



Riparian Landbird Monitoring in Golden Gate National Recreation Area and Point Reyes National Seashore

Progress Report for 2013-2014

Natural Resource Data Series NPS/SFAN/NRDS—2015/984



ON THE COVER

Townsend's Warbler

Photograph by: Mark Dettling

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This report received informal peer review by subject-matter experts who were not directly involved in the collection, analysis, or reporting of the data. Data in this report were collected and summarized using methods based on established, peer-reviewed protocols and were analyzed and interpreted within the guidelines of the protocols.

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Executive Summary

This document contains a brief progress report for landbird monitoring conducted in 2013-2014 in riparian habitats in Point Reyes National Seashore and Golden Gate National Recreation Area as part of the National Park Service's Inventory and Monitoring Project, and following protocols established for this purpose (Gardali et al. 2010). The Analysis and Synthesis reports that are produced every six years (e.g., Humple and Porzig 2012) include in-depth analyses and discussion that are not the purview of this progress report.

Monitoring was conducted by Point Blue Conservation Science (hereafter Point Blue; formerly PRBO Conservation Science) at 15 locations within the parks using one or both of two methods, point counts and mist netting. Point count surveys were conducted during the breeding season of 2014, while mist netting was conducted from 15 August 2013 to 16 August 2014. Monitoring at this entire suite of sites takes place every three years, with monitoring at a subset of sites (including the intensive mist netting) also occurring annually (Gardali et al. 2010). Of the 119 bird species detected, 33 were California Partners in Flight Focal Species (CalPIF 2000, CalPIF 2002a, CalPIF 2002b, CalPIF 2004, CalPIF 2009, RHJV 2004), and 6 were also California Bird Species of Special Concern (Shuford and Gardali 2008). Site narratives were updated to reflect changes in vegetation and other environmental factors. Public outreach is an important component of Point Blue's mist netting programs; a total of 500 members of the public viewed mist netting at these sites between 15 August 2013 and 16 August 2014 through organized class visits, and many more as drop-in visitors.

Acknowledgments

We thank the National Park Service, and especially Point Reyes National Seashore and Golden Gate National Recreation Area and their staff, for support of this monitoring program. We acknowledge Point Blue biologist X. Castaneda for collecting point count data in 2014 and for reviewing a draft of this report; numerous Point Blue interns and banding supervisor R. Cormier for mist netting efforts; and T. Gardali for overseeing this project as Point Blue's Pacific Coast and Central Valley Group Director. We thank D. George and S. Wakamiya for reviewing a draft of this report; T. Gardali, D. George, M. Herzog, M. Koenen, D. Press, W. Merkle, S. Allen, and M. Denn for their contributions to the development and/or implementation of the riparian monitoring plan; and L. R. Mewaldt, C. J. Ralph, D. DeSante and G. Geupel for their role in establishing and maintaining long-term data collection at Palomarin.

Introduction

Landbirds were monitored in 2013-2014 in riparian habitat of Point Reyes National Seashore and Golden Gate National Recreation Area as part of the National Park Service's Inventory and Monitoring Program. The objectives of this ongoing work are to monitor productivity and survival of bird populations, to detect any trends in these populations due to natural or human-caused environmental changes, and in certain circumstances to monitor the effects of management actions (Gardali et al. 2010). Landbirds are recognized as indicators of changing ecosystems (Carignan and Villard 2002) and climate (MacMynowski et al. 2007). They are also relatively easy to monitor and allow for monitoring a suite of species (Ralph et al. 1993, Hutto 1998) representing diverse ecological requirements. Finally, landbirds are an important natural resource, engendering a great deal of public interest. Several landbird species that occur regularly in the Point Reyes National Seashore (PORE) and Golden Gate National Recreation Area (GOGA) are state species of special concern (Shuford and Gardali 2008) or California Partners in Flight Focal Species (CalPIF 2000, CalPIF 2002a, CalPIF 2002b, CalPIF 2004, CalPIF 2009, RHJV 2004).

This document reports on the monitoring effort in PORE and GOGA from 15 August 2013 through 16 August 2014. Two methods were used in this monitoring: point counts and mist netting. We report mist netting results from the fall of 2013 through the end of summer 2014; mist netting took place at established locations where Point Blue Conservation Science conducts ongoing, annual long-term monitoring. We report point count results from the spring of 2014; point counts were conducted both at sites that are monitored annually, and those which were selected to be surveyed through this protocol (Gardali et al. 2010) every third year. Continuing monitoring at these sites for which we have extensive data increases our power to detect long-term trends (Gardali et al. 2010).

Here we report species lists and numbers of individuals monitored by both methods, noting which species have special conservation status. We also describe changes to the protocol that were made during the time period of interest, especially to point count site narratives.

Methods

Protocol for this monitoring project is described fully in Gardali et al. (2010). Briefly, monitoring was conducted at established sites throughout Point Reyes National Seashore (PORE) and Golden Gate National Recreation Area (GOGA; Figure 1). Sites were predominantly located within willow-alder riparian areas. All sites had been established and surveyed previously, prior to development of the monitoring protocol (Gardali et al. 2010), for inventory, monitoring or other purposes. The full suite of riparian forest sites will be surveyed during the breeding season every three years, while core sites are monitored annually. The first year of implementation of the full monitoring protocol was 2011 (Jennings and Humple 2014; Humple and Porzig 2012), and this report is for the second year of full implementation, 2014; in actuality, the report covers 2013-14 as it also includes our annual, year-round constant effort mist-netting effort from fall 2013 through summer 2014. The point count transects were chosen from a larger number of historically surveyed PORE and GOGA sites based on habitat type and the existence of historical data (Table 1). Two exceptions were: 1) the inclusion of two mist netting sites at the Palomarin Field Station in PORE, where habitat is predominantly coastal scrub, Douglas-fir, and mixed evergreen hardwood forest and 2) the inclusion of mist netting and point counting at Pine Gulch, a riparian site on Marin County Open Space District (MCOSD) land. Both sites are included in the monitoring protocol (Gardali et al. 2010) and are long-term core Point Blue monitoring sites, so are relevant to use.

