax in Marin County, California. The study area was divided into 6 study sites for analysis: GGNRA (Jewel and Cheda), SP (SPT), MMWD, MCP North (FR RR or French Ranch and Roy's Redwood), MCP CC WH (Cascade Canyon and White Hill), and MCP GG (Gary Giacomini). Results are presented for each study site and combined into "All Sites" sections for comparison.

Table 1: Study sites within study area, jurisdiction, access and size (area)

Agency	Site	Access	Area (ac)
GGNRA	CHEDA/JEWEL	GRAZING, PUBLIC	(80,624)
SP	SPT	DAY USE PASS	2,618
MMWD	MMWD	PUBLIC ACCESS	18,820
MCP	FR, RR	PUBLIC ACCESS	677
MCP	CC, WH	PUBLIC ACCESS	922
MCP	GG	PUBLIC ACCESS	1,483

Setting

Golden Gate National Recreation Area: Jewel and Cheda

The purpose of Golden Gate National Recreation Area is to offer national park experience to a large and diverse urban population while preserving and interpreting its outstanding natural, historic, scenic, and recreational values (taken from [HYPERLINK "http://www.nps.gov/goga/learn/management/statistics.htm"]). While the entire GGNRA covers approximately 80,624 acres across three counties; the study site is small area at the northeastern edge of a large parcel in Marin County that is contiguous with State Park's Samuel P. Taylor. The study area is characterized by a riparian habitat, grazed non-native grasslands, chaparral and oak bay woodland. Fairly steep topography with commensurate elevation changes are present. Ranch roads, trails and a few cattle related structures are present on these parcels.

State Parks Samuel P. Taylor

Samuel P. Taylor State Park has wooded countryside in the steep rolling hills of Marin County north of San Francisco. The park features a unique contrast of coast redwood groves and open grassland (taken from website [HYPERLINK "http://www.parks.ca.gov/?page_id=469"]). Trails, paved roads, camp sites and small buildings supporting park services are present on site. The terrain is extremely steep in some areas. Riparian, riverine and redwood habitat is extensive along with other habitats including chaparral, non-native grasslands and oak bay woodland. This study site is characterized by a Mediterranean climate with dry summers and wet winters along with fog characteristic of the San Francisco Bay area.

Marin Municipal Water District

The Mt. Tamalpais Watershed is held in trust as a natural wildland of great biological diversity, as scenic open space and as an area for passive outdoor recreation for Marin and much of the Bay Area. Passive outdoor recreation is defined as those activities that are based on nature and that require little or no development or facilities (taken from website [HYPERLINK "http://www.marinwater.org/188/Visiting-Watershed-Lands"]). In 1912, the Marin Municipal Water District received its charter as the first municipal water district in California. Today, MMWD is a public agency that provides high-quality drinking water to 186,000 people in a 147-square-mile area of south and central Marin County. MMWD is characterized by rugged terrain and includes several streams, rivers and reservoirs. The habitats include redwood, riparian, oak bay woodland, mixed conifer forests, native and non-native grasslands, and chaparral. Fire roads and trails are extensive with infrastructure that supports the mission of the MMWD. These lands are characterized by a Mediterranean climate with dry summers and wet winters along with fog characteristic of the San Francisco Bay area.

Marin County Parks: Roy's Redwoods, French Ranch, Cascade Canyon, White Hill, Gary Giacomini

MCP has 34 parks in Marin County. These parks include the representative matrix of habitats such as native and non-native grasslands, redwood forests, oak bay woodlands, chaparral, riparian, and mixed evergreen forests. These habitats intergrade to varying degrees and patch sizes vary widely. Some areas support steep elevation changes. All parks have official and unofficial trails that vary in use. This study site is characterized by a Mediterranean climate with dry summers and wet winters along with fog characteristic of the San Francisco Bay area.

Camera Trapping

Site selection, layout, set up and maintenance
One-hundred and twenty eight camera stations were deployed at 0.5 km intervals in north south grids. A 0.5 km grid was placed on Marin County and location coordinates were derived from this randomly placed grid. Camera stations locations were uniquely identified by line letter and number (for example, A1, A2, A3, etc.).

Camera stations, Bushnell TrophyCam (model#119636c), were set to maximize the likelihood of mammal and bird detections and, when possible, perpendicular to a logical animal pathway (~3 m away) at a height to capture small mammals such as gray squirrels if they pass as close as a few feet from the camera. The placement of the camera station was within 100 m of the predetermined coordinate at the 0.5 km interval. Camera stations were mounted with a nylon strap to a 1.2 m wooden stake pounded into the ground. The height of the camera on each stake varied because of the terrain (the terrain was rarely flat) but the target area was standardized to detect mammals and other wildlife at a distance of 2 m from the camera at the height of a gray fox; however, cameras could detect animals closer and farther away than that. Location (GPS coordinates), region and subregion, camera station location identifier (CS_Id), names of team members, SD card identification and camera station serial numbers, date and time of set up, habitat and elevation were recorded for each camera station location during deployment. Habitat was put into one of three categories to describe vegetative structure and canopy: closed (closed canopy), mixed (mixture of open and some overhead canopy such as oak woodland intergrading with grassland or chaparral), and open (no overhead canopy usually grassland). Each camera station was loaded with 8 charged AA NiMH batteries or 4 to 8 AA batteries and a labeled SD card. Camera settings were standardized to take 3 images per event, 6 MP size, 5 second interval between events, high sensitivity level, and time stamp ON.

The camera station was tested during set up by having a person walk ~2 m (target zone for detection) in front of the camera station while in test mode to verify the camera could detect movement in the target area. Settings were checked. Photographs of whiteboards with date, camera station identification, region and subregion were taken during set up and SD card collection during maintenance to verify camera station functioning.

Camera stations were maintained regularly for proper functioning. During maintenance, the number of pictures taken and remaining, settings, battery status, date and time were recorded. SD cards were collected and were replaced with blank SD cards.

Data management
Data from SD cards were downloaded into directories for analysis. The database was arranged to identify location, start and end date, subregion, and camera station ID. Digital photographs were batch renamed, georeferenced and catalogued, using P.I.E. (Photo Information Extractor) by Picmeta. Species and number of individuals were recorded for each image during cataloguing (See Appendix B: Categories for Cataloguing). S. Townsend catalogued all of the PORE photographs and a portion of the MCP, SPT and MMWD photographs. All other photographs were catalogued by trained staff and volunteers.Catalogued photographs were vetted by staff after volunteer cataloguers completed cataloguing. Any uncertainty on catalogued photograph was flagged, reviewed and verified by S. Townsend. While summarizing catalogued photographs for

Comment [S1]: COMMENT: ADDITIONAL DESCRIPTION OF TRAINING PROCESS FOR CATALOGUERS AND HOW ERROR WAS REDUCED

analysis, S. Townsend reviewed catalogued entries and spot checked photographs for MMWD, SPT and MCP.

Data Analysis

Data summary

Summary of species detected, how often and other data were tabulated from the catalogued images. The species and maximum number of individuals per event (three photographs) were used for the analysis. For example, if the three photographs recorded during an event included one photo of 2 deer, one photo of 3 deer and one photo of one deer; the event would be recorded as having 3 deer rates of detection. Camera trap days (trap nights) were calculated as the number of nights that camera stations were up and functioning.

The number of functioning trap days ("trap nights"), number of species and individuals (detections), and trap success (detections per 100 trap nights) were calculated. Camera station effort for each camera was determined. For each study area, total detections, proportion of total detections, and detection rates (detections per 100 trap nights) for each species and human categories were calculated. Categories were combined to derive overall detection rates for wildlife and human-related categories.

Occupancy Analysis

Occupancy estimates are surrogates for abundance and will establish baseline estimates. Occupancy estimates approaching 1 would indicate a prevalent species of presumably higher abundance. Occupancy estimates near zero would indicate a less prevalent species of presumably of lower abundance within the study area.

An occupancy estimate, ψ, for each species detected for the season was determined using the program PRESENCE (v3.2, Hines 2006). We used single-season occupancy models to estimate initial occupancy estimates (ψ) and detection probabilities (ρ) for each species (MacKenzie et al. 2003). Occupancy models account for imperfect detection and provide unbiased estimates of occupancy. To apply these models, detection histories are compiled for each species at each site for each camera station in a series of ones (detection) and zeros (non-detection). Each day the camera was up was considered a (re)survey. Each day the camera station was "down" or not functioning was treated as a missing value.

We modeled each of our study sites separately. We ran 2 pre-defined models and used the model with lowest delta Akaike's Information Criterion (AIC) to estimate probability of detection and occupancy as calculated by the software PRESENCE (Hines 2006). The first model estimated the same occupancy probability for all camera station locations and that detection probability (ρ) was constant across both camera station location and survey occasions (i.e., two parameters). The second model assumes that all camera station locations have the same probability of occupancy (ψ), but that ρ varies between the surveys although at each survey occasion, ρ is the same at each camera station location. PRESENCE uses) to rank models (Burnham & Anderson 2002), which relies on rules of parsimony. In this case, twice the log-likelihood values at the maximum likelihood estimates were used to calculate the AIC values in model weighting.

The duration of the study included portions of 2 seasons so occupancy modeling included two seasons for each study area. Season 1 included dates between September 1 and November 30 and Season 2 included dates from December 1 to February 30.

The Wildlife Picture Index (WPI)

Because this is the first year of this study, this year will be used as the baseline (Year 1). In order to run the WPI, at least three years are needed to determine trend. In future years should this study continue, the WPI can be calculated to see if biodiversity is trending up or down or staying stable. Therefore, *the WPI was not calculated for this report*. Methods to calculate the WPI are discussed in detail in O'Brien *et al.* (2010) and O'Brien (2010). The most essential details are presented below. To develop the WPI, species specific occupancy estimates are generated from the camera trap grid data for each season. Each survey season has a series of repeated surveys represented by each camera trap day. For any species that the occupancy estimate is zero, that term is adjusted by the following equation:

$$\psi^* = \psi + 1/2x$$

for an occupancy estimate based on x camera trap points.

The index uses each species-specific occupancy estimate for species *i* at site *j* in year *k*. Three years of seasonal data or three data points can provide three periods to generate occupancy estimates and an index. Occupancy in year *k* was divided by the estimated occupancy at the initial season, $o_{ijk} = \psi_{ijk}/\psi_{ij1}$. Each species-specific index measured change in occupancy from initial conditions. The estimate for k = 1 is always 1. The WPI for year *k* and site *j* and *n* species in geometric mean of scaled occupancy statistics for *n* species was calculated as follows:

$$I_{jk} = \sqrt[n]{\prod_{i=1}^{n} o_{ijk}}$$

RESULTS

Overall Effort

Camera trapping effort varied between sites (Table 2; see Appendix C) resulting in 10,562 camera trap nights for all study sites for the period spanning from late September to the end of December 2014 for MMWD and MCP and to early February 2015 for SPT and GGNRA. This effort resulted in 565,075 images from approximately 188,511 events. All images were catalogued. Events were used for analysis (maximum number of individuals in one image detected during a burst of three images).

Table 2: The overall effort resulting from MWPIP in Marin County, California for the interim analysis (number of camera stations, size of sites, period of data collection, trap nights, number of photographs, and number of events)[+ indicates that a few cameras may have included dates after December 31, 2015]

STUDY SITES	NO. CS	SIZE (SQ KM)	ANALYSIS PERIOD	TRAP NIGHTS	NO. PHOTOS	NO. EVENTS
GGNRA	8	4	22SEP14_4FEB15	911	42,657	14,219
SP SPT	22	11	22SEP14_4FEB15	2,010	73,460	24,487
MMWD	29	14.5	19SEP_31DEC14+	2,171	125,383	41,946
MCP NORTH	18	9	22SEP14_14JAN15	1,382	124,569	41,523
MCP WH CC	20	10	22SEP14_14JAN15	1,164	107,657	35,886
MCP GG	31	15.5	22SEP14_31DEC14+	2,924	91,349	30,450
TOTAL	**128**	**64**		**10,562**	**565,075**	**188,511**

Detections and Detection Rates

Site Specific Detection Rates

GOLDEN GATE NATIONAL RECREATION AREA: JEWEL AND CHEDA

Eight camera stations were set at 0.5 km intervals on two parcels of land in the GGNRA (Jewel and Cheda) covering 2 sq km on September 22, 2014 both east and west of Sir Francis Drake Boulevard in Marin County, California. The study site varied in elevation from x to x meters; 75% were placed in closed habitat and 13% in open and mixed, respectively (Appendix D). The photographs were catalogued from set up to the February 4, 2015 and used for this analysis.

GGNRA EFFORT	*TOTAL*
TRAP NIGHTS	*911*
NUMBER OF PHOTOS	*42,657*
NUMBER OF EVENTS	*14,219*

The black-tailed deer (*Odocoileus hemionus*) were detected most frequently (3,320 detections, 44.73% of total; see Table 3, Figs. 2 & 3). Numerous ground foraging birds were detected (982 detections, 13.6%); these species included California towhee (*Melozone crissalis*), varied thrush (*Ixoreus naevius*), California quail (*Callipepla californica*), western scrub jay (*Aphelocoma californica*) among others. The species that had the greatest detection rates (detections per 100 trap nights; also, known as "trapping success") included black-tailed deer (354.56), bird (107.79), gray squirrel (*Sciurus griseus*; 100.88), and cattle (*Bos taurus*; 52.69; Table 3, Fig. 3).

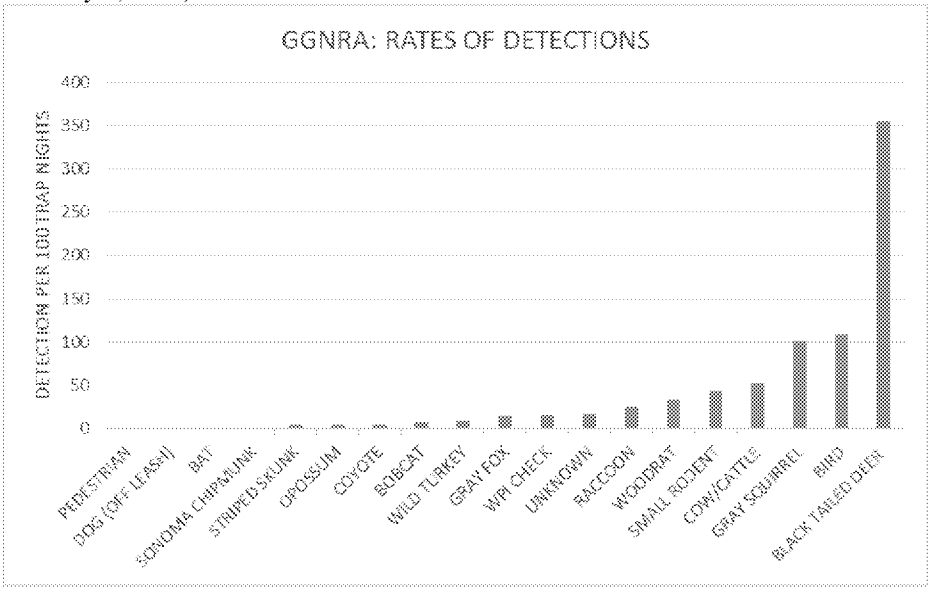
TABLE 3: Number of detections, proportion of total detected, and detection rates (detections per 100 camera trap nights) for species and human-related categories for Jewel and Cheda, GGNRA, Marin County, California for study period (September 22, 2014 to February 4, 2014)

CATEGORY	***TOTAL***	***PERCENT***	***RATE***
PEDESTRIAN	1	0.0001	0.11
DOG (OFF LEASH)	1	0.0001	0.11
BAT	1	0.0001	0.11
SONOMA CHIPMUNK	5	0.0007	0.55
STRIPED SKUNK	32	0.0044	3.51
OPOSSUM	39	0.0054	4.28
COYOTE	39	0.0054	4.28
BOBCAT	68	0.0094	7.46
WILD TURKEY	75	0.0104	8.23
GRAY FOX	132	0.0183	14.49
WPI CHECK*	143	0.0198	15.70
UNKNOWN	151	0.0209	16.58
RACCOON	223	0.0309	24.48
WOODRAT	306	0.0424	33.59
SMALL RODENT	394	0.0546	43.25
COW/CATTLE	480	0.0665	52.69
GRAY SQUIRREL	919	0.1273	100.88
BIRD	982	0.1360	107.79
BLACK TAILED DEER	3,230	0.4473	354.56
TOTAL	**7,221**		

*WPI Check = WPI personnel set up and maintenance

FIGURE 2: Proportion of total detections (for categories over 0.01 or greater) for Jewel and Cheda, GGNRA, Marin County, California for study period (September 22, 2014 to February 4, 2015)

[SHAPE * MERGEFORMAT]FIGURE 3: Rates of detection by category for Jewel and Cheda, GGNRA, Marin County, California for study period (September 22, 2014 to February 4, 2014)



STATE PARKS: SAMUEL P. TAYLOR

Twenty-two camera stations at 0.5 km interval covering approximately 5.5 sq km were set on State Park Samuel P. Taylor in Marin County, California in late September. The elevation ranged from x to x; 10% were open habitat, 35% were mixed habitat, and 65% were in closed habitats. This study period includes data from set up in late September 2014 until February 4, 2015.

SPT EFFORT	***TOTAL***
TRAP NIGHTS	*2,010*
PHOTOGRAPHS	*73,460*
EVENTS	*24,487*

Black-tailed deer and bird had greatest total detections and detection rates (Table 4, Figs. 4 & 5). Raccoon (*Procyon lotor*) and pedestrian were the 3rd and 4th most commonly detected, respectively. The State Park also supports rarer species such as the spotted skunk (*Spilogale gracilis*) and the river otter (*Lontra canadensis*; Table 4).

TABLE 4: Number of detections, proportion of total detected, and detection rates (detections per 100 camera trap nights) for species and human-related categories for the State Park Samuel P. Taylor in Marin County, California for study period (September 22, 2014 to February 4, 2015).

CATEGORY	*TOTAL*	*%*	*RATE*
OPOSSUM	0	0.0000	0.00
CANOER	1	0.0001	0.05
SPOTTED SKUNK	1	0.0001	0.05
CAR	3	0.0003	0.15
RIVER OTTER	3	0.0003	0.15
DOG (ON LEASH)	23	0.0019	1.14
BAT	26	0.0022	1.29
STAFF VEHICLE	28	0.0023	1.39
HORSE	29	0.0024	1.44
STRIPED SKUNK	29	0.0024	1.44
SONOMA CHIPMUNK	47	0.0039	2.34
COYOTE	47	0.0039	2.34
CYCLIST	61	0.0051	3.03
DOG (OFF LEASH)	65	0.0054	3.23
BRUSH RABBIT	75	0.0063	3.73
COW/CATTLE	82	0.0069	4.08
BOBCAT	109	0.0091	5.42
WOODRAT	123	0.0103	6.12
UNKNOWN	199	0.0167	9.90
GRAY FOX	200	0.0167	9.95
WPI CREW	264	0.0221	13.13
SMALL RODENT	436	0.0365	21.69
GRAY SQUIRREL	639	0.0535	31.79
PEDESTRIAN	1156	0.0968	57.51
RACCOON	1329	0.1112	66.12
BIRD	2898	0.2426	144.18
BLACK TAILED DEER	4074	0.3410	202.69
TOTAL	**11,947**		

Figure 4: Proportion of the total detections over 1% for the State Park Samuel P. Taylor in Marin County, California for study period (September 22, 2014 to February 4, 2014).
[SHAPE * MERGEFORMAT]
Figure 5: Detection rates (detections per 100 camera trap nights) for species and human-related categories for the State Park, Samuel P. Taylor in Marin County, California for study period (September 22, 2014 to February 4, 2014).
[SHAPE * MERGEFORMAT]

MARIN MUNICIPAL WATER DISTRICT

Twenty-nine camera stations at 0.5 km intervals covering a 7.25 sq km area were set up in late September on the MMWD lands adjacent to and south of MCP Gary Giacomini. Elevation ranged from 81 to 709 m; 23% of the camera stations were in open and mixed habitat, respectively, and 50% were in closed habitats. The period of analysis includes from the initial set-up in September 22, 2014 to the end of December 2014; in some cases, to mid-February 2015 covering an approximately 3 month period (see Appendix C).

MMWD EFFORT	*TOTAL*
TRAP NIGHTS	*2,171*
PHOTOGRAPHS	*125,838*
EVENTS	*41,946*

The total number of detections was 20,558 including the WPI crew (camera maintenance). Pedestrians were detected 10,502 times at a rate of 484 per 100 trap nights (Table 5, Figs. 6 & 7), which may be in part due to having camera stations on busy trails. Human-related categories such as cyclist, dog (on leash), and dog (off leash) were also commonly detected. The black-tailed deer, gray squirrel and bird were the most commonly detected wildlife (Table 5, Figs. 8 & 9).

TABLE 5: Number of detections, proportion of total detected, and detection rates (detections per 100 camera trap nights) for species and human-related categories for MMWD, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

CATEGORY	*TOTAL*	*%*	*RATE*
PUMA	1	0.0000	0.05
DOMESTIC CAT	2	0.0001	0.09
SPOTTED SKUNK	2	0.0001	0.09
INSECT	3	0.0001	0.14
CAR	4	0.0002	0.18
RIVER OTTER	4	0.0002	0.18
BRUSH RABBIT	7	0.0003	0.32
STRIPED SKUNK	12	0.0006	0.55
BAT	22	0.0011	1.01
SONOMA CHIPMUNK	35	0.0017	1.61
STAFF VEHICLE	72	0.0035	3.32
BLACK TAILED HARE	91	0.0044	4.19
BOBCAT	102	0.0050	4.70
COYOTE	121	0.0059	5.57
STAFF	122	0.0059	5.62
UNKNOWN	126	0.0061	5.80
HORSE (EQUESTRIAN)	129	0.0063	5.94
RACCOON	157	0.0076	7.23
WOODRAT	319	0.0155	14.69
GRAY FOX	354	0.0172	16.31
SMALL RODENT	373	0.0181	17.18
WPI CREW	466	0.0227	21.46
CYCLIST	925	0.0450	42.61
DOG (OFF LEASH)	1,042	0.0507	48.00
DOG (ON LEASH)	1,101	0.0536	50.71
BIRD	1,264	0.0615	58.22
GRAY SQUIRREL	1,306	0.0635	60.16
BLACK TAILED DEER	1,897	0.0923	87.38
PEDESTRIAN	10,502	0.5108	483.74
TOTAL	**20,558**		

FIGURE 6: Proportion of total detected for categories over 1% or greater for categories for MMWD, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

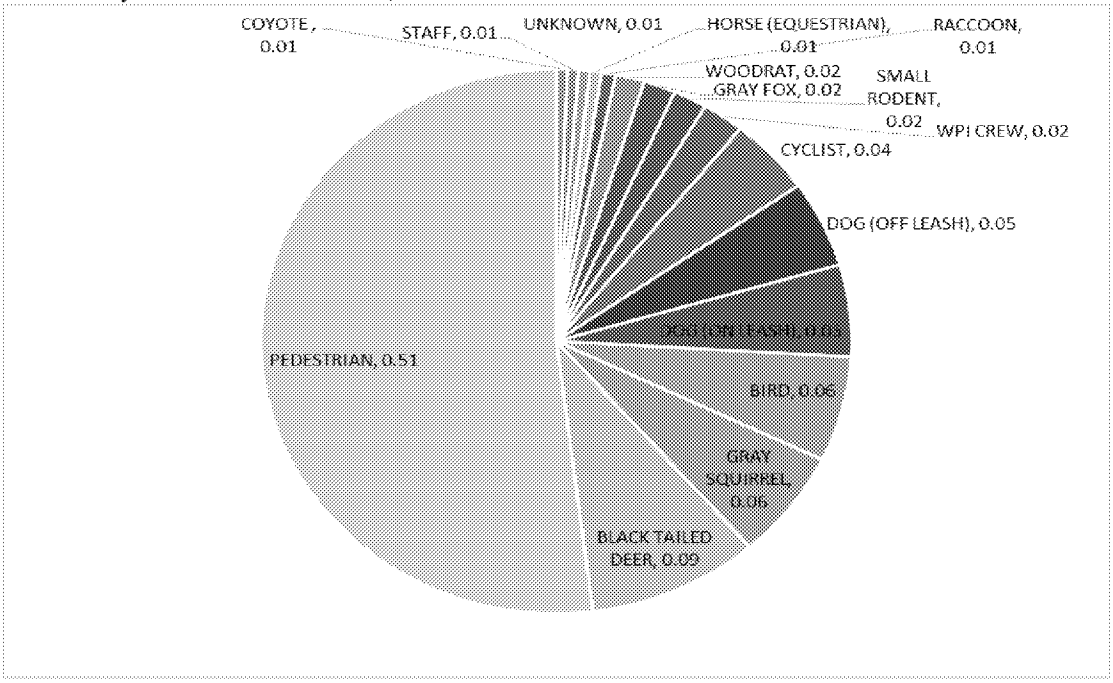
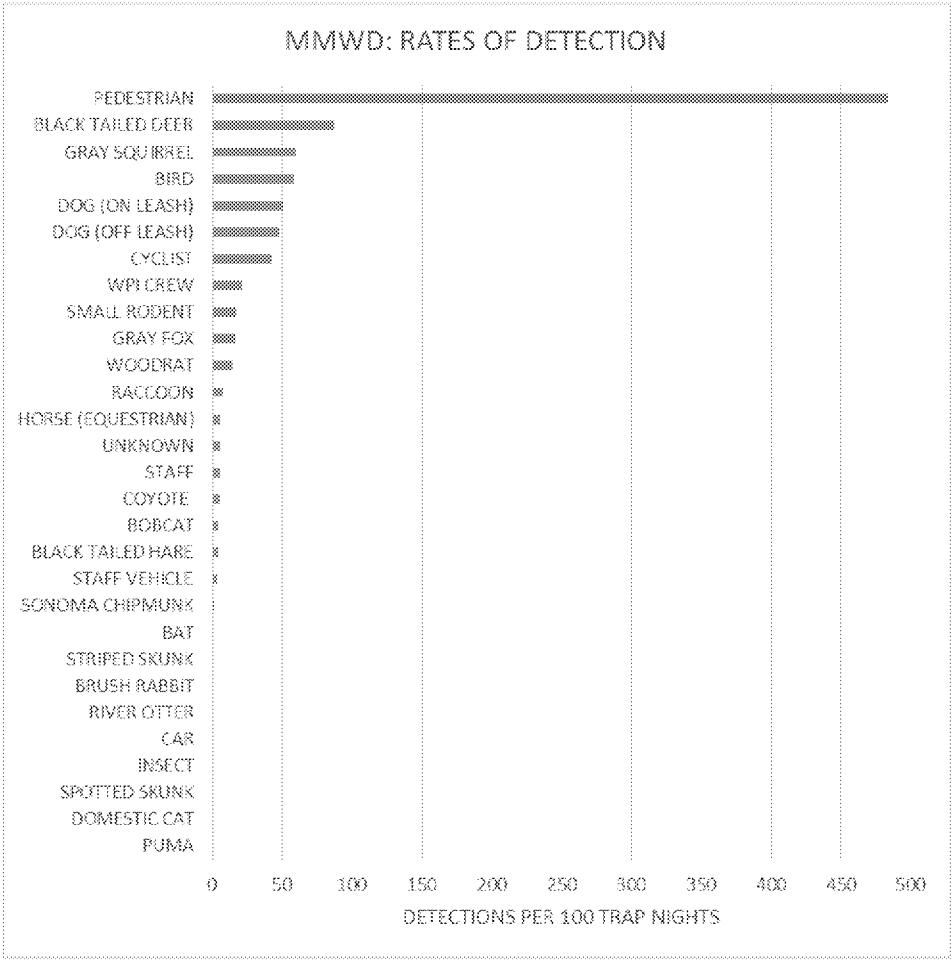


Figure 7: Detection rates for species and human-related categories for MMWD, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)



MARIN COUNTY PARKS

The Marin County Park was divided into 3 study sites. MCP North included Roy's Redwoods and French Ranch. MCP WH CC included White Hill and Cascade Canyon and MCP GG included Gary Giacomini.