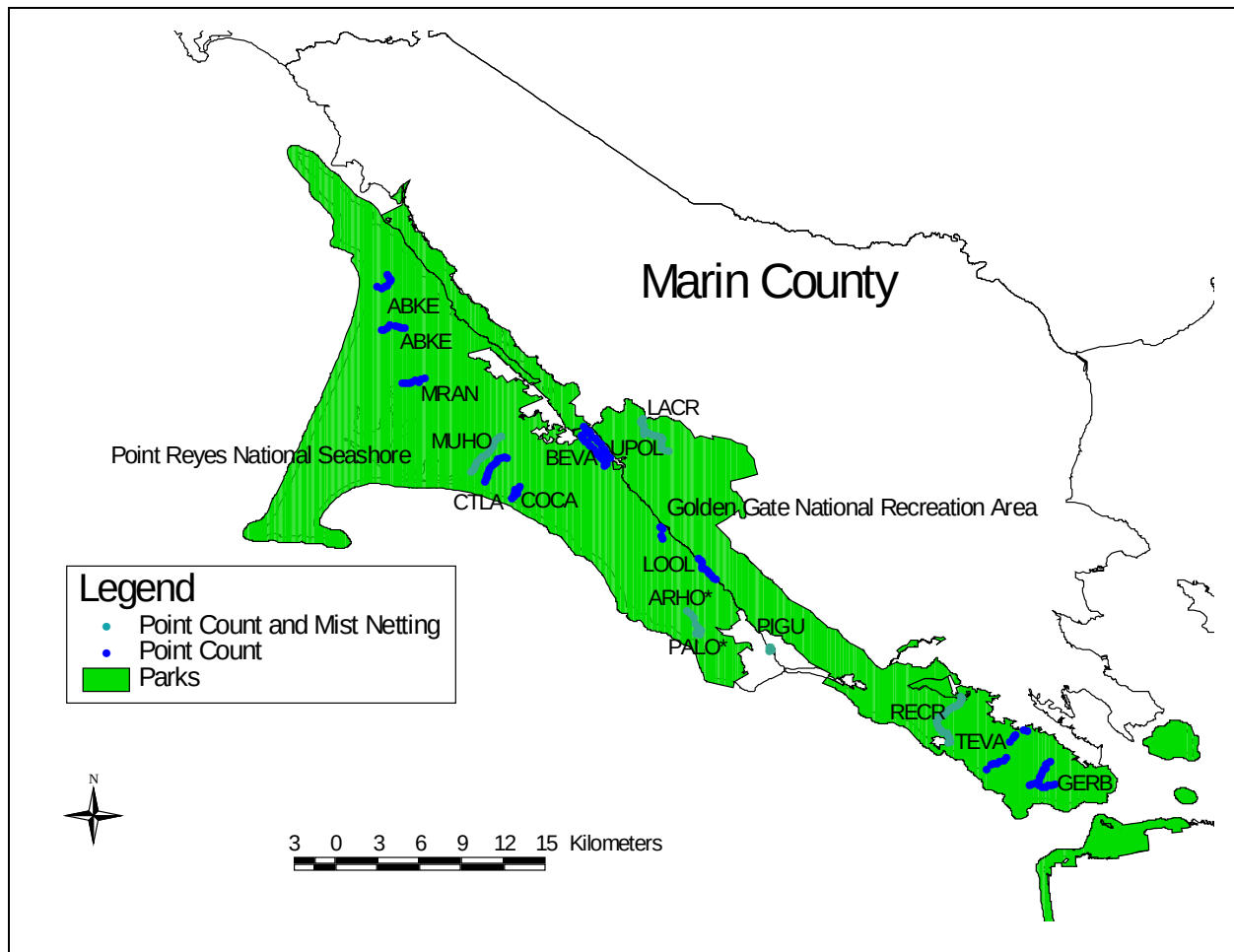


Figure 1. Locations of riparian point count and mist netting stations in PORE, GOGA, and MCOSD Marin County, CA, 2013-14, Point Blue Conservation Science. Full site names are in Table 1. Also shown is Palomarin Field Station (PALO; includes PN and PGUP, mist netting), a non-riparian site; all other non-riparian study sites are excluded.

Table 1. Point count and mist netting riparian sites in PORE and GOGA, Marin County, CA, 2013-14, Point Blue Conservation Science. PC=point count, MN=mist netting. Year begun refers to PC and MN, respectively; and number of years surveyed refers to PC.

Site Name	Code	# pts	Season	Method	Year begun	# yrs surveyed (PC) ^a
GOGA						
Lagunitas Creek	LACR	18	Breeding, Fall	PC, MN	1997, 2001	18
Gerbode Valley	GERB	18	Breeding	PC	1997	5
Redwood Creek (lower + upper)	RECR	24	Breeding, Fall	PC, MN	1997, 2001	18
Tennessee Valley	TEVA	13	Breeding	PC	1997	4
PORE						
Abbott's / Kehoe	ABKE	16	Breeding	PC	1997	4
Arroyo Hondo	ARHO	6 ^b	Breeding	PC	1997	18
Bear Valley	BEVA	16	Breeding	PC	1997	4
Coast Camp	COCA	7 (was 8) ^d	Breeding	PC	1996	6 ^c
Coast Trail Laguna	CTLA	13	Breeding	PC	1997	5
Lower Olema Creek	LOOL	11	Breeding	PC	1997	9
M Ranch	MRAN	8	Breeding	PC	1997	4
Muddy Hollow	MUH O	15	Year-round	PC, MN	1997, 1995	18
Upper Olema Creek	UPOL	13	Breeding	PC	1997	5
Other						
Palomarin Main Nets (PORE) ^e	PN		Year-round	MN	1966	n/a
Palomarin Upper Nets (PORE) ^e	PGUP		Year-round	MN	1992	n/a
Pine Gulch	PIGU	5	Year-round	PC, MN	1997, 1994	18
<i>Total Points</i>		183				

^a Mist netting was conducted yearly since it was begun at each site; point counting was not done every year (see Gardali et al. 2010, Table 1, for historic monitoring schedule).

^b The number of points on this transect was incorrectly reported as 7 in Jennings and Humple 2014 and Humple and Porzig 2012.

^c 1996 data for Coast Camp may be excluded from most analyses, as the other transects were established in 1997.

^d One point was dropped in 2014 due to vegetation changes that made it inaccessible as well as the large distance between the point and riparian vegetation.

^e These sites are located at the Palomarin Field Station, whose mist-netting efforts are included in the monitoring protocol (Gardali et al. 2010) but are not in riparian habitat. The effort and results for mist netting at these sites are included in this report, but the upland point counts are not.

The Variable Circular Plot method was used for all point count surveys conducted in 2014. We surveyed 15 transects, each with 5-24 points and totaling 183 points. Surveys began approximately 15 minutes after local sunrise and were completed within four hours, when bird activity is generally

the highest. Each point was surveyed for a 5-minute sampling period. Individuals of all species detected were recorded as occurring in distance intervals from the point: 0-10 meters (m), 10-20m, 20-30m, 30-50m, 50-100m, >100m; or as flyovers. Biologists with experience identifying birds of the region by sight and sound conducted all point counts. Point count surveys were conducted twice during the peak landbird breeding season, between 1 May and 30 June, with a minimum of 10 days between the two visits. Redwood Creek is effectively split into subtransects (Lower and Upper; see Appendix A) as it requires two days to complete. SOP 6 of the riparian bird monitoring protocol (Gardali et al. 2010) lays out the above protocols in greater detail. Point count surveys occur annually for a subset of core study sites, and every third year for the rest of the sites.

For mist netting, we generally followed the nationally standardized Monitoring Avian Productivity and Survival protocols (MAPS; DeSante et al. 2000); SOP 7 of the riparian bird monitoring protocol (Gardali et al. 2010) defines fully how Point Blue protocols differ from MAPS protocols. The mist netting stations at Redwood and Lagunitas creeks were operated 1 May through 31 October; all other stations were operated year-round. At Palomarin Main Nets, nets were run six days per week May through November and three days per week December through April, weather permitting. At all other sites, nets were run approximately once every 10 days May through mid-August, once every seven days mid-August through October (to reduce the chance of missing pulses of migrating birds), and, for Pine Gulch, Muddy Hollow, and Palomarin Upper Nets, once every 10 days November through April. Mist netting occurs annually at these sites (not just every third year, as does our reporting and many of the point count surveys). There were 20 nets at Palomarin, 11 at Redwood Creek, and 10 at each of the other sites. All birds captured were identified to species, age, and sex using criteria in Pyle (1997) and most were banded with a uniquely numbered aluminum band provided by the Bird Banding Laboratory of the U.S. Geological Survey/Biological Resources Division. Some species (e.g., gamebirds; hummingbirds at sites other than Palomarin) were not banded due to permitting or other constraints. Mist netting was conducted primarily by Point Blue interns who received at least two weeks training in safe capture, handling and measuring techniques by the staff supervisor. These sites are monitored annually, and we report only on this single year covered in this progress report.

For both methods, work was not conducted during periods of rain, high wind, or other adverse weather conditions, as these can affect bird behavior, capture rates, and detectability, and in the case of mist netting can affect bird safety.

Changes to the Monitoring Protocol

For all point count transects, biologists updated route descriptions to reflect current vegetation, trail, etc. conditions to improve navigation to points. GPS coordinates were also corrected where site descriptions were unambiguous but GPS coordinates were incorrect. In rare instances, where substantial changes to plant growth or waterbodies (creeks or ponds) occurred since the points were established, and accessing these points would have required a level of disturbance to the area that may have altered bird behavior and compromised the survey, or would have been unreasonable within the time frame of point count surveys or impractical, points were relocated to nearby sites which were as similar as possible to the original site. In these cases, new GPS coordinates were

recorded, and site descriptions were edited to reflect the change. All changes to narratives were described in the “revision history” imbedded within each of the narratives. The original protocol called for each point to be flagged each year. We deviated from this protocol by only flagging select points to help with finding them within the season. Some points were not flagged because of the likelihood that they would be removed by the public or natural conditions. Appendix A contains the modified Standard Operating Procedure 4, including all changes described above. All changes to GPS coordinates are also made on the California Avian Data Center (see Data Management and Availability, below).