TABLE 6: MCP study sites and the number of camera stations, size of each area, the period used for this analysis, number of trap nights (effort), number of photographs and number of events for each

STUDY SITES	*NO. CS*	*SIZE (SQ KM)*	*PERIOD ANALYSIS*	*EFFORT*	*NO. PHOTOS*	*NO. EVENTS*
MCP NORTH	18	4.5	22SEP14_14JAN15	1,382	124,569	41,523
MCP WH CC	20	5	22SEP14_14JAN15	1,164	107,657	35,886
MCP GG	31	7.75	22SEP14_31DEC14+	2,924	91,349	30,450
TOTAL	**69**	**17.25**		**5,470**	**323,575**	**107,859**

MCP NORTH (FRENCH RANCH AND ROY'S REDWOODS)

Eighteen camera stations covering 4.5 sq km were set up in late September in two adjacent Marin County Parks, French Ranch and Roy's Redwoods, north of Sir Francis Drake Boulevard in Marin County, California. Elevation ranged from 11 to 370 m; 44% were in open habitats, 33% were in mixed habitats, and 22% were in closed habitats. The period of analysis included data from the initial set up in September 22, 2014 to the end of December 2014, in some cases, to January 14, 2015 covering an approximately a 3 month period (see Appendix C).

MCP NORTH	***TOTAL***
TRAP NIGHTS	*1,382*
PHOTOGRAPHS	*124,569*

Total number of detections was 4,920. The black-tailed deer was the most commonly detected and had the highest detection rate (Table 7, Figs. 11 & 12). Small rodent, bird and gray squirrel were the most commonly detected wildlife after the black-tailed deer. Pedestrian and dog (off leash) were the most commonly detected human-related categories (Table 7, Figs. 11 & 12).

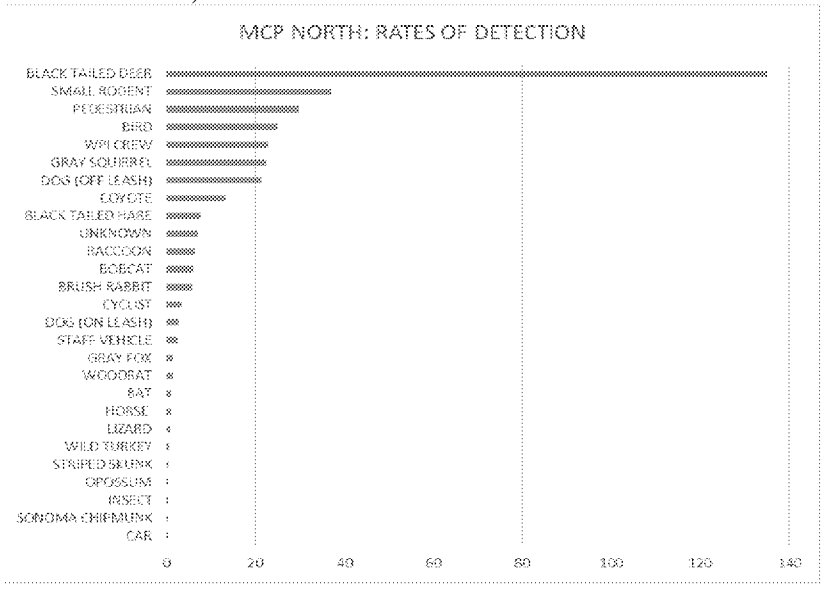
TABLE 7: Number of detections, proportion of total detected, and detection rates (detections per 100 camera trap nights) for species and human-related categories for Roy's Redwoods and French Ranch, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

CATEGORY	*TOTAL*	*%*	*RATE*
CAR	2	0.0004	0.14
SONOMA CHIPMUNK	3	0.0006	0.22
INSECT	3	0.0006	0.22
OPOSSUM	4	0.0008	0.29
STRIPED SKUNK	7	0.0014	0.51
WILD TURKEY	8	0.0016	0.58
LIZARD	11	0.0022	0.80
HORSE	15	0.0030	1.09
BAT	15	0.0030	1.09
WOODRAT	20	0.0041	1.45
GRAY FOX	20	0.0041	1.45
STAFF VEHICLE	36	0.0073	2.60
DOG (ON LEASH)	38	0.0077	2.75
CYCLIST	48	0.0098	3.47
BRUSH RABBIT	79	0.0161	5.72
BOBCAT	85	0.0173	6.15
RACCOON	87	0.0177	6.30
UNKNOWN	98	0.0199	7.09
BLACK TAILED HARE	106	0.0215	7.67
COYOTE	182	0.0370	13.17
DOG (OFF LEASH)	295	0.0600	21.35
GRAY SQUIRREL	310	0.0630	22.43
WPI CREW	315	0.0640	22.79
BIRD	344	0.0699	24.89
PEDESTRIAN	413	0.0839	29.88
SMALL RODENT	511	0.1039	36.98
BLACK TAILED DEER	1,865	0.3791	134.95
TOTAL	**4,920**		

FIGURE 8: Proportion of total detected for categories over 1% or greater for Roy's Redwoods and French Ranch, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

[SHAPE * MERGEFORMAT]

Figure 9: Detection rates (detections per 100 camera trap nights) for species and human-related categories for Roy's Redwoods and French Ranch, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)



MCP WH CC (WHITE HILL AND CASCADE CANYON)

Twenty camera stations were set in late September in two adjacent Marin County Parks (White Hill and Cascade Canyon) at 0.5 km intervals covering a 5 sq km area. Elevation ranged from 77 to 410 m; 40% were in open habitats, 20% were in mixed habitats and 40% were in closed habitats (Appendix D). The period of analysis included data from the initial set up in September 22, 2014 to the end of December 2014; in some cases, to January 14, 2015 covering an approximately a 3 month period (see Appendix C).

MCP WH CC EFFORT	*TOTAL*
TRAP NIGHTS	*1,164*
PHOTOGRAPHS	*107,657*
EVENTS	*35,886*

Total number of detections was 7,486. The black-tailed deer (60% of detections) and gray squirrel (9% of total) were the most commonly detected wildlife (4,424 and 699, respectively; Table 8, Figs. 14 &15). Pedestrians were detected 572 times (8% of total, Table 8).

TABLE 8: Number of detections, proportion of total detected, and detection rates (detections per 100 camera trap nights) for species and human-related categories for White Hill and Cascade Canyon, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

Category	TOTAL	%	RATE
opossum	1	0.00	0.09
wild turkey	2	0.00	0.17
equestrian	3	0.00	0.26
insect	3	0.00	0.26
striped skunk	7	0.00	0.60
woodrat	10	0.00	0.86
bat	11	0.00	0.95
cyclist	29	0.00	2.49
dog (on leash)	38	0.01	3.26
bobcat	52	0.01	4.47
coyote	78	0.01	6.70
raccoon	114	0.02	9.79
unknown	120	0.02	10.31
small rodent	136	0.02	11.68
black-tailed hare	141	0.02	12.11
dog (off leash)	170	0.02	14.60
check	213	0.03	18.30
gray fox	231	0.03	19.85
bird	432	0.06	37.11
pedestrian	572	0.08	49.14
gray squirrel	699	0.09	60.05
black-tailed deer	4,424	0.59	380.07

FIGURE 10: Proportion of total detected for categories over 1% or greater for White Hill and Cascade Canyon, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)
[SHAPE * MERGEFORMAT]
Figure 11: Detection rates (detections per 100 camera trap nights) for species and human-related categories for White Hill and Cascade Canyon, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)
[SHAPE * MERGEFORMAT]

MCP GG (GARY GIACOMINI)

Thirty-one camera traps were set at 0.5 km intervals covering a 7.75 sq km area in the MCP GG, south of Sir Francis Drake Boulevard in Marin County, California. Elevation ranged from 123 to 470 m; 10% were in open habitats, 45% were in mixed habitats and 40% were in closed habitats (Appendix D). The period of analysis was completed from the initial set up in September 22, 2014 to the end of December 2014 covering an approximately 3 month period. In some cases, data from several camera stations were catalogued until mid- or the end of January or as late as mid-March 2015 (see Appendix C).

MCP GG EFFORT	*TOTAL*
TRAP NIGHTS	*2,924*
PHOTOGRAPHS	*91,349*
EVENTS	*30,450*

Total number of detections was 11,147 (Table 9). Black-tailed deer (34% of total detections), gray squirrel (16%) and bird (15%) were the most often detected (Table 9, Fig. 17). Pedestrians had a detection rate of 27.22 per 100 trap nights (Table 9, Fig. 18) and was the most prevalent human-related category.

TABLE 9: Number of detections, proportion of total detected, and detection rates (detections per 100 camera trap nights) for species and human-related categories for Gary Giacomini, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

CATEGORY	*TOTAL*	*%*	*RATE*
DOMESTIC CAT	3	0.0003	0.10
INSECT	5	0.0004	0.17
STRIPED SKUNK	8	0.0007	0.27
BAT	9	0.0008	0.31
OPOSSUM	19	0.0017	0.65
COYOTE	74	0.0066	2.53
SONOMA CHIPMUNK	88	0.0079	3.01
BLACK TAILED HARE	93	0.0083	3.18
DOG (ON LEASH)	102	0.0092	3.49
BOBCAT	103	0.0092	3.52
CYCLIST	174	0.0156	5.95
UNKNOWN	196	0.0176	6.70
WOODRAT	263	0.0236	8.99
RACCOON	282	0.0253	9.64
STRIPED SKUNK	282	0.0253	9.64
DOG (OFF LEASH)	344	0.0309	11.76
CHECK	358	0.0321	12.24
BRUSH RABBIT	364	0.0327	12.45
SMALL RODENT	444	0.0398	15.18
PEDESTRIAN	796	0.0714	27.22
BIRD	1,632	0.1464	55.81
GRAY SQUIRREL	1,745	0.1565	59.68
BLACK TAILED DEER	3,763	0.3376	128.69
TOTAL	**11,147**		

FIGURE 12: Proportion of total detected for categories over 1% or greater for Gary Giacomini, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)