One important change, reflected in Appendix A, was that one point count station was dropped from one of the transects, Coast Camp (COCA). Point COCA_98 was dropped due to the growth of very thick coastal scrub vegetation preventing the surveyor to get within 40m of the point and the lack of riparian vegetation within 50m of the point (using satellite imagery to assess). The point was established shortly after the Mount Vision fire and riparian vegetation was expected to develop, but coastal scrub vegetation has instead established. For these reasons, it was deemed appropriate to drop this point from monitoring in 2014 and beyond, and not to re-establish the point nearby.

It should be noted that at the Redwood Creek mist netting site, the fall banding season was extended by one day (to 1 November 2013). The fall season normally ends on October 31 each year, but adverse weather conditions pushed the schedule one day later. We also needed to band at this site to complete the North American Banding Council certification testing we were conducting for the banding interns. The data from this day is included in the fall banding season.

As described during the previous progress report (Jennings and Humple 2014), an additional clarification should be made to the monitoring protocol (Gardali et al. 2010), although it does not require any changes to Standard Operating Procedures. On page 18, under Sampling Frequency and Schedule, it states that point count surveys should be conducted “between late May and June”. However, this sampling frequency is incorrect, and in SOP 6 (Conducting Variable Circular Plot Point Count Surveys) it correctly states that the first visit is to be conducted in May and the second visit in June. The latter is more biologically and logistically appropriate and is the sampling frequency guideline we followed in 2011 (and in recent years), and intend to follow in future years.

The above (timing clarification and changes to narratives) requires physically changing the overall protocol, tracking the changes that occurred, changing the protocol from Version 4.4 to Version 4.5, and disseminating as appropriate. Those changes have not yet been made, nor were they made after the previous progress report.

Plant Phenology

A new monitoring protocol has been added to each of the mist netting sites to track changes in plant phenology (timing of leafing, flowering, fruiting, etc.). We follow the protocols and use the data forms from the National Phenology Network through their website, Nature’s Notebook (https://www.usanpn.org/natures_notebook). The data collected is also part of the California Phenology Project. More information about the National Phenology Network and Point Blue’s contributions, see Kellerman et al. (2015).

Photo Documentation of Point Count Locations

Observers took photographs at every point count station (n=183) in 2014, as per the request of the National Park Service and for archiving purposes in order to provide a visual assessment of the habitat. Each observer followed the same protocol described here. Photographs were taken in a direction that illustrated the representative vegetation being surveyed. The direction (relative to magnetic north) was recorded. All photos were taken at eye level (~5 ft). The photo files are labeled in the following way: (transect four letter code)_(point number)_(direction in degrees). For example RECR_74_150deg is the photo from the Redwood Creek transect, point number 74, looking in the direction of 150 degrees. The photographs were in JPEG format.

This photo documentation is not intended to be repeated during each subsequent year of surveys. Photos are archived on the server at Point Blue Conservation Science (Z:\Terrestrial\programs_and_projects\coastal_parks\NPS_I&M\CoastalNPSMonitoring\PC_photo_documentation), and are also included as a DVD supplement to this report (Supplement A) for archiving by the National Park Service. In Appendix B, one photograph per transect is shown to represent the typical habitat found in that transect, and provide a sense of the archival photo documentation.

Data Management and Availability

Point count data discussed in this report are available to download from the California Avian Data Center (CADC), a regional node of the Avian Knowledge Network (AKN) hosted by Point Blue Conservation Science. The data are available there under projects CNPSM and PALO, for all SFAN partners (contact Diana Humple for additional personnel access, dhumple@pointblue.org). Updated GPS points can be downloaded from CADC in a variety of formats for mapping or uploading to GPS receivers; GPS points are also listed in Appendix A of this document.

To access point count data through CADC, once you have access, go to <http://data.prbo.org/cadc2/>, then follow the steps below:

1. Click “Go” in the red My CADC box on the right-hand side of the page.
2. Select “I want to log in to my MyCADC account”
3. Select “Analysts Tools”
4. Enter your user name, click enter, then enter your password and click Log In.
5. Click Point Counts, then select the project you wish to view or download data for (CNPSM or Palo)
6. You will then have a variety of options for selecting and filtering the data you want to download. Once you have selected the locations, time span, and other parameters, you can choose “Get selected data as - CSV file” to download all the data; or you can use the analyst’s tools to view various summaries of the data. It is recommended that you talk to the

Point Blue project lead (dhumple@pointblue.org) regarding this process and some of the limitations of it before doing any statistical analyses through CADDC.

To download GPS points for study sites:

1. Follow steps 1 and 2 above.
2. Select “Biologists”
3. Select “Get maps and coordinates”
4. Select the appropriate project as in 5 above.
5. You will then be able to select which locations you want to download coordinates for, and to select a variety of formats to download them in.

Electronic databases of all mist netting data, along with scans of point count raw data sheets, will be provided to the National Park Service on a supplemental CD.

Public Outreach

Point Blue invites school and other groups to view mist netting at Palomarin and Muddy Hollow, and occasionally the other riparian sites. From 15 August 2013 to 16 August 2014, 19 classes and other groups visited Point Blue Marin County mist netting sites. In total, 500 people visited the mist netting sites through these organized visits, and hundreds more visited as drop-in visitors. Members of the public also viewed mist netting at Redwood Creek as part of International Migratory Bird Day (IMBD) celebrations that are held at Muir Woods National Monument on 10 May 2014.

Results

Three biologists conducted point counts and 15 biologists conducted mist netting between 15 August 2013 and 16 August 2014 (Table 2). Point count surveys were conducted during May (visit 1) and June (visit 2) 2014 (Table 3). Mist netting followed the site-specific schedule outlined in the Methods; dates of visits are not listed here, but Table 4 summarizes the amount of time mist nets were operated (“net hours”) for each site and season, which are recorded in order to correct captures for varying effort among years in analyses.

For the following data summaries, we report tallies of species, although in the tables we also separate out subspecies when they could be determined. When more than one subspecies was detected, summary information was evaluated on the combined data of all subspecies such that species do not get double counted and the number of detections is at the species level. There were also two sets of species that can be inseparable (Rufous/Allen’s Hummingbird and Pacific-slope/Cordilleran Flycatcher) which were not included in the below summaries in order to not over-count (assuming Rufous and/or Allen’s, and Pacific-slope Flycatcher [Cordilleran exceedingly rare], were already included).

A total of 119 species were detected by point counts and mist netting combined (Table 5). Of these, 24 were detected by mist netting only, 43 by point counts only, and the remaining 52 species by both methods. Thirty-three species detected are California Partners in Flight Habitat Conservation Plan Focal Species (CalPIF 2000, CalPIF 2002a, CalPIF 2002b, CalPIF 2004, CalPIF 2009, RHJV 2004) and of these, six are also California Bird Species of Special Concern (Shuford and Gardali 2008; Table 5).

The ten most-commonly detected species during breeding season point counts, in decreasing order of abundance, were Song Sparrow, Swainson’s Thrush, Wilson’s Warbler, Wrentit, American Goldfinch, Spotted Towhee, Chestnut-backed Chickadee, American Crow, Bewick’s Wren, and Common Raven (Table 6). Of the 95 species detected during point counts, 32 species had ten or fewer individual detections (Table 6).

The ten most-commonly detected species during year-round mist netting, in decreasing abundance, were Fox Sparrow, Song Sparrow, Swainson’s Thrush, Dark-eyed Junco (Oregon), Ruby-crowned Kinglet, Wilson’s Warbler, Wrentit, Chestnut-backed Chickadee, Golden-crowned Sparrow, and Hermit Thrush (Table 7). Of the 76 species captured during mist netting, 35 had 10 or fewer individual captures (Table 7).

Table 2. Primary observers who conducted field work, Marin County PORE/GOGA/MCOSD sites, 15 August 2013 – 16 August 2014, Point Blue Conservation Science. PC= point count; MN= mist netting.