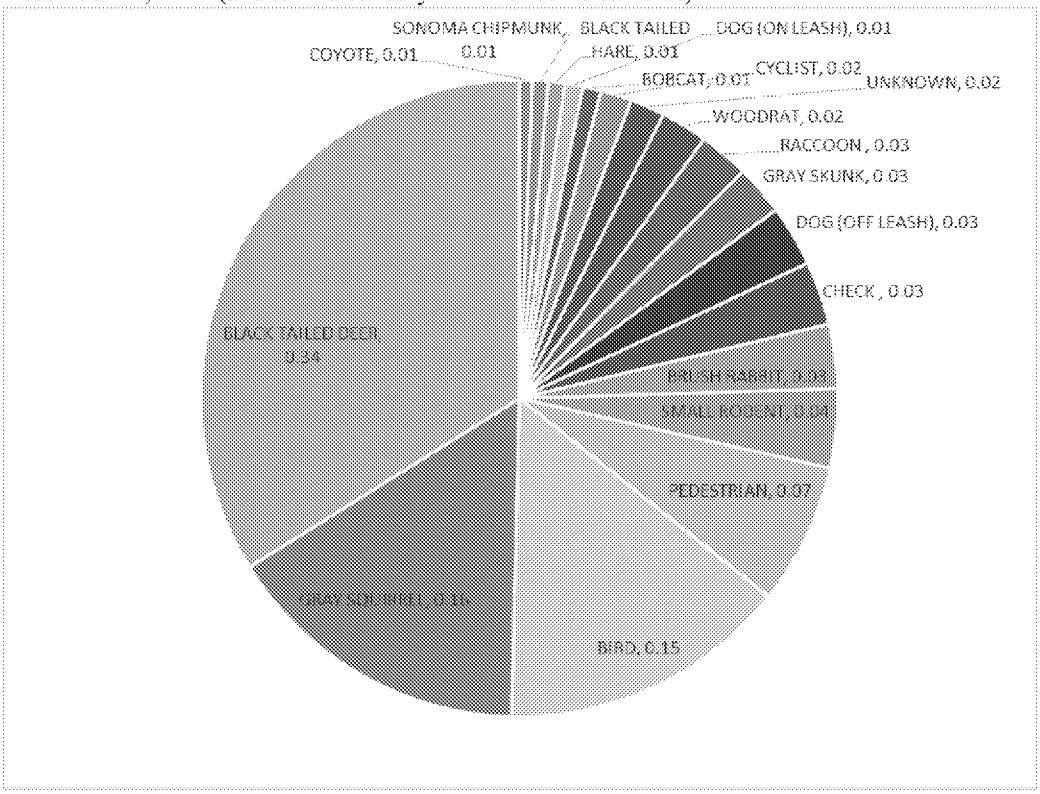
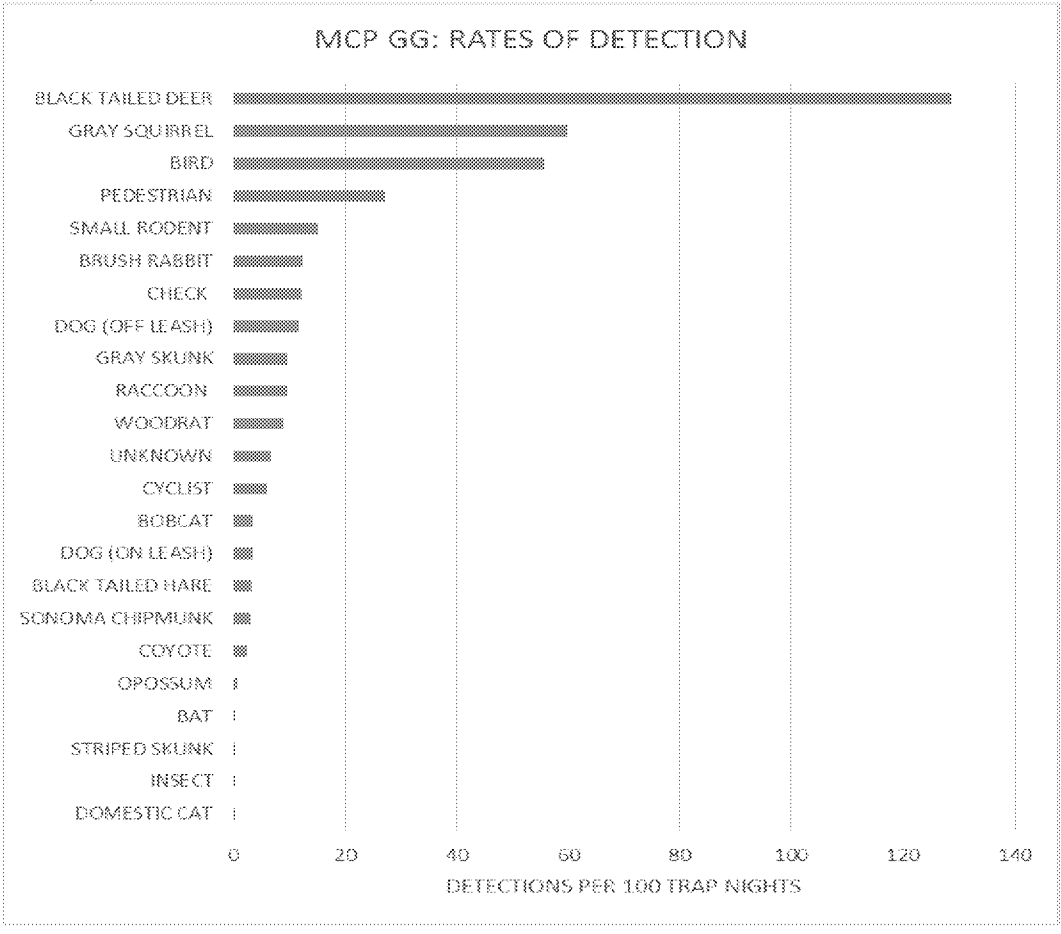


FIGURE 13: Detection rates (detections per 100 camera trap nights) for species and human-related categories for Gary Giacomini, Marin County Parks, Marin County, California from September 22 to December 31, 2014 (and to mid-January 2015 for some cameras)



Detection Rates: All Sites

Carnivores are an important part of the ecosystems of Marin County; they can be indicators of the health of lower trophic levels (prey species) and can be sensitive to human presence. Striped skunk are associated with human development and were the least commonly detected mesocarnivore (Fig. 14). The gray fox (*Urocyon cinereoargenteus*) had the highest detection rates for most sites [range = 9.64 (SPT) to 19.85 (MCP WH CC)] except for the Marin County Park North study site (1.45). MCP North had the greatest detection rate for coyotes (*Canis latrans*; 13.17) versus the lowest at SPT (2.34). Coyotes were also detected at all study sites but were less common than gray fox. Bobcat (*Lynx rufus*) detection rates were fairly similar ranging from 3.52 (MCP GG) to 7.46 (GGNRA; Fig. 14).

Figure 14: Detection rates for carnivore species for each study site[2], Marin County, California (late September 2014 to early 2015)
[EMBED Excel.Chart.8 \s]

Puma were detected in MMWD at a camera trap on a shared boundary with MCP GG; the only camera trap within this study area where a puma (*Puma concolor*) was detected for this study period (Fig. 15). Puma are known to occur in this county but are rare (see Discussion section) despite the availability of prey (black-tailed deer) and appropriate habitat. Spotted skunk are a species about which we have little information so it is important that they were detected at least 2 of the study sites (MMWD and SPT). River otter are known to occur in Marin County and are associated with permanent water sources (rivers and reservoirs). Other research has detected them in several places in Marin County, but they are still not considered common.

Figure 15: Detection rates for rarer mammalian species (puma, spotted skunk and river otter) for each study site, Marin County, California (late September 2014 to early 2015)
[EMBED Excel.Chart.8 \s]

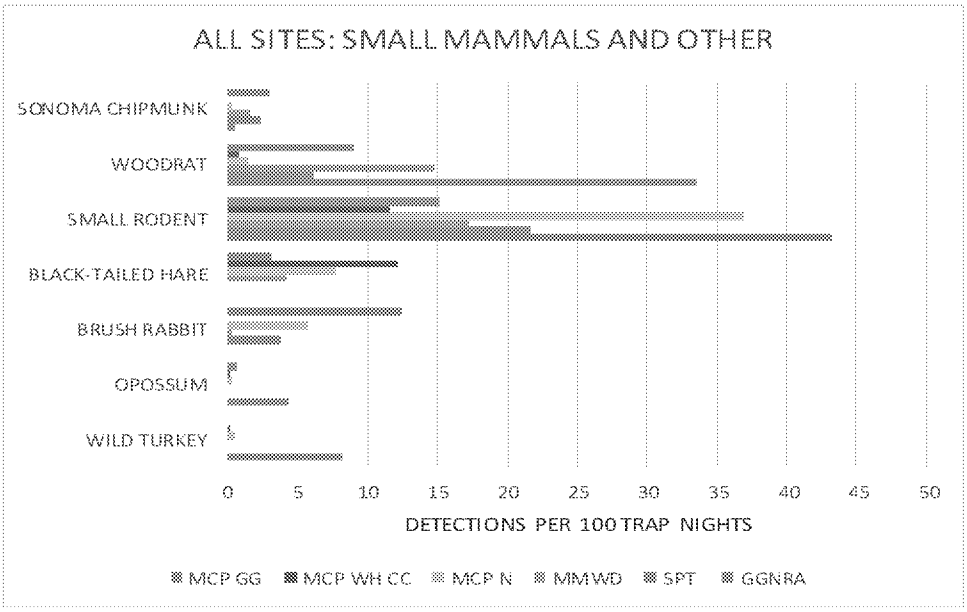
Black-tailed deer had the highest detection rates across all sites, particularly for GGNRA and MCP North (Fig. 16). Gray squirrels were detected at all sites (Fig. 22); the greatest detection rate was at GGNRA. Birds were detected at all sites with the highest detection rates at SPT.

[2] GGNRA = GOLDEN GATE NATIONAL RECREATIONAL AREA, SPT = SAMUAL P. TAYLOR, MMWD = MARIN MUNICIPAL WATER DISTRICT, MCP N = MCP NORTH, MCP WH CC = MCP WHITE HILL AND CASCADE CANYON, MCP GG = GARY GIACOMINI

Figure 16: Detection rates for commonly detected mammalian species and birds for each study site, Marin County, California (late September 2014 to early 2015)
[SHAPE * MERGEFORMAT]

A variety of small(er) mammals were detected at all sites (Fig. 17). Small rodents (as a category excluding woodrats, *Neotoma fuscipes*) had highest detection rates at MCP North and GGNRA. Woodrats were detected at all sites but had the highest detection rate at GGNRA. Sonoma chipmunk was not detected at the MCP WH CC study site and had low detection rates overall and may be generally uncommon. Brush rabbit, *Sylvilagus bachmani*, associated with scrub habitat, had the highest detection rate at the MCP WH CC study site. The black-tailed hare, *Lepus californicus*, was not detected at SPT or GGNRA; this species is associated with grasslands. Wild turkey (*Meleagris gallopavo*) were uncommon and were absent from several sites (MCP GG, MMWD, SPT). Interestingly, opossum (*Didelphis virginiana*) are often associated with humans but had the highest detection rate with the study site with the fewest humans (GGNRA).

Figure 17: Detection rates for smaller mammals, opossum and wild turkey for each study area, Marin County, California (late September 2014 to early 2015)



MMWD had highest detection rates for pedestrians and for the remainder of human-related categories (Figs. 18 & 19). GGNRA had cattle but virtually no other human presence; the MCP study sites recorded high detection rates for off-leash dogs.

Figure 18*:* Detection rates for pedestrian for each study site, Marin County, California (late September 2014 to early 2015)
[EMBED Excel.Chart.8 \s]

Figure 19: Detection rates for human-related categories (non-pedestrian) for each study site, Marin County, California (late September 2014 to early 2015)
[EMBED Excel.Chart.8 \s]

Occupancy Estimates

Occupancy estimates were calculated for all species (or taxonomic groups) that were reliably detected by the camera stations (see Table 10 for wildlife that could be reliably detected by camera stations in Marin County). For example, birds were not included because while some ground foragers were frequently detected, many birds are too small or too quick to be reliably detected by the camera stations. Rare species such as river otter, spotted skunk, and puma were detected so infrequently that no occupancy estimate could be derived and were therefore omitted from this analysis. While small rodents and woodrats are quite small, they were frequently detected on the camera stations and, therefore, were included in this analysis. These two groups are treated separately but there were likely instances where an individual classified as a "small rodent" could in fact be a woodrat. Therefore, these two groups could be considered one group.

Table 10: Mammalian species and one bird species detectable by camera traps and expected to occur in Marin County, California based on geographic range and historical occurrence (see Status column). Species detected for this analysis were numbered (see No. column).

Taxon	*No.*	*Common Name*	*Species*	*Status*
Marsupialia	1	Opossum	*Didelphis virginiana*	*Detected*
Carnivora	2	River otter	*Lontra canadensis*	*Detected*
	3	Gray fox	*Urocyon cinereoargenteus*	*Detected*
	4	Coyote	*Canis latrans*	*Detected*
		Black bear	*Ursus americanus*	*Unknown*[3]
	5	Striped skunk	*Mephitus mephitus*	*Detected*
	6	Western spotted skunk	*Spilogale gracilis*	*Detected*
		Badger	*Taxidea taxus*	*Not detected*
	7	Bobcat	*Lynx rufus*	*Detected*
	8	Mountain lion	*Puma concolor*	*Detected*
F. Procyonidae	9	Raccoon	*Procyon lotor*	*Detected*
		Ringtail	*Bassariscus astutus*	*Not detected*
Artiodactyla		Wild boar	*Sus scrofa*	*Absent*
	10	Black-tailed deer	*Odocoileus hemionus*	*Detected*
Rodentia	11	Woodrat	*Neotoma fuscipes*	*Detected*
	12	Sonoma chipmunk	*Tamias sonomae*	*Detected*
	13	Gray squirrel	*Sciurus griseus*	*Detected*
		Porcupine	*Erethizon dorsatum*	*Not detected*
Lagomorpha		(Hare and Rabbit)	*(Lepus and Sylvilagus)*	
	15	Black-tailed jackrabbit	*Lepus californicus*	*Detected*
	16	brush rabbit	*Sylvilagus bachmani*	*Detected*
Aves	17	Wild turkey	*Meleagris gallopavo*	*Detected*

Occupancy Estimates: Site Specific

Site-specific occupancy estimates for each species were generated for Season 1 (late September to November 30, 2014) and Season 2 (December 1 to December 31st for MCP and MMWD; December 1 to February 4, 2015 for GGNRA and SPT). Occupancy

[3] Unknown = indicates that the current range and status of this species in Marin County is not known

estimates are a surrogate for abundance. Similar occupancy estimates from one season to the next may indicate a resident population.

For GGNRA (Fig. 20), black-tailed deer, gray squirrel and raccoon had occupancy estimates of or at nearly 1. Additionally, all carnivores (striped skunk, gray fox, coyote and bobcat) are similarly abundant. Small rodents and woodrats were less abundant than other species.

For SPT (Fig. 21), black-tailed deer approached 1 for an occupancy estimate. Three of the carnivores (gray fox, coyote, and bobcat) were all similarly abundant. Of the smaller mammals, gray squirrel and small rodent were relatively abundant compared to the other smaller mammals such as woodrat, Sonoma chipmunk, and brush rabbit. Little seasonal difference was observed for all species except for greater estimates for small rodents and gray fox in Season 2.

For MMWD (Fig. 22), black-tailed deer had an occupancy estimate (ψ) of 1 for Season 1 and 0.7232 (±0.1056) for Season 2. All carnivores (with the exception of the striped skunk), and small rodent were fairly abundant in Season 1 with lower estimates in Season 2 (except raccoon and bobcat). The smaller mammals were variable in abundance within this group and all were abundant enough to derive an occupancy estimate; the gray squirrel was the most abundant. Lower abundance for small rodents and gray squirrel were recorded in Season 2.

For MCP North (French Ranch and Roy's Redwood) (Fig. 23), black-tailed deer approached an occupancy estimate of 1 for both seasons. All carnivores including raccoon were "well represented" (relatively abundant for all members) with a slight decrease in Season 2 (with exception of the bobcat). All smaller mammals (small rodent, woodrat, Sonoma chipmunk, gray squirrel, brush rabbit, and black-tailed hare) had occupancy estimates that ranged from 0.0788 ±0.0838 (Sonoma chipmunk) to 0.6698±0.1116 (gray squirrel) for Season 1. The Sonoma chipmunk was absent in Season 2.

For MCP WH CC (Fig. 24), black-tailed deer approached an occupancy estimate of 1.00 for both seasons. Gray squirrel, small rodent, woodrat, raccoon, gray fox, coyote and bobcat all were relatively abundant (occupancy estimate of +/- 0.50). Gray squirrel was notably absent in Season 2.

For MCP GG (Fig. 25), black-tailed deer approached an occupancy estimate of 1 for both seasons. All six smaller mammals had variable estimates with gray squirrel and small rodents the most abundant in this group. Gray fox was the most abundant carnivore. Seasonally, there were apparent decreases in occupancy estimates for woodrat, raccoon, and coyote into Season 2.

Figure 20: Species-specific occupancy estimates for Seasons 1 & 2[4], GGNRA, Marin County, California
[SHAPE * MERGEFORMAT]Figure 21: Species-specific occupancy estimates Seasons 1 & 2, SPT, Marin County, California
[SHAPE * MERGEFORMAT]

Figure 22: Species-specific occupancy estimates Seasons 1 & 2, MMWD, Marin County, California

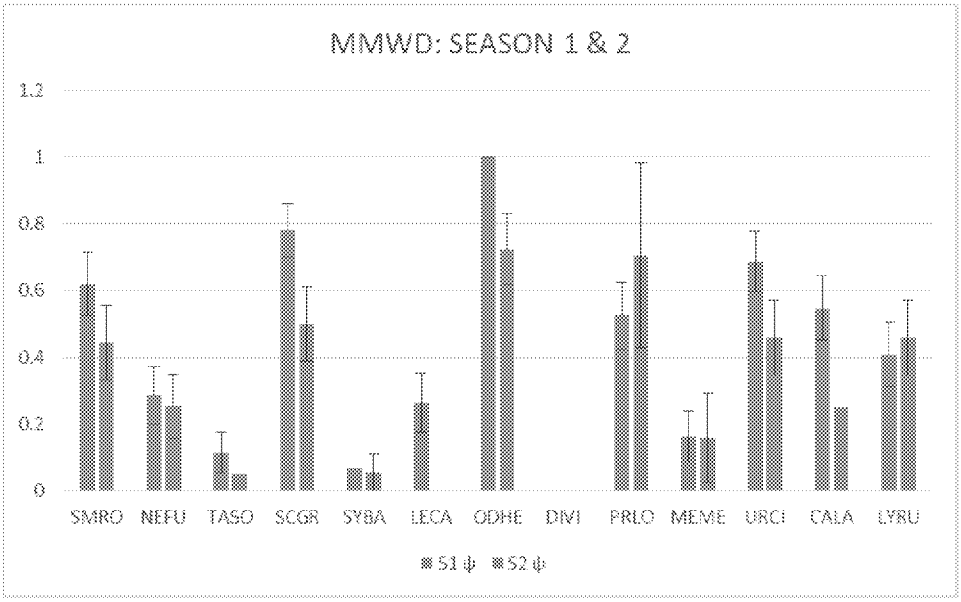


Figure 23: Species-specific occupancy estimates Seasons 1 & 2, French Ranch & Roy's Redwoods, MCP, Marin County, California

[4] Smro = small rodent, nefu = woodrat, taso = Sonoma chipmunk, scgr = gray squirrel, syba = brush rabbit, leca = black-tailed hare, odhe = black-tailed deer, meme = striped skunk, urci = gray fox, cala = coyote, lyru = bobcat, and bota = cattle

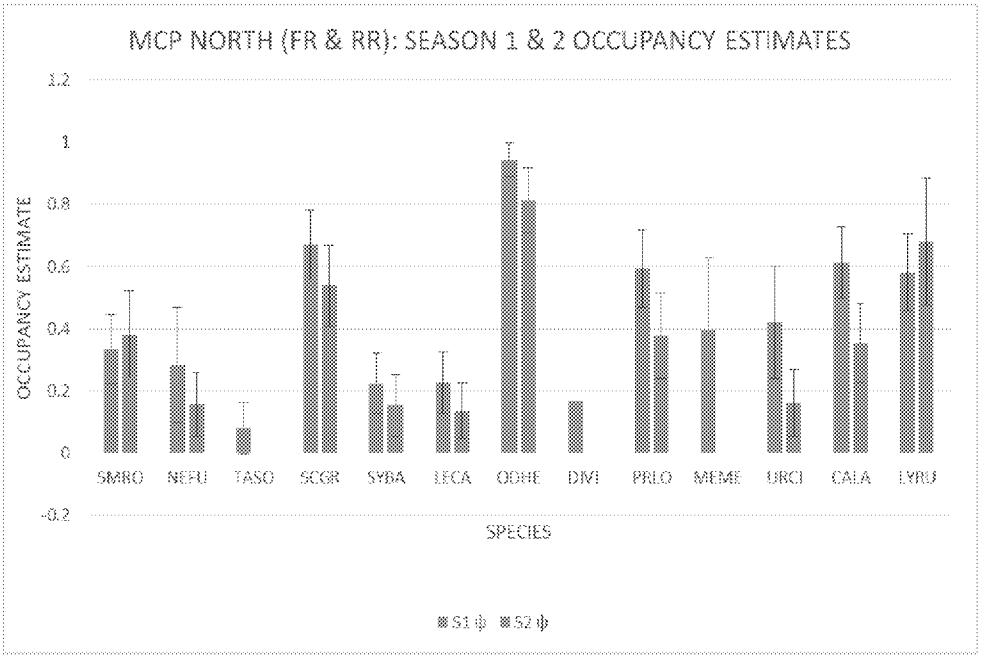


Figure 24: Species-specific occupancy estimates Seasons 1 & 2, White Hill and Cascade Canyon, MCP, Marin County, California
[SHAPE * MERGEFORMAT]
Figure 25: Species-specific occupancy estimates Seasons 1 & 2, Gary Giacomini, MCP, Marin County, California
[SHAPE * MERGEFORMAT]

Occupancy Estimates: All Sites

For all sites for Season 1 (Fig. 26), species-specific occupancy estimate were similar. GGNRA had several species with an occupancy estimate of 1 (gray squirrel, deer and raccoon) and two carnivores (bobcat and coyote) with error bars exceeding 1. GGNRA had the fewest camera traps (n = 8), which can lead to more uncertainty in the estimates (large standard error). Several smaller mammals such as the Sonoma chipmunk, brush rabbit, and black-tailed hare were the most variable across sites. Small rodents were most abundant in MMWD, MCP WH CC and MCP GG. Woodrat were most abundant in MCP WH CC and MCP GG than the other study sites. The carnivore occupancy estimates were similar across sites, well-represented (at or above 0.5) with no one dominant species. The opossum was uncommon and detected too infrequently to run occupancy models.

For all sites for Season 2 (Fig. 27), species-specific occupancy estimates were similar. The woodrat was more abundant in MCP WH CC. In GGNRA, the coyote (ψ = 1) and bobcat (ψ = 0.82 ±0.17) were abundant; however, the large standard error was likely due

to the fewer camera stations (n = 8) at this site. GGNRA was unique in so far as it had the fewest human disturbances but did have cattle unlike the remainder of the study sites.

For all three MCP study sites for Season 1 (Fig. 28), small rodents and gray fox were most abundant in MCP GG. Most other species were similarly abundant. Sonoma chipmunk, opossum, and brush rabbit were present in MCP North and MCP GG but absent from MCP WH CC. Striped skunk was most abundant at the MCP North site.

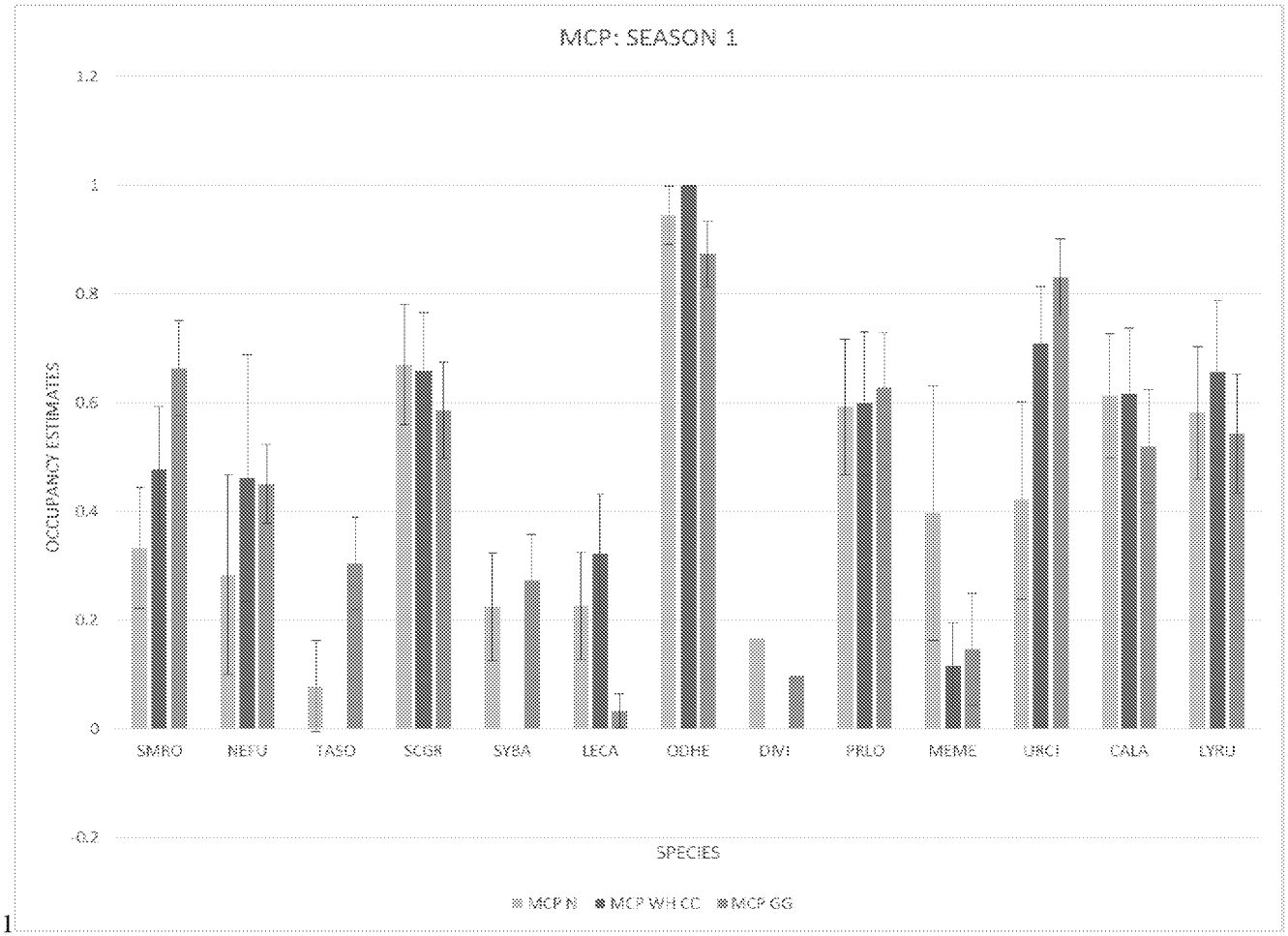
For all three MCP study sites for Season 2 (Fig. 29), woodrat and coyote were the most abundant for MCP CC WH; otherwise, for each species that was present at all three sites, abundance (ψ) was similar. Occupancy estimates varied considerably for the smaller mammals; Sonoma chipmunk, gray squirrel, and brush rabbit were absent from MCP WH CC.

Figure 26: Occupancy estimates for all species for all sites for Season 1 (September 19 to November 30, 2014), Marin County, California

[SHAPE * MERGEFORMAT]
Figure 27: Species-specific occupancy estimates for all study sites for Season 2 (Dec 1 - 31, 2014 for MMWD and MCP and to Feb 4, 2015 for GGNRA and SPT), Marin County, California

[SHAPE * MERGEFORMAT]

Figure 28: Species-specific occupancy estimates for MCP study sites for Season 1 (September 19 to November 30, 2014), Marin County, California



1

Figure 29: Species-specific occupancy estimates for MCP study sites for Season 2 (December 1 to 31, 2014), Marin County, California

[SHAPE * MERGEFORMAT]

CONCLUSIONS

The presence and status of mammalian species reported for the six study sites in our study area indicate an ecosystem with diversity and abundance at each trophic level. Smaller mammals such as woodrats, gray squirrel, brush rabbits and black-tailed hares provide ecosystem services such as seed dispersal and prey for the carnivore community. Gray squirrel were the most abundant of the smaller mammals group. The carnivore community (upper trophic level) was diverse with no one member dominating in abundance. Additionally, bobcat and gray fox were abundant despite human use and other potential contra-indicators. Additionally, species that tend to increase around humans such as the opossum and striped skunk were in low abundance (the opossum and striped skunk) or absent (the opossum); this may be due to top down influence of a diverse and prevalent carnivore community or a lack of supplemental feeding that can occur with humans or both. The raccoon (also associated with humans) was present in abundance similar to the other carnivore species and was expected due to the presence of its preferred riparian habitat at most sites.