Name	Role	Method	Year
Diana Humple	Project Lead	PC, MN	2013, 2014
Renée Cormier	MN Field Lead	MN	2013, 2014
Mark Dettling	PC Field Lead	PC, MN	2013, 2014
Xeronimo Castañeda	Field Technician	PC	2014
Navit Reid	Intern bander	MN	2013
Elena Daggett	Intern bander	MN	2013
Richard Roush	Intern bander	MN	2013
Jerry Cole	Intern bander	MN	2013
Hodali Almonte	Intern bander	MN	2013, 2014
Max Baber	Intern bander	MN	2013, 2014
Danielle Aubé	Intern bander	MN	2013, 2014
Lindsay Wagner	Intern bander	MN	2013, 2014
Kim Geissler	Intern bander	MN	2014
Brian Cole	Intern bander	MN	2014
Janelle Chojnacki	Intern bander	MN	2014
Anastasia Rahlin	Intern bander	MN	2014

Table 3. Dates of point count surveys by transect, Marin County PORE/GOGA/MCOSD sites, 2014, Point Blue Conservation Science.

Transect	Station Code	Visit 1	Visit 2
Abbot's/Kehoe	ABKE	5/12/2014	6/10/2014
Arroyo Hondo	ARHO	5/1/2014	6/2/2014
Bear Valley	BEVA	5/19/2014	6/13/2014
Coast Camp	COCA	5/15/2014	6/19/2014
Coast Trail Laguna	CTLA	5/13/2014	6/17/2014
Gerbode Valley	GERB	5/21/2014	6/26/2014
Lagunitas Creek	LAGU	5/6/2014	6/9/2014
Lower Olema Creek	LOOL	5/22/2014	6/16/2014
M Ranch	MRAN	5/2/2014	6/3/2014
Muddy Hollow	MUHO	5/14/2014	6/13/2014
Pine Gulch	PIGU	5/8/2014	6/5/2014
Redwood Creek*	RECR	5/14/2014, 5/16/2014	6/18/2014, 6/20/2014
Tennessee Valley	TEVA	5/12/2014	6/27/2014
Upper Olema Creek	UPOL	5/20/2014	6/23/2014

* Redwood Creek transect is subdivided into two subtransects (Upper and Lower; see Appendix A) due to the number of points, thus multiple survey dates.

Table 4. Number of mist net hours by station, Marin County PORE/GOGA/MCOSA riparian sites and Palomarin, 15 August 2013 – 16 August 2014, Point Blue Conservation Science. One mist net-hour is one 12-meter mist net operated for 1 hour. Fall is defined as 15 August, 2013 to 31 October, 2013. Winter is defined as 1 November 2013 to 30 April, 2014. Spring/Summer is defined as 1 May, 2014 to 16 August, 2014.

Station	Fall 2013	Winter 2013-14	Spring/Summer 2014
Palomarin Main Nets	6496.65	10528.34	11118.40
Palomarin Upper Nets	469.26	1053.83	547.00
Pine Gulch	609.18	1020.07	625.92
Muddy Hollow	495.96	1072.27	551.66
Redwood Creek ^a	583.85 ^b	-- ^b	674.50
Lagunitas Creek ^a	594.38	--	631.67

^a Stations operated 1 May - 31 October.

^b Due to adverse weather conditions, some Fall banding was done on 1 November 2013 and these hours were included in the Fall and not Winter total.

Table 5. All species recorded by point count and mist netting, Marin County PORE/GOGA/MCOSA riparian sites and the Palomarin mist netting station, combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. PC=point count, MN=mist netting. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	Method
Canada Goose	<i>Branta canadensis</i>	PC
Gadwall	<i>Anas strepera</i>	PC
Mallard	<i>Anas platyrhynchos</i>	PC
Cinnamon Teal	<i>Anas cyanoptera</i>	PC
California Quail	<i>Callipepla californica</i>	PC, MN
Wild Turkey	<i>Meleagris gallopavo</i>	PC
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	PC
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	PC
Brown Pelican	<i>Pelecanus occidentalis</i>	PC
Great Blue Heron	<i>Ardea herodias</i>	PC
Turkey Vulture	<i>Cathartes aura</i>	PC
Osprey	<i>Pandion haliaetus</i>	PC
Northern Harrier ^{a,b}	<i>Circus cyaneus</i>	PC
Sharp-shinned Hawk	<i>Accipiter striatus</i>	MN
Cooper's Hawk	<i>Accipiter cooperii</i>	PC, MN
Red-shouldered Hawk	<i>Buteo lineatus</i>	PC, MN
Red-tailed Hawk	<i>Buteo jamaicensis</i>	PC
Virginia Rail	<i>Rallus limicola</i>	PC
Killdeer	<i>Charadrius vociferus</i>	PC
Spotted Sandpiper	<i>Actitis macularius</i>	PC
Red-necked Phalarope	<i>Phalaropus lobatus</i>	PC
Western Gull	<i>Larus occidentalis</i>	PC
Glaucous-winged Gull	<i>Larus glaucescens</i>	PC
Caspian Tern	<i>Hydroprogne caspia</i>	PC
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	PC, MN
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	PC
Mourning Dove	<i>Zenaida asiatica</i>	PC, MN
Great Horned Owl	<i>Bubo virginianus</i>	PC

Table 5. (continued) All species recorded by point count and mist netting, Marin County PORE/GOGA/MCOSA riparian sites and the Palomarin mist netting station, combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. PC=point count, MN=mist netting. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	Method
Anna's Hummingbird	<i>Calypte anna</i>	PC, MN
Rufous Hummingbird	<i>Selasphorus rufus</i>	MN
Allen's Hummingbird	<i>Selasphorus sasin</i>	PC, MN
Rufous/Allen's Hummingbird	<i>Selasphorus rufus/sasin</i>	PC, MN
Belted Kingfisher	<i>Megaceryle alcyon</i>	MN
Acorn Woodpecker ^a	<i>Melanerpes formicivorus</i>	PC
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	MN
Nuttall's Woodpecker ^a	<i>Picoides nuttallii</i>	PC, MN
Downy Woodpecker	<i>Picoides pubescens</i>	PC, MN
Hairy Woodpecker	<i>Picoides villosus</i>	PC, MN
Northern Flicker	<i>Colaptes auratus</i>	PC
Northern Flicker (Red-shafted)	<i>Colaptes auratus cafer</i>	MN
Northern Flicker (Yellow-shafted)	<i>Colaptes auratus auratus</i>	MN
Pileated Woodpecker ^a	<i>Dryocopus pileatus</i>	PC
Peregrine Falcon	<i>Falco peregrinus</i>	PC
Olive-sided Flycatcher ^{a,b}	<i>Contopus cooperi</i>	PC, MN
Western Wood-Pewee	<i>Contopus sordidulus</i>	PC, MN
Willow Flycatcher ^a	<i>Empidonax traillii</i>	MN
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	PC, MN
Pacific-slope/Cordilleran Flycatcher ^c	<i>Empidonax difficilis/occidentalis</i>	MN
Black Phoebe	<i>Sayornis nigricans</i>	PC, MN
Ash-throated Flycatcher ^a	<i>Myiarchus cinerascens</i>	PC
Hutton's Vireo	<i>Vireo huttoni</i>	PC, MN
Warbling Vireo ^a	<i>Vireo gilvus</i>	PC, MN
Red-eyed Vireo	<i>Vireo olivaceus</i>	MN
Steller's Jay	<i>Cyanocitta stelleri</i>	PC, MN
Western Scrub-Jay ^a	<i>Aphelocoma californica</i>	PC, MN
American Crow	<i>Corvus brachyrhynchos</i>	PC
Common Raven ^a	<i>Corvus corax</i>	PC
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	PC
Purple Martin ^b	<i>Progne subis</i>	PC
Tree Swallow ^a	<i>Tachycineta bicolor</i>	PC, MN
Violet-green Swallow	<i>Tachycineta thalassina</i>	PC
Barn Swallow	<i>Hirundo rustica</i>	PC
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	PC
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	PC, MN
Oak Titmouse ^a	<i>Baeolophus inornatus</i>	PC
Bushtit	<i>Psaltiriparus minimus</i>	PC, MN
Red-breasted Nuthatch ^a	<i>Sitta canadensis</i>	PC, MN
Pygmy Nuthatch	<i>Sitta pygmaea</i>	PC
Brown Creeper ^a	<i>Certhia americana</i>	PC, MN
House Wren	<i>Troglodytes aedon</i>	MN
Pacific Wren	<i>Troglodytes pacificus</i>	PC, MN
Marsh Wren	<i>Cistothorus palustris</i>	PC, MN
Bewick's Wren	<i>Thryomanes bewickii</i>	PC, MN

Table 5. (continued) All species recorded by point count and mist netting, Marin County PORE/GOGA/MCOSA riparian sites and the Palomarin mist netting station, combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. PC=point count, MN=mist netting. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	Method
Golden-crowned Kinglet ^a	<i>Regulus satrapa</i>	PC, MN
Ruby-crowned Kinglet	<i>Regulus calendula</i>	MN
Wrentit ^a	<i>Chamaea fasciata</i>	PC, MN
Western Bluebird ^a	<i>Sialia mexicana</i>	PC, MN
Swainson's Thrush ^a	<i>Catharus ustulatus</i>	PC, MN
Hermit Thrush	<i>Catharus guttatus</i>	PC, MN
American Robin	<i>Turdus migratorius</i>	PC, MN
Varied Thrush	<i>Ixoreus naevius</i>	MN
European Starling	<i>Sturnus vulgaris</i>	PC
Cedar Waxwing	<i>Bombycilla cedrorum</i>	PC, MN
Northern Waterthrush	<i>Parkesia noveboracensis</i>	MN
Orange-crowned Warbler	<i>Oreothlypis celata</i>	PC, MN
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	MN
MacGillivray's Warbler ^a	<i>Geothlypis tolmiei</i>	PC, MN
Common Yellowthroat ^a	<i>Geothlypis trichas</i>	PC, MN
Yellow Warbler ^{a,b}	<i>Setophaga petechia</i>	MN
Blackpoll Warbler	<i>Setophaga striata</i>	MN
Yellow-rumped Warbler	<i>Setophaga coronata</i>	MN
Yellow-rumped Warbler (Myrtle)	<i>Setophaga coronata coronata</i>	MN
Yellow-rumped Warbler (Audubon's)	<i>Setophaga coronata auduboni</i>	MN
Black-throated Gray Warbler ^a	<i>Setophaga nigrescens</i>	MN
Townsend's Warbler	<i>Setophaga townsendi</i>	PC, MN
Hermit Warbler	<i>Setophaga occidentalis</i>	MN
Canada Warbler	<i>Cardellina canadensis</i>	MN
Wilson's Warbler ^a	<i>Cardellina pusilla</i>	PC, MN
Yellow-breasted Chat ^{a,b}	<i>Icteria virens</i>	MN
Spotted Towhee	<i>Pipilo maculatus</i>	PC, MN
California Towhee	<i>Melospiza crissalis</i>	PC, MN
Chipping Sparrow	<i>Spizella passerina</i>	PC
Black-chinned Sparrow ^a	<i>Spizella atrogularis</i>	MN
Savannah Sparrow ^a	<i>Passerculus sandwichensis</i>	PC, MN
Grasshopper Sparrow ^{a,b}	<i>Ammodramus savannarum</i>	PC
Fox Sparrow ^a	<i>Passerella iliaca</i>	MN
Song Sparrow ^a	<i>Melospiza melodia</i>	PC, MN
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	MN
Swamp Sparrow	<i>Melospiza georgiana</i>	MN
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	PC, MN
White-crowned Sparrow (Gambel's)	<i>Zonotrichia leucophrys gambelii</i>	MN
White-crowned Sparrow (Nuttall's) ^a	<i>Zonotrichia leucophrys nuttalli</i>	MN
White-crowned Sparrow (Puget Sound)	<i>Zonotrichia leucophrys pugetensis</i>	MN
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	MN
Dark-eyed Junco ^a	<i>Junco hyemalis</i>	PC, MN
Dark-eyed Junco (Oregon)	<i>Junco hyemalis oregonus</i>	PC, MN
Dark-eyed Junco (Slate-colored)	<i>Junco hyemalis hyemalis</i>	MN

Table 5. (continued) All species recorded by point count and mist netting, Marin County PORE/GOGA/MCOSD riparian sites and the Palomarin mist netting station, combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. PC=point count, MN=mist netting. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	Method
Western Tanager ^a	<i>Piranga ludoviciana</i>	MN
Black-headed Grosbeak ^a	<i>Pheucticus melanocephalus</i>	PC, MN
Lazuli Bunting	<i>Passerina caerulea</i>	PC, MN
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	PC
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	PC
Brown-headed Cowbird	<i>Molothrus ater</i>	PC, MN
House Finch	<i>Haemorhous mexicanus</i>	PC, MN
Purple Finch	<i>Haemorhous purpureus</i>	PC, MN
Red Crossbill	<i>Loxia curvirostra</i>	PC
Pine Siskin	<i>Spinus pinus</i>	PC, MN
Lesser Goldfinch	<i>Spinus psaltria</i>	PC
American Goldfinch	<i>Spinus tristis</i>	PC, MN
House Sparrow	<i>Passer domesticus</i>	PC

^a California Partners in Flight Habitat Conservation Plans Focal Species (includes all habitats).

^b California Bird Species of Special Concern.

^c Pacific-slope and Cordilleran flycatchers were split from what was historically known as a single species, Western Flycatcher.

Table 6. Number of individual detections of each species during riparian point counts, Marin County PORE/GOGA/MCOSD sites, 2014, Point Blue Conservation Science. Includes observations at all distances (not just within 50m), flyover observations, and both visits, and are not averaged per point (some individuals detected at multiple points), so count may not represent actual abundance. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	PC Count
Canada Goose	<i>Branta canadensis</i>	11
Gadwall	<i>Anas strepera</i>	20
Mallard	<i>Anas platyrhynchos</i>	17
Cinnamon Teal	<i>Anas cyanoptera</i>	5
California Quail	<i>Callipepla californica</i>	148
Wild Turkey	<i>Meleagris gallopavo</i>	10
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	13
Pelagic Cormorant	<i>Phalacrocorax pelagicus</i>	4
Brown Pelican	<i>Pelecanus occidentalis</i>	3
Great Blue Heron	<i>Ardea herodias</i>	2
Turkey Vulture	<i>Cathartes aura</i>	34
Osprey	<i>Pandion haliaetus</i>	5
Northern Harrier	<i>Circus cyaneus</i>	6
Cooper's Hawk	<i>Accipiter cooperii</i>	2
Red-shouldered Hawk	<i>Buteo lineatus</i>	4
Red-tailed Hawk	<i>Buteo jamaicensis</i>	12
Virginia Rail	<i>Rallus limicola</i>	6
Killdeer	<i>Charadrius vociferus</i>	2
Spotted Sandpiper	<i>Actitis macularius</i>	1
Red-necked Phalarope	<i>Phalaropus lobatus</i>	1