The black-tailed deer were present in high abundance across all study sites, which makes it all the more notable that puma was only detected once; deer is the puma's preferred prey. Despite a relatively persistent effort to determine puma presence in Marin County over the past few decades, puma have not been detected in any great numbers. Fifield et al. (2015) could confirm only 2 males over a three year study using camera traps.

The presence of other rarer species included the spotted skunk; this is significant because the spotted skunk has been less commonly observed and has been considered to be declining with little or no empirical evidence available. The river otter has been more recently studied and appears to be increasing; it was detected in our study both on a trail and in the river at two of our study sites, MMWD and SPT. There was a notable absence of the badger in this study. This species is known to occur in Marin County. Despite being with the published geographic range (see CDFW CWHR and Zeiner et al. 1988-1990), very few if any records of the black bear, ringtail and porcupine have been recorded in this County. These species were not recorded during this study period (see Table 10).

These preliminary findings are useful toward understanding how well the cameras are functioning and to provide an initial understanding of mammalian wildlife presence and abundance in Marin County. Complete seasonal baselines (of which this interim analysis represents only portions of two seasons) will allow for detecting changes in species abundance over time, trends in biodiversity, detection of rare species, resident versus seasonal occupancy for certain species, and other metrics. When results from the MWPIP are combined with similar efforts in the San Francisco Bay region, regional connectivity and functionality of ecosystems can be examined. Finally, climate change and anthropocentric factors continue to impact our landscapes and wildlife; the metrics generated from this type of study allow us to gauge these impacts, thereby mitigate them to sustain our wildlife populations as we move into the future.

The distribution and diversity of wildlife, proximity to human activity, and metrics to gauge human recreational use were also derived from this study. The multiple jurisdictional open space in Marin County caters to a variety of recreational activities including pedestrians (hikers, runners), dog walking, cyclists and equestrians. Each study site varied in intensity of recorded use; several cameras at each site were on trails, which were part of the overall grid. Intensity of

use was measured by rates of detection. MMWD had the highest detection rates of human use (see Figs. 24 & 25) and GGNRA study sites, the least.

Finally, charming pictures of charismatic (and less charismatic!) birds and mammals resulted from this effort. Due to outreach (MCP website, for example) and general good-natured quality of the general public, few thefts and damage were incurred by the largely unprotected camera stations. Dedicated staff, interns, and a growing cadre of volunteers were instrumental in the set up and maintenance of the camera stations and the cataloguing of the over half a million images. The coordination provided by the multiple stakeholders that included the National Park Service, Point Reyes National Seashore, Golden Gate National Parks Conservancy, State Parks, OneTam, the Marin Municipal Water District, and Marin County Parks were an important element to the success of this project as well as their participation in the multiple trainings.

As a result of the interim analysis of the MWPIP effort, an initial understanding of wildlife presence and occupancy for each study site was determined: the suite of mammalian species detected by the camera traps, other wildlife such as birds, detection rates for humans and wildlife, and occupancy estimates (a measure of abundance) for the suite of detected mammal species. As this study progresses and the study period lengthens, a baseline for wildlife in this County can be used to measure change both for this region and disaggregated to learn about wildlife within specific study sites.

The WPI is primarily a monitoring tool that should be implemented annually (or over some other meaningful time frame) to measure trends in biodiversity. Equally useful are the occupancy estimates. In addition to what has been discussed above, results from this type of landscape level camera trapping can be used to answer the following questions:

1. Are the terrestrial mammals that are expected to occur in/protected by a particular open space preserve, national park or state park occurring there (presence/absence)? The WPI, and the large systematic layout of camera stations, are especially helpful to detect elusive, hard to detect and/or nocturnal species such as the ringtail, spotted skunk and puma.
2. If an expected species is not detected, is it extirpated? What can be done to identify reasons for that species' absence?
3. Occupancy estimates (and the Index over time) can be used to verify expectations of management plans. Baseline estimates can serve as the starting place for setting goals in a management plan. For example, goals like "to maintain baseline occupancy estimates for x, x, and x species," and "we plan on increasing occupancy estimates for x species by 30% in five years through establishing native chaparral habitat" can be established. Occupancy estimates can then be obtained to verify if goals are met. This type of quantitative (measurable) goal setting is the basis of adaptive management.

The preliminary results from the MWPIP has provided a brief snapshot of the status of the mammalian wildlife community as a potential indicator of overall ecosystem health. Based on the findings from this preliminary analysis, a variety of expected wildlife appears to be coexisting in these open spaces with humans, their pets and other recreationalists. In order to maintain the presence of local mammalian wildlife (as well as other detected species), continued management of these open space areas is essential for the benefit of both humans and wildlife.

Recommendations

1. *Continue collecting baseline data through the MWPIP* – For the reasons mentioned in this interim analysis, creating a season by season understanding of the wildlife presence within open space allows for empirically-based management and conservation decisions.
2. *Promote locally-supported awareness of local wildlife to convey to visitors and tourists*– non-consumptive enjoyment of the landscape and wildlife will encourage locals to consider the value of maintaining the landscape and ecosystems. A venue to share the photographs could be a useful tool in this effort.
3. *Local Community Support and Education* – Continue to grow the local volunteer base involved in this project to support maintaining camera stations and good will.
4. *Share experiences with other park administrators* – share results and photographs with regional open space groups

The conservation of wildlife and biodiversity are one of myriad functions of Parks and Open Space. The MWPIP provides a metric to understand how well open space is achieving that goal. The MWPIP will continue to verify species' presence, measure abundance and prevalence and determine trends both upward and downward. The baseline occupancy estimates can be used to set management goals. The WPI could prove to be a very practical, quantitative tool to evaluate the functioning of Parks and Open Space in Marin in its role as stewards of biodiversity and to provide empirical data to inform discussions around how human management of public landscapes may be affecting the wildlife that live there and rely on these spaces to persist into the future. Furthermore, providing photographs for the general public of local wildlife allows citizens to enjoy this resource that exists all around them but are rarely seen.

LITERATURE CITED

Ahumada, J.A., C.E.F. Silva, K. Gajapersad, C. Hallam, J. Hurtado, E. Martin, A. McWilliam, B. Mugerwa, T. O'brien, F. Rovero, D. Sheil, W.R. Spironello, N. Winarni, & S. J. Andaelman. 2011. Community structure and diversity of tropical forest mammals: data from a global camera trap network. *Phil. Trans. R. Soc. B* 366: 2703 – 2711.

Buckland, S.T., A. E. Margurran, R.E. Green, & R.M. Fewster. 2005. Monitoring change in biodiversity through composite indices. *Phil. Trans. R. Soc. Lond. B.* 360:243-254.

Burnham, K.P. & D.R. Anderson. 2002. Model Selection and Multimodal Inference. 2nd Edition. Springer-Verlag, New York.

Burton, A.C., M.K. Sam, D.G. Kpelle, C. Balangtaa, E.B. Buedi, & J.S. Brashares. 2011. Evaluating persistence and its predictors in a West African carnivore community. *Biological Conservation*. Doi:10.1016?j.biocon.2011.06.014.

CDFW. California Wildlife Life History Accounts and Range Maps. https://www.dfg.ca.gov/biogeodata/cwhr/cawildlife.aspx

Ferguson-Lees, J. & D. Christie. 2001. *Raptors of the World: A field guide*. Christopher Helm, London.

Fifield, V.L., A.J. Rossi, & E.E. Boydston. 2015. Documentation of mountain lions in Marin County, California 2010 – 2013. California Fish and Game 101: 66 – 71.

Hines, J.E. 2006. Presence v3.2 – Software to estimate patch occupancy and related parameters. USGS-PWRC.

MacKenzie, D.I., J.D. Nichols, J.E. Hines, M.G. Knutson, & A.D. Franklin. 2003. Estimating site occupancy, colonization, and local extinction when a species is detected imperfectly. *Ecology* 84: 2200-2207.

MacKenzie, D.I., J.D. Nichols, N. Sutton, K. Kawanishi, & L.L. Bailey. 2005. Improving inference in population studies of rare species that area detected imperfectly. *Ecology* 86: 1101-1113.

O'Brien, T.G. 2010. Wildlife Picture Index: implementation manual version 1.0. WCS Working Paper No. 39. New York.

O'Brien, T.G., J.E.M. Baillie, L. Krueger & M. Cuke. 2010. The Wildlife Picture Index: Monitoring top trophic levels. *Animal Conservation* 13:335-343.

O'Connell, A.F., J.D. Nichols, & K.U. Karanth. 2011. *Camera traps in Animal Ecology: Methods and Analysis*. Springer, Tokyo.

Pettorelli, N., A.L. Lobora, M.J. Msuha, C. Foley, & S.M. Durant. 2010. Carnivore biodiversity in Tanzania: Revealing the distribution patterns of secretive mammals using camera traps. *Animal Conservation* 13: 131 – 139. doi: 10.1111/j.1469-1795.2009.00309.x

Townsend, S.E., M. Myagmar, B. Galtbalt., J.E.M. Baillie, & T.G. O'Brien. 2014. The Wildlife Picture Index: monitoring Mongolian biodiversity with camera trapping. *In* Camera Trapping: Wildlife Management and Research (eds. Meek, P. and Fleming P. et al.) CSIRO, Melbourne.

Wilson, D.E. & D. M. Reeder. 2005. *Mammal Species of the World. A Taxonomic and Geographic Reference* (3rd ed), Johns Hopkins University, Baltimore. ([HYPERLINK "http://www.press.jhu.edu"]).

Zeiner, D.C., W.F. Laudenslayer, Jr., K.E. Mayer, and M. White, eds. 1988-1990. California's Wildlife. Vol. I-III. California Depart. of Fish and Game, Sacramento, California

APPENDIX A
LAND USE

MWPIP STUDY SITES: ACCESS AND PUBLIC USE

Region	Subregion	public access	official trails	cattle	Dogs (on leash)	dogs (off leash)	cyclists	equestrian	vehicular access
GGNRA	CHEDA	YES	YES	YES	NO	NO	NO	NO	YES
GGNRA	JEWEL	YES	YES	YES	NO	NO	YES	YES	YES
SP	SPT	YES	YES	NO	YES	NO	YES	NO	NO (ON MOST)
MMWD	MMWD	YES	YES	NO	Fire roads only	NO	YES	YES	YES
MCP	ROY'S REDWOOD	YES	YES	NO	Fire roads only	On trail only	YES	YES	YES
MCP	FRENCH RANCH	YES	YES	NO	Fire roads only	On trail only	YES	YES	YES
MCP	CASCADE CANYON	YES	YES	NO	Yes	On trail only	YES	YES	YES
MCP	WHITE HILL	YES	YES	NO	Fire roads only	On trail only	YES	YES	YES
MCP	GARY G	YES	YES	NO	Fire roads only	On trail only	YES	YES	YES

*FIRE ROAD = DEFINITION; TRAIL = DEFINITION

APPENDIX B
CATEGORIES FOR CATALOGUING

CATEGORIES FOR CATALOGUING

COMMON WILDLIFE			
Taxon	**Genus**	**Species**	**Common Name**
Marsupialia	*Didelphis*	*virginiana*	Opossum
Carnivora	*Urocyon*	*cinereoargenteus*	Gray fox
Carnivora	*Canis*	*latrans*	Coyote
F. Procyonidae	*Procyon*	*lotor*	Raccoon
Carnivora	*Mephitis*	*mephitis*	Striped skunk
Carnivora	*Spilogale*	*gracilis*	Western spotted skunk
Carnivora	*Lynx*	*rufus*	Bobcat
Carnivora	*Lontra*	*canadensis*	River otter
Carnivora	*Puma*	*concolor*	Mountain Lion
Artiodactyla	*Odocoileus*	*hemionus*	Black-tailed Deer
Rodentia	*Sciurus*	*griseus*	Gray Squirrel
Rodentia	*Sciurus*	*niger*	Eastern Fox Squirrel
Rodentia	*Tamias*	*sonomae*	Sonoma chipmunk
Rodentia	*Neotoma*	*fuscipes*	Dusky-Footed Wood Rat
Lagomorpha	*Lepus*	*californicus*	Black-Tailed Jackrabbit
Lagomorpha	*Sylvilagus*	*bachmani*	Brush Rabbit
Aves	*Meleagris*	*gallopavo*	Wild Turkey
UNCERTAINTY			
whiteout	photo totally white/washed out, can't determine if wildlife present		
blackout	photo totally dark, can't determine if wildlife present		
blank	no wildlife present		
unknown	can't determine if wildlife present, or what type (blurry, obscure)		
HUMAN USE CATEGORIES			
Category	**Genus**	**Species**	**Common Name**
PEOPLE	*WPI*	*Crew*	WPI CREW
PEOPLE	*Staff*	*(Non-WPI)*	other uniformed staff
PEOPLE	*Bicyclist*		Biking or walking bike
PEOPLE	*Pedestrian*		Hiker, runner, equestrian
PEOPLE	*Dogs*	*(off leash)*	Dogs off leash
PEOPLE	*Dogs*	*(on leash)*	Dogs on leash
PEOPLE	*Vehicle*	*(staff)*	vehicle w/ logo (ie Ranger)
PEOPLE	*Vehicle*	*(other)*	unmarked vechicle
DOMESTIC	*Horse*		Horse (without humans)
DOMESTIC	*Felis*	*sylvestris*	Domestic Cat