Table 6. (continued) Number of individual detections of each species during riparian point counts, Marin County PORE/GOGA/MCOSD sites, 2014, Point Blue Conservation Science. Includes observations at all distances (not just within 50m), flyover observations, and both visits, and are not averaged per point (some individuals detected at multiple points), so count may not represent actual abundance. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	PC Count
Western Gull	<i>Larus occidentalis</i>	17
Glaucous-winged Gull	<i>Larus glaucescens</i>	1
Caspian Tern	<i>Hydroprogne caspia</i>	6
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	82
Eurasian Collared-Dove	<i>Streptopelia decaocto</i>	25
Mourning Dove	<i>Zenaida asiatica</i>	90
Great Horned Owl	<i>Bubo virginianus</i>	1
Anna's Hummingbird	<i>Calypte anna</i>	79
Allen's Hummingbird	<i>Selasphorus sasin</i>	14
Rufous/Allen's Hummingbird	<i>Selasphorus rufus/sasin</i>	64
Acorn Woodpecker	<i>Melanerpes formicivorus</i>	13
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	21
Downy Woodpecker	<i>Picoides pubescens</i>	26
Hairy Woodpecker	<i>Picoides villosus</i>	27
Northern Flicker	<i>Colaptes auratus</i>	51
Pileated Woodpecker	<i>Dryocopus pileatus</i>	3
Peregrine Falcon	<i>Falco peregrinus</i>	1
Olive-sided Flycatcher	<i>Contopus cooperi</i>	18
Western Wood-Pewee	<i>Contopus sordidulus</i>	29
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	154
Black Phoebe	<i>Sayornis nigricans</i>	22
Ash-throated Flycatcher	<i>Myiarchus cinerascens</i>	16
Hutton's Vireo	<i>Vireo huttoni</i>	73
Warbling Vireo	<i>Vireo gilvus</i>	165
Steller's Jay	<i>Cyanocitta stelleri</i>	91
Western Scrub-Jay	<i>Aphelocoma californica</i>	175
American Crow	<i>Corvus brachyrhynchos</i>	216
Common Raven	<i>Corvus corax</i>	180
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	1
Purple Martin	<i>Progne subis</i>	1
Tree Swallow	<i>Tachycineta bicolor</i>	64
Violet-green Swallow	<i>Tachycineta thalassina</i>	5
Barn Swallow	<i>Hirundo rustica</i>	25
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	44
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	279
Oak Titmouse	<i>Baeolophus inornatus</i>	11
Bushtit	<i>Psaltirparus minimus</i>	77
Red-breasted Nuthatch	<i>Sitta canadensis</i>	3
Pygmy Nuthatch	<i>Sitta pygmaea</i>	9
Brown Creeper	<i>Certhia americana</i>	3
Pacific Wren	<i>Troglodytes pacificus</i>	97
Marsh Wren	<i>Cistothorus palustris</i>	47
Bewick's Wren	<i>Thryomanes bewickii</i>	189
Golden-crowned Kinglet	<i>Regulus satrapa</i>	9
Wrentit	<i>Chamaea fasciata</i>	463
Western Bluebird	<i>Sialia mexicana</i>	12

Table 6. (continued) Number of individual detections of each species during riparian point counts, Marin County PORE/GOGA/MCOSA sites, 2014, Point Blue Conservation Science. Includes observations at all distances (not just within 50m), flyover observations, and both visits, and are not averaged per point (some individuals detected at multiple points), so count may not represent actual abundance. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	PC Count
Swainson's Thrush	<i>Catharus ustulatus</i>	723
Hermit Thrush	<i>Catharus guttatus</i>	1
American Robin	<i>Turdus migratorius</i>	112
European Starling	<i>Sturnus vulgaris</i>	27
Cedar Waxwing	<i>Bombycilla cedrorum</i>	68
Orange-crowned Warbler	<i>Oreothlypis celata</i>	136
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	13
Common Yellowthroat	<i>Geothlypis trichas</i>	141
Townsend's Warbler	<i>Setophaga townsendi</i>	1
Wilson's Warbler	<i>Cardellina pusilla</i>	484
Spotted Towhee	<i>Pipilo maculatus</i>	288
California Towhee	<i>Melospiza crissalis</i>	64
Chipping Sparrow	<i>Spizella passerina</i>	7
Savannah Sparrow	<i>Passerculus sandwichensis</i>	13
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	12
Song Sparrow	<i>Melospiza melodia</i>	770
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	88
Dark-eyed Junco	<i>Junco hyemalis</i>	7
Dark-eyed Junco (Oregon)	<i>Junco hyemalis oregonus</i>	8
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	67
Lazuli Bunting	<i>Passerina caerulea</i>	6
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	146
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	30
Brown-headed Cowbird	<i>Molothrus ater</i>	88
House Finch	<i>Haemorhous mexicanus</i>	50
Purple Finch	<i>Haemorhous purpureus</i>	104
Red Crossbill	<i>Loxia curvirostra</i>	1
Pine Siskin	<i>Spinus pinus</i>	71
Lesser Goldfinch	<i>Spinus psaltria</i>	9
American Goldfinch	<i>Spinus tristis</i>	329
House Sparrow	<i>Passer domesticus</i>	7

Table 7. Number of individual captures of each species during mist netting, Marin County PORE/GOGA/MCOSA and Palomarin sites combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	MN Count
California Quail	<i>Callipepla californica</i>	2
Sharp-shinned Hawk	<i>Accipiter striatus</i>	38
Cooper's Hawk	<i>Accipiter cooperii</i>	1
Red-shouldered Hawk	<i>Buteo lineatus</i>	1
Band-tailed Pigeon	<i>Patagioenas fasciata</i>	4
Mourning Dove	<i>Zenaidura asiatica</i>	3
Anna's Hummingbird	<i>Calypte anna</i>	105
Rufous Hummingbird	<i>Selasphorus rufus</i>	14
Allen's Hummingbird	<i>Selasphorus sasin</i>	168
Rufous/Allen's Hummingbird	<i>Selasphorus rufus/sasin</i>	24

Table 7. (continued) Number of individual captures of each species during mist netting, Marin County PORE/GOGA/MCOSA and Palomarin sites combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	MN Count
Belted Kingfisher	<i>Megasceryle alcyon</i>	3
Red-breasted Sapsucker	<i>Sphyrapicus ruber</i>	11
Nuttall's Woodpecker	<i>Picoides nuttallii</i>	2
Downy Woodpecker	<i>Picoides pubescens</i>	26
Hairy Woodpecker	<i>Picoides villosus</i>	19
Northern Flicker (Red-shafted)	<i>Colaptes auratus cafer</i>	4
Northern Flicker (Yellow-shafted)	<i>Colaptes auratus auratus</i>	1
Olive-sided Flycatcher	<i>Contopus cooperi</i>	5
Western Wood-Pewee	<i>Contopus sordidulus</i>	2
Willow Flycatcher	<i>Empidonax traillii</i>	5
Pacific-slope Flycatcher	<i>Empidonax difficilis</i>	165
Pacific-slope/Cordilleran Flycatcher	<i>Empidonax difficilis/occidentalis</i>	46
Black Phoebe	<i>Sayornis nigricans</i>	8
Hutton's Vireo	<i>Vireo huttoni</i>	43
Warbling Vireo	<i>Vireo gilvus</i>	67
Red-eyed Vireo	<i>Vireo olivaceus</i>	1
Steller's Jay	<i>Cyanocitta stelleri</i>	23
Western Scrub-Jay	<i>Aphelocoma californica</i>	8
Tree Swallow	<i>Tachycineta bicolor</i>	8
Chestnut-backed Chickadee	<i>Poecile rufescens</i>	350
Bushtit	<i>Psaltirparus minimus</i>	97
Red-breasted Nuthatch	<i>Sitta canadensis</i>	30
Brown Creeper	<i>Certhia americana</i>	82
House Wren	<i>Troglodytes aedon</i>	5
Pacific Wren	<i>Troglodytes pacificus</i>	183
Marsh Wren	<i>Cistothorus palustris</i>	2
Bewick's Wren	<i>Thryomanes bewickii</i>	144
Golden-crowned Kinglet	<i>Regulus satrapa</i>	87
Ruby-crowned Kinglet	<i>Regulus calendula</i>	528
Wrentit	<i>Chamaea fasciata</i>	456
Western Bluebird	<i>Sialia mexicana</i>	2
Swainson's Thrush	<i>Catharus ustulatus</i>	645
Hermit Thrush	<i>Catharus guttatus</i>	195
American Robin	<i>Turdus migratorius</i>	38
Varied Thrush	<i>Ixoreus naevius</i>	68
Cedar Waxwing	<i>Bombycilla cedrorum</i>	2
Northern Waterthrush	<i>Parkesia noveboracensis</i>	1
Orange-crowned Warbler	<i>Oreothlypis celata</i>	119
Nashville Warbler	<i>Oreothlypis ruficapilla</i>	2
MacGillivray's Warbler	<i>Geothlypis tolmiei</i>	8
Common Yellowthroat	<i>Geothlypis trichas</i>	61
Yellow Warbler	<i>Setophaga petechia</i>	15
Blackpoll Warbler	<i>Setophaga striata</i>	1
Yellow-rumped Warbler	<i>Setophaga coronata</i>	3
Yellow-rumped Warbler (Myrtle)	<i>Setophaga coronata coronata</i>	46
Yellow-rumped Warbler (Audubon's)	<i>Setophaga coronata auduboni</i>	21
Black-throated Gray Warbler	<i>Setophaga nigrescens</i>	2
Townsend's Warbler	<i>Setophaga townsendi</i>	76

Table 7. (continued) Number of individual captures of each species during mist netting, Marin County PORE/GOGA/MCOSA and Palomarin sites combined, 15 August 2013 - 16 August 2014, Point Blue Conservation Science. Determined subspecies are shown in parentheses following the species name.