APPENDIX C
CAMERA STATION EFFORT BY SITE

Figure 1: Number of trap nights for each camera station (SEPTEMBER 22, 2014 TO FEBRUARY 4, 2015)

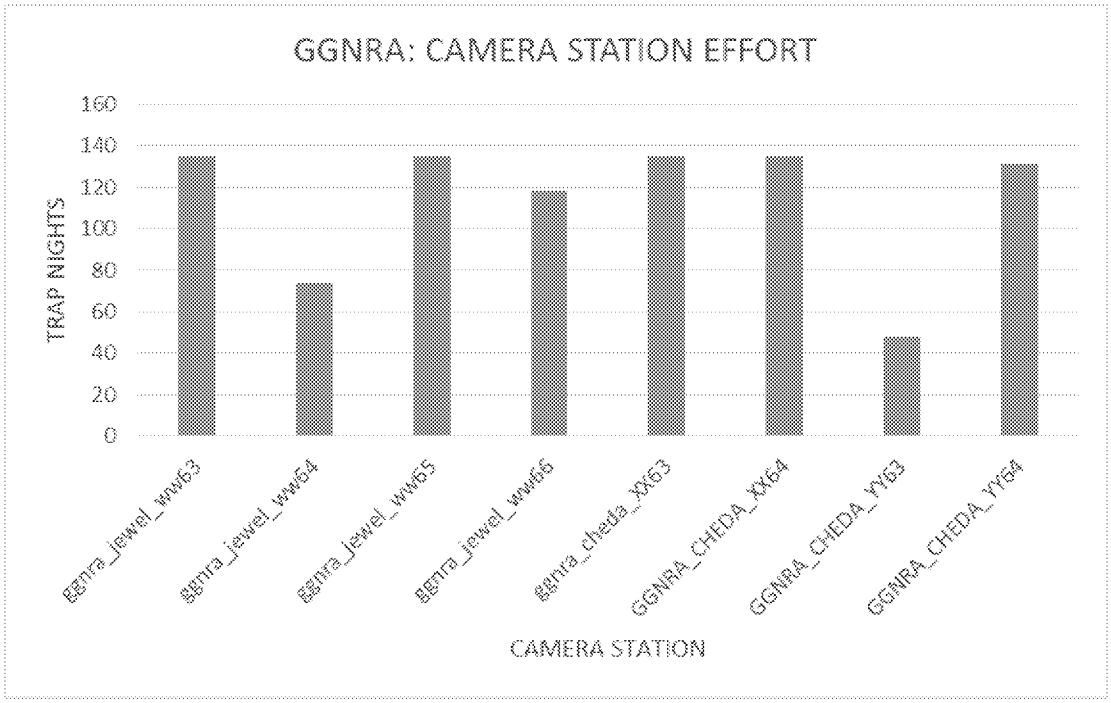


Figure 1: Number of trap nights for each camera station; SEPTEMBER 22, 2014 TO FEBRUARY 4, 2015

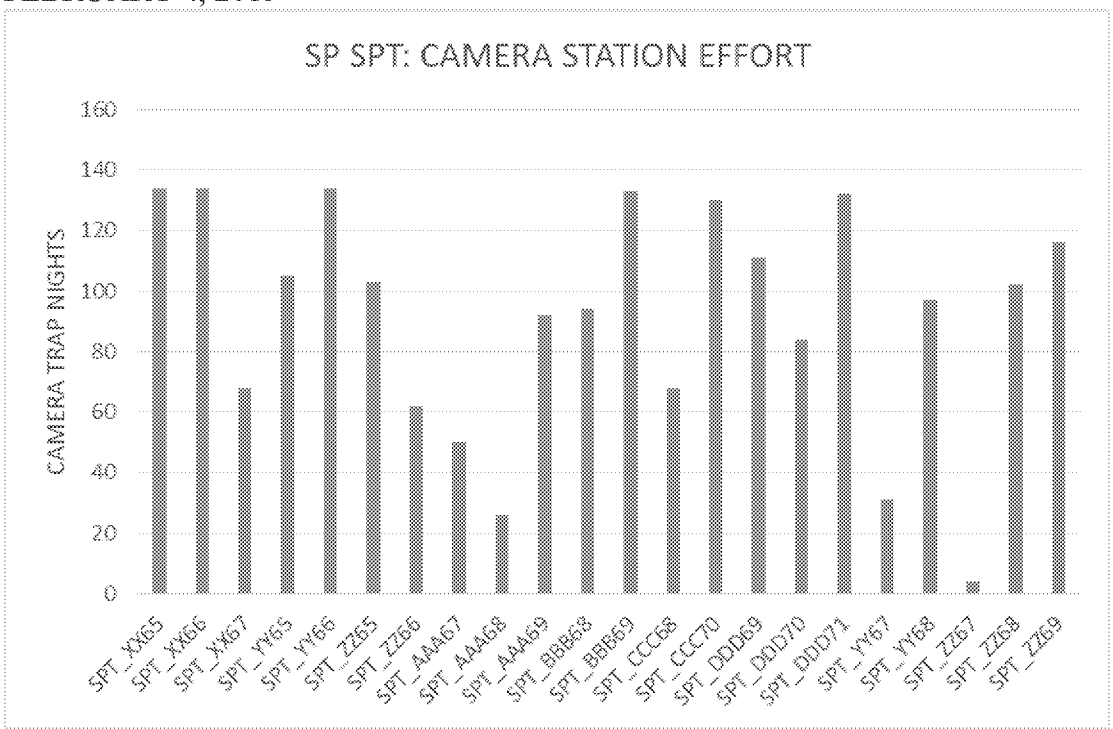


Figure 1: Number of trap nights for each camera station (effort) SEPTEMBER 19, 2014 TO DECEMBER 31, 2014 (UP TO FEB 12, 2015)

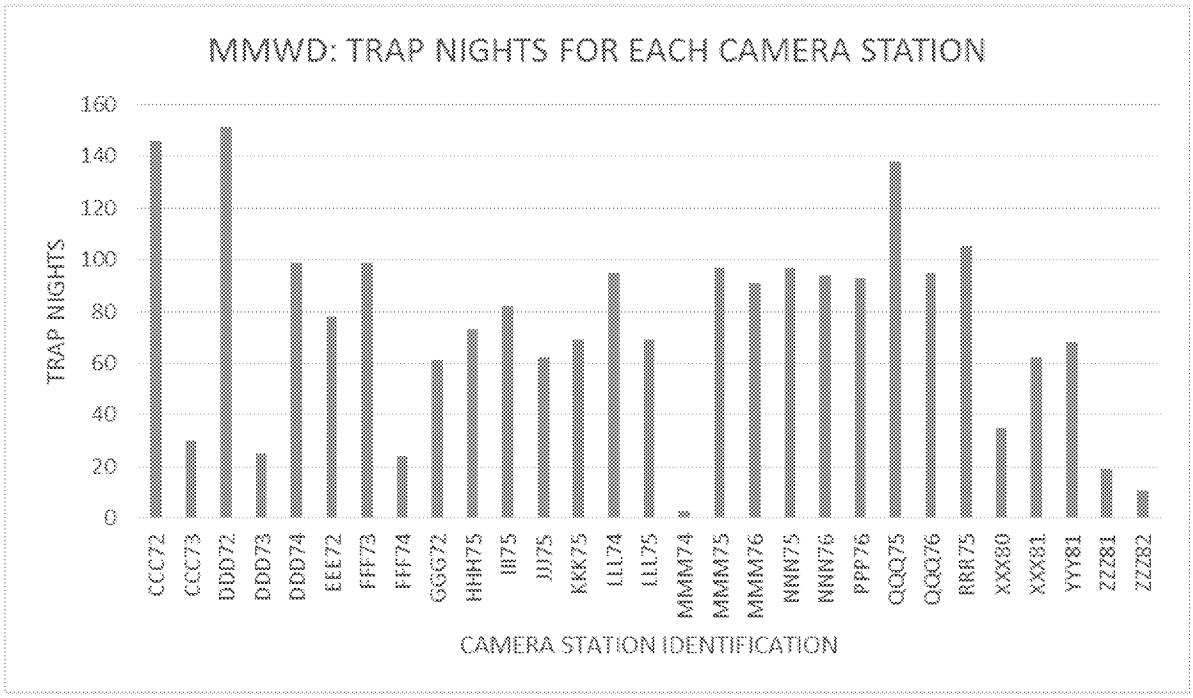


Figure 1: Number of trap nights for each camera station (effort) PILOT PHASE: SEPTEMBER 22, 2014 TO JANUARY 14, 2015

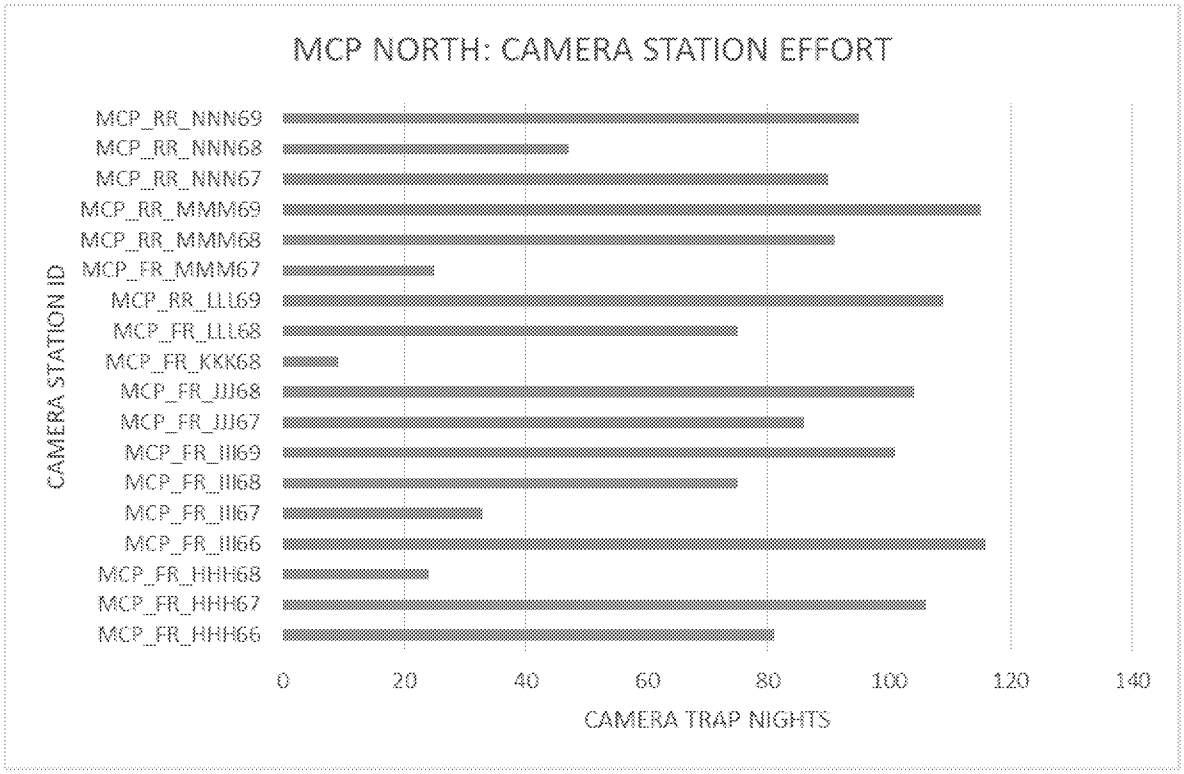


Figure 1: Number of trap nights for each camera station (effort) PILOT PHASE: SEPTEMBER 22, 2014 TO JANUARY 19, 2015

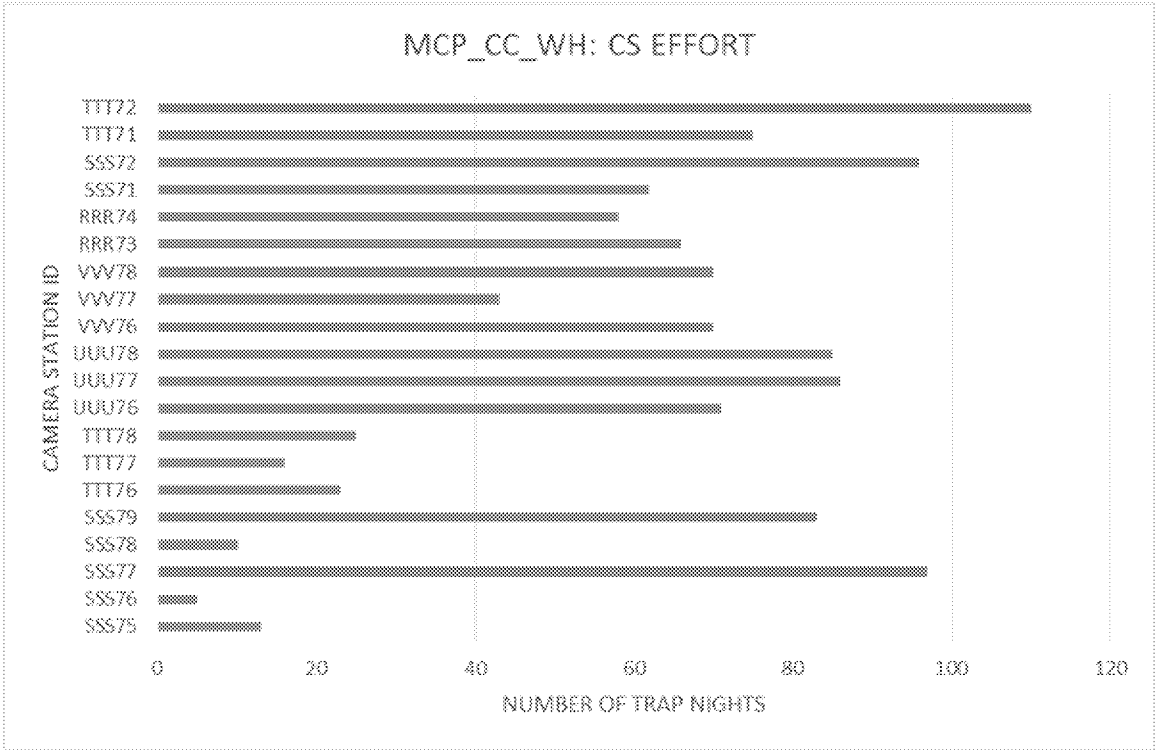
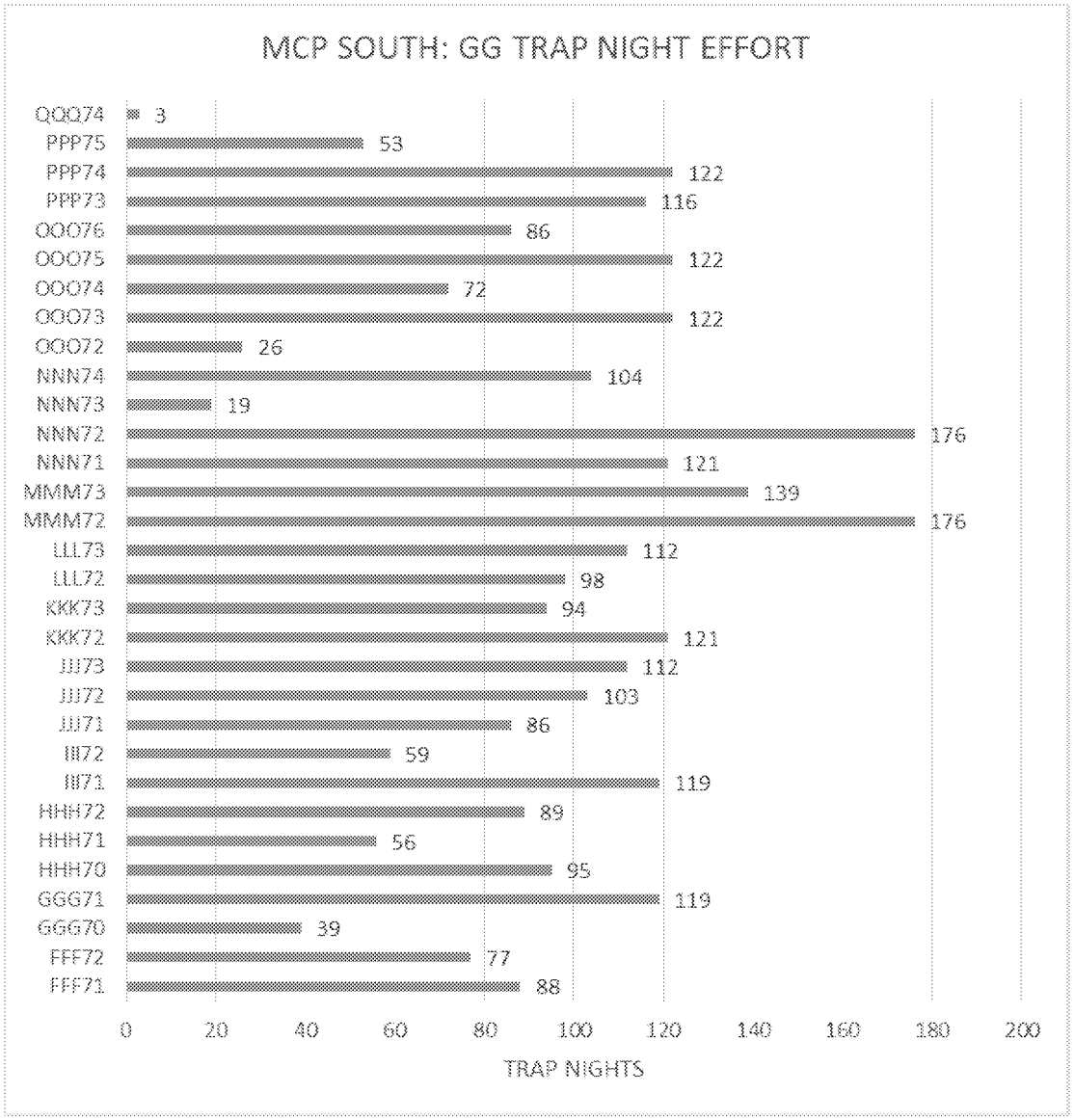


Figure 1: Number of trap nights for each camera station (effort) PILOT PHASE: SEPTEMBER 22, 2014 TO JANUARY 19, 2015



APPENDIX D
HABITAT TYPES FOR CAMERA STATIONS
revised

Table 1: Type of habitats and percentage of total [updated]

SITE	*OPEN*	*MIXED*	*CLOSED*	*N*	*SITE*	*OPEN*	*MIXED*	*CLOSED*
GGNRA	1	1	6	8	GGNRA	0.13	0.13	0.75
SPT	2	7	13	22	SPT	0.09	0.32	0.59
MMWD	7	7	15	29	MMWD	0.24	0.24	0.52
MCP NORTH	8	6	4	18	MCP NORTH	0.44	0.33	0.22
MCP CC WH	8	4	8	20	MCP CC WH	0.40	0.20	0.40
MCP GG	3	14	14	31	MCP GG	0.10	0.45	0.45

Figure 1: Percent of total cameras at each site of habitat types (open, mixed, closed)

[SHAPE * MERGEFORMAT]

Message

From: Allen Fish [AFish@ParksConservancy.org]
Sent: 9/3/2013 1:58:49 PM
To: Merkle, William [bill_merkle@nps.gov]
Subject: RE: Tuesday-Rodeo Beach

please do – also, I cant help but think if we establish any kind of new fencing or nonfencing now, we might be stuck with that decision for a long time – and it would be harder to declare more off-limit dog areas later …

Allen

From: Merkle, William [mailto:bill_merkle@nps.gov]
Sent: Tuesday, September 03, 2013 1:59 PM
To: Allen Fish
Subject: Re: Tuesday-Rodeo Beach

great thank you!

I am going to forward on to Daphne if that is ok. Would love to talk to you more about this if there is a chance.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Tue, Sep 3, 2013 at 12:57 PM, Allen Fish <AFish@parksconservancy.org> wrote:

HI Bill –

Sorry I missed you – just talked to Jill and Id be happy to talk anytime – if you want to call again Ill even meet you outside where we can stare at the lagoon. I'm on Hawk Hill all day tomorrow.

So: my opinion, since we don't allow recreation people-use of the lagoon, it has always surprised me that we allow dogs and people into its most sensitive edge ,,, at the beach. I have wanted to see, for many years, to see a fence-line from the south end of the footbridge staying at the crestline of the beach and landing at the coastal trail start at the southwest corner of the lagoon.

What might we gain:

1. increased use and protection of winter water bird use of the west end of the lagoon – dozens of species have been seen in the winter using this mudflat from terns to *Calidris* sandpipiers, pelicans, heerman's gull (Species of Sp Concern in Calif) and even an occasional Black skimmer;

2. Increased use of the dune area by birds year-round: grassland sparrows, blackbirds, sandpipers will be more likely to venture upland a few dozen meters into this higher ground;

3. possible Snowy Plover nesting in sand-lizardtail, skyrocket patches.

Do some visitors use that area for recreationalizing? Sure, but not the, but the serious naturalists and passionate birders I know would rather have everyone stay back so you could minimize disturbance to the lagoon edge, and study the birds from a distance. IT's a great potential statement of our National Park standards. The dogs get the beach; the birds get the lagoon edge....

Id be happy to help champion this – let me know –

ALLEN

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Allen M. Fish

GGRO Director

Golden Gate Raptor Observatory

Golden Gate National Parks Conservancy
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

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afish@parksconservancy.org

415-331-0730 ggro

GGRO - inspiring preservation of California's raptors

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Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 9/3/2013 1:59:08 PM
To: Allen Fish [AFish@parksconservancy.org]
Subject: Re: Tuesday-Rodeo Beach

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On Tue, Sep 3, 2013 at 12:57 PM, Allen Fish <AFish@parksconservancy.org> wrote:

HI Bill –

Sorry I missed you – just talked to Jill and Id be happy to talk anytime – if you want to call again Ill even meet you outside where we can stare at the lagoon. I'm on Hawk Hill all day tomorrow.

So: my opinion, since we don't allow recreation people-use of the lagoon, it has always surprised me that we allow dogs and people into its most sensitive edge ,,, at the beach. I have wanted to see, for many years, to see a fence-line from the south end of the footbridge staying at the crestline of the beach and landing at the coastal trail start at the southwest corner of the lagoon.

What might we gain:

1. increased use and protection of winter water bird use of the west end of the lagoon – dozens of species have been seen in the winter using this mudflat from terns to *Calidris* sandpipiers, pelicans, heerman's gull (Species of Sp Concern in Calif) and even an occasional Black skimmer;

2. Increased use of the dune area by birds year-round: grassland sparrows, blackbirds, sandpipers will be more likely to venture upland a few dozen meters into this higher ground;

3. possible Snowy Plover nesting in sand-lizardtail, skyrocket patches.

Do some visitors use that area for recreationalizing? Sure, but not the, but the serious naturalists and passionate birders I know would rather have everyone stay back so you could minimize disturbance to the lagoon edge, and study the birds from a distance. IT's a great potential statement of our National Park standards. The dogs get the beach; the birds get the lagoon edge....

Id be happy to help champion this – let me know –

ALLEN

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Allen M. Fish

GGRO Director

Golden Gate Raptor Observatory

Golden Gate National Parks Conservancy

Bldg 1064, Ft Cronkhite

Sausalito, CA 94965

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415-331-0730 ggro

GGRO - inspiring preservation of California's raptors

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Message

From: Smith, Shirwin [shirwin_smith@nps.gov]
Sent: 9/23/2013 12:41:25 PM
To: Merkle, William [bill_merkle@nps.gov]
CC: Mia Monroe [mia_monroe@nps.gov]; Sarah Koenen [sarah_koenen@nps.gov]
Subject: Re: Rodeo Lagoon fencing

Thx Bill, and remind me - what's the timeline for construction?

SES

Shirwin Smith
Management Assistant
Golden Gate National Recreation Area
Ft. Mason, Building 201
San Francisco, CA 94123
415-561-4947 (o)
415-716-9999 (c)

On Mon, Sep 23, 2013 at 11:15 AM, Merkle, William <bill_merkle@nps.gov> wrote:
Hi,

We have a project approved through project review to put fencing on the west side of Rodeo Lagoon from the pedestrian bridge over to where the trail goes up the hill on the sw side of the Lagoon.

There will be a closure to people and dogs and behind the fencing.

Just wanted to make sure that you are aware.

Attached is the proposed fence line.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 9/23/2013 11:18:29 AM
To: Samantha Pollak [Samantha_Pollak@nps.gov]
Subject: Rodeo Fencing

Hi Samantha,

Daphne and I met with Kevin Cochary on site to determine the final alignment for the fencing on the west side of Rodeo Lagoon. I have attached the final alignment.

Also, I have been communicating with Shirwin Smith (dogs), and interp. (Mia Monroe and Sarah Koenen) about the proposed new fencing.

Finally, I will be meeting with Nature Bridge to let them know we are putting in fencing and answer any of their questions.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843


N
© 2013 Google
Google earth
239 ft
1987
Imagery Date: 5/6/2012 37°49'47.92" N 122°32'07.47" W elev 16 ft eye alt 1042 ft

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 9/23/2013 2:30:57 PM
To: Koenen, Sarah [sarah_koenen@nps.gov]
Subject: Re: Rodeo Lagoon fencing

yes, I will bring to partner mtg. tomorrow.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Sep 23, 2013 at 12:55 PM, Koenen, Sarah <sarah_koenen@nps.gov> wrote:
Good to know. I take it this is what you are going to share with others tomorrow at Park Partner training?

Sarah

On Mon, Sep 23, 2013 at 11:15 AM, Merkle, William <bill_merkle@nps.gov> wrote:
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Attached is the proposed fence line.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

Message

From: Merkle, William [bill_merkle@nps.gov]
Sent: 9/23/2013 2:30:26 PM
To: Smith, Shirwin [shirwin_smith@nps.gov]
CC: Mia Monroe [mia_monroe@nps.gov]; Sarah Koenen [sarah_koenen@nps.gov]
Subject: Re: Rodeo Lagoon fencing

Sometime this fall--I hope.

-Bill

Bill Merkle, Ph.D.
Wildlife Ecologist
Golden Gate National Recreation Area
415-289-1843

On Mon, Sep 23, 2013 at 12:41 PM, Smith, Shirwin <shirwin_smith@nps.gov> wrote:
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SES

Shirwin Smith
Management Assistant
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Ft. Mason, Building 201
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On Mon, Sep 23, 2013 at 11:15 AM, Merkle, William <bill_merkle@nps.gov> wrote:
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