Common Name	Scientific Name	MN Count
Hermit Warbler	<i>Setophaga occidentalis</i>	4
Canada Warbler	<i>Cardellina canadensis</i>	2
Wilson's Warbler	<i>Cardellina pusilla</i>	511
Yellow-breasted Chat	<i>Icteria virens</i>	1
Spotted Towhee	<i>Pipilo maculatus</i>	130
California Towhee	<i>Melospiza crissalis</i>	6
Black-chinned Sparrow	<i>Spizella atrogularis</i>	1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	1
Fox Sparrow	<i>Passerella iliaca</i>	1031
Song Sparrow	<i>Melospiza melodia</i>	703
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	13
Swamp Sparrow	<i>Melospiza georgiana</i>	4
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	6
White-crowned Sparrow (Gambel's)	<i>Zonotrichia leucophrys gambelii</i>	2
White-crowned Sparrow (Nuttall's)	<i>Zonotrichia leucophrys nuttalli</i>	17
White-crowned Sparrow (Puget Sound)	<i>Zonotrichia leucophrys pugetensis</i>	23
Golden-crowned Sparrow	<i>Zonotrichia atricapilla</i>	249
Dark-eyed Junco (Oregon)	<i>Junco hyemalis oregonus</i>	539
Dark-eyed Junco (Slate-colored)	<i>Junco hyemalis hyemalis</i>	2
Western Tanager	<i>Piranga ludoviciana</i>	2
Black-headed Grosbeak	<i>Pheucticus melanocephalus</i>	17
Lazuli Bunting	<i>Passerina caerulea</i>	5
Brown-headed Cowbird	<i>Molothrus ater</i>	4
House Finch	<i>Haemorhous mexicanus</i>	3
Purple Finch	<i>Haemorhous purpureus</i>	74
Pine Siskin	<i>Spinus pinus</i>	12
American Goldfinch	<i>Spinus tristis</i>	32

Discussion

We do not present any trends or figures, or discuss the above results in any depth, as the Analysis and Synthesis reports that are produced every six years (e.g., Humple and Porzig 2012; and will next be produced after the 2017 field season) is meant to include the in-depth analyses and discussion.

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Appendix A. Standard Operating Procedure (SOP) 4: Marking and Relocating Sampling Plots V2.2.

Revision History Log

Prev. Version #	Revision Date	Author	Changes Made	Reason for Change	New Version #
1.0	Oct. 2006	T. Gardali	Minor wordsmith and suggestions	NPS internal review comments	2.0
2.0	June 2012	S. Jennings, D. Humple, R. Cormier, L. Porzig	Updated point count station narratives (locations and descriptions); created some that were missing	GPS coordinate did not match landscape; vegetation or other feature prevented access to original station	2.1
2.1	Feb. 2015	M. Dettling, D. Humple	Updated point count station narratives (locations and descriptions)	GPS coordinate did not match landscape; vegetation or other feature prevented access to original station; vegetation or other features changed and prior description was outdated	2.2

This Standard Operating Procedure explains the procedure for establishing and marking sampling plots to (1) locate point count stations, (2) locate net lanes, and (3) establish, modifying and mark point count stations. Detailed descriptions of all sampling sites are provided.

Locating Point Count Stations

All pre-existing point count stations are relocated with a combination of means: (1) they might be previously marked with colored flagging for visual location and are re-flagged if deemed necessary and helpful for that season; (2) GPS coordinates; (3) a narrative is written for each transect describing any details and important features useful for relocating the points; and (4) maps showing location of entire transect and individual points.

Locating Net Lanes

All pre-existing net lanes, where possible, are relocated through (1) permanent nets; (2) permanent net equipment (net poles, ropes); (3) marked flagging identifying both ends of the net lane; (4) maps revealing locations of net lanes; and (5) GPS locations of net lanes. However, net lanes are relocated only by experienced banders with knowledge of those net lanes in order to avoid minor movements of mist-nets.

Modifying and Marking Point Count Stations

- Point count stations are already established and selected. Consideration to add new point count stations will require modification of this SOP.

- Occasionally biologists will encounter previously established point count stations for which (1) the GPS coordinates do not appear as accurate as possible (due to suboptimal conditions when coordinates were originally recorded), and (2) for which physical features have changed and therefore the narrative is either misleading or requires updating. If coordinates appear inaccurate and current conditions appear optimal for recording new coordinates, the biologist will record the updated coordinates and provide them to the Point Blue GIS Specialist and the SFAN Data Manager, change the coordinates on the narrative, and change them in any GPS units that contain them. When narratives need to be updated, the biologist will make sure this is changed for all locations of the narrative (keeping the retired version in an electronic folder specifically for this purpose).

Abbott's Lagoon/Kehoe Ranch (ABKE), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 16

Getting there: Points 9-16 are near Abbott's Lagoon. Drive past the parking lot for the lagoon and park on the left at the single car parking spot, across from the reddish shed and before mile marker 3.62 (parking area often not mowed; alternate parking in Abbott's lot or pullout near bathroom). Points 1-8 are at the Kehoe Ranch. Continue on in car in direction of Tomales Point. Park at the Kehoe Ranch sign (mile marker 5.56). For efficiency, start count at either pt 16, 8, or 1.

Notes: GPS works well. Rubber boots and rain pants for tall grass and some marshy spots. Poison Oak avoidable. Points are approximately 200 meters apart. Degrees are relative to magnetic, not true, north. Transect is in 2 sections, and you must drive between the two. ~20min walk from ABKE_8 to Kehoe parking area. ~25min walk to ABKE_16 from single car parking spot.

Points 9 – 16 are near Abbott's Lagoon. Points 9 and 10 are on left side of road; 11-16 are on right side of road (if you were heading towards Tomales Point)

ABKE_10: Walk up mound across from reddish shed to avoid Poison Oak patch. ABKE_10 is before you reach the lagoon, on south side of swampy area. Point between lupine and low-growing coyote bush.

ABKE_9: Go straight up the slope along a deer trail, heading uphill from and parallel to the patch of willows. Point is at the uphill side of the far edge of the last willow clump along the lagoon, about 7m up from willow edge. Poison Oak in area.

ABKE_11: Go back to road and cross to east side. Go under barbwire, point is along the willows about 20 meters in from the road, on south side of willows. Poison Oak at point.

ABKE_12: Go back to road, then north to north side of the willows. Cross barbwire, walk on ridge above riparian until near the point, then down towards the willows. Point is 65° and about 20 meters from the corner of fence.

ABKE_13: Continue east along willow edge, crossing the fence (ends at riparian so easiest to cross there) and the levee. Keep straight, heading towards leftmost (north most) willow patch, point is at beginning edge of the patch. ABKE_13 is about 290 meters from ABKE_12.

ABKE_14: Continue east. Point is along willows at the next fence. (Point used to be on otherside of fence, but access too difficult, so stand at fence).

ABKE_15: Cross fence a little uphill at gate. Continue east. Point is about 30 meters after the next willow patch begins, along willow edge.

ABKE_16: Continue east. Pass smaller willow patch, and point is at beginning of the last willow patch you will come to before the 2nd "pond".

Points 1-8 are at the Kehoe Ranch. Points 1 and 2 are on west side of road; points 3 – 8 are on east side of road.

ABKE_1: Take trail on west side of the road. Cross through the cattle gate further up the trail, then go 105 meters; point is on your left along the willow edge. Point is off trail about 10m through tallish veg.

ABKE_2: This point is actually back toward the road. At the west edge of the cypresses and privy, cut in heading left (south) to the willows. Follow along the west edge of the willows, and go about 2/3 of the way to the other side. Point is on this west edge of the willows.

ABKE_3: Go back to road and walk north up the road about 75 meters and go under fence where easy. Walk up creek. Point is at willow edge near steep bank down to creek. Work your way around blackberry patch to get to point.

ABKE_4: Continue in same direction along creek (crossing a fence) towards salmonberry patch. Point is at willow edge across from salmonberry patch.

ABKE_5: Continue along creek. Point is at the start of the next willow patch almost immediately after crossing the fence.

ABKE_6: Continue along creek. Point is on a willow in the 2nd grassy cove, just past where creek is carved out away from willows at tiny “peninsula”. Peninsula becoming overgrown, but still visible in 2014. Cows might be in the area.

ABKE_7: Continue along creek, crossing fence where dirt road crosses creek. Staying on west side of riparian, follow GPS to point. No good landmarks. Cows may be in the area.

ABKE_8: Point is on east side of riparian. Cross creek by going back south to dirt road which crosses creek. Then go northwest to point following GPS. Point is at willow edge a little south of a deep gully. Can then cross gully to get to road (which you walk to get back to car).

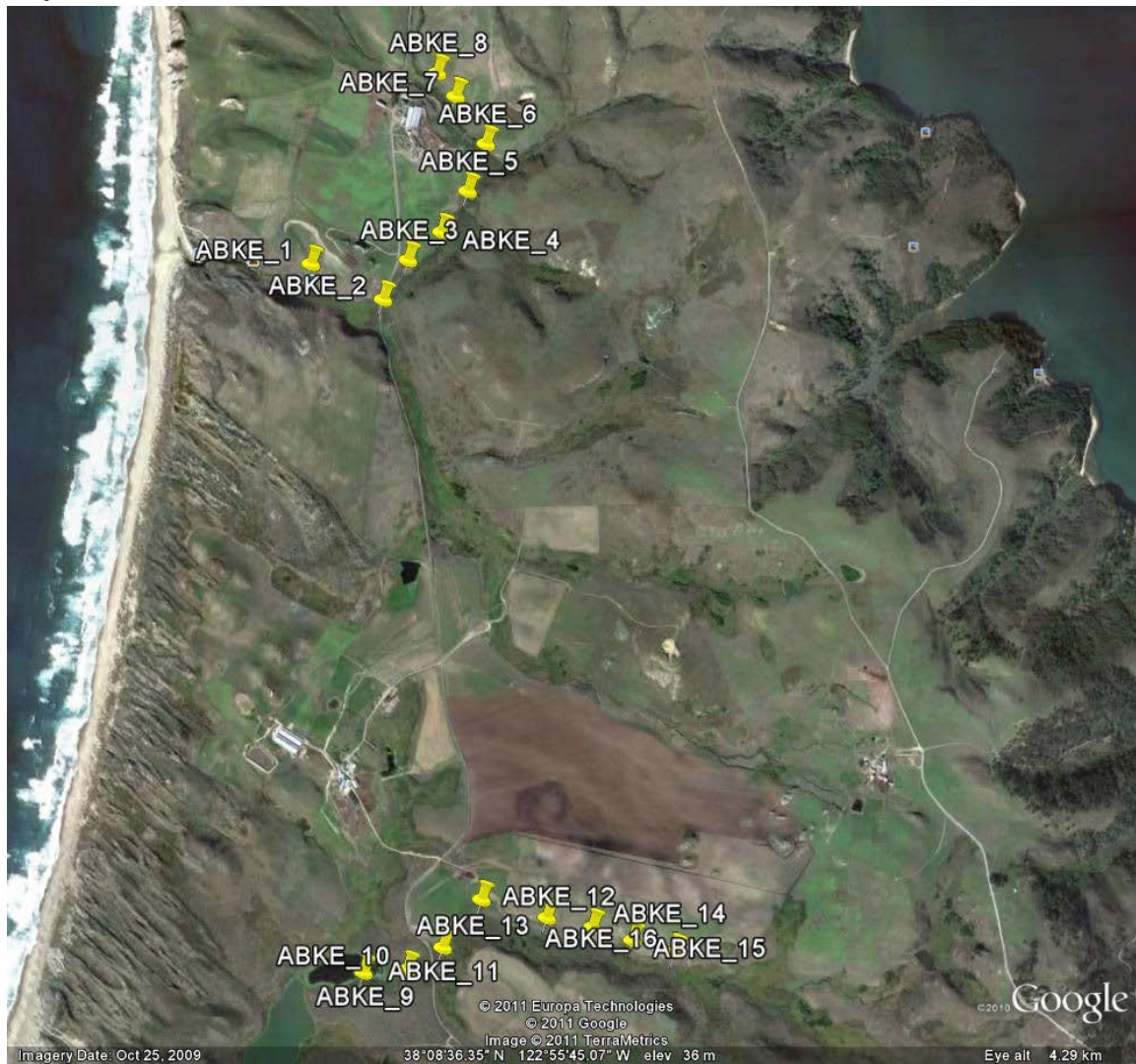
Coordinates: DD, WGS84/NAD83

ABKE_1	38.15338	-122.94260	ABKE_9	38.12574	-122.94002
ABKE_2	38.15191	-122.93953	ABKE_10	38.12588	-122.93784
ABKE_3	38.15351	-122.93778	ABKE_11	38.12673	-122.93608
ABKE_4	38.15461	-122.93613	ABKE_12	38.12866	-122.93414
ABKE_5	38.15620	-122.93483	ABKE_13	38.12792	-122.93092
ABKE_6	38.15801	-122.93392	ABKE_14	38.12756	-122.92866
ABKE_7	38.15983	-122.93540	ABKE_15	38.12707	-122.92668
ABKE_8	38.16072	-122.93631	ABKE_16	38.12660	-122.92460

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1998?	2011	Humple	Standardization	Needed coordinates/map
2011	Aug 2011	Cormier	Updated veg changes & re-gps'd pt 2	Changes had occurred, and coordinates off for 2 points
2011	2014	Dettling	Updated, veg changes and wording	Updates, standardizing

Map:



Arroyo Hondo (ARHO), Point Reyes National Seashore, Marin County, CA

Project: Palomarin

No. Points: 6

Getting there: Up arroyo road/trail from Palo.

Notes: GPS does not work very well. No Poison Oak since all points are on trail. Bearings are magnetic north. Flagged in red (1999). Narrative written by someone for whom which 100 paces=65 meters; 100 meters=161 paces. Not sure how helpful the paces are.

ARHO_14: 230 paces from gate, heading up arroyo on dirt road/trail. Opposite from bank of thimbleberry and buckeye tree. At *Ceanothus* tree on the right, beneath a Doug-fir; lots of *Equisetum* (horsetail) nearby. Also 50 m before “bridge” of two large bay laurels around right hand bend.

ARHO_15: 220 paces from ARHO_14. Look for Douglas-fir tree straight up the road at 306 degrees. Point is just past gentle right hand curve (through grove of bays and Doug-firs) in clearing just at the start of a line of buckeyes on the left.

ARHO_16: About 400m from ARHO_15. 10 m before rocky cut in hill on the right (with small rock slide). Canyon narrow. Open view of creek on the left. Road is in direction of 321 degrees.

ARHO_17: 475 paces from ARHO_16. Cross the creek twice. Point is 30 m past 2nd crossing just before small clearing. At this point the road travels in a direction of 353 degrees, almost due north. Lots of sword ferns on steep bank on east side of road.

ARHO_18: 200 paces from ARHO_17. On top of small rise in road. Orange flag is tied to maple tree. 20 m past metal pipe on left side of road that crosses small drainage. New GPS point taken in 2014. GPS does not work well at this point, but GPS was consistently off. Old coords -122.7410643973, 37.94299844188.

ARHO_19: Very topmost reach of the water road near entrance of foot trail (which is now mostly overgrown), old blue and red flags tied to bay tree on dirt bank on the right. New “parking area” as of 6/25/97 – a cleared space about 4meters in diameter.

Coordinates: DD, WGS84/NAD83

ARHO_14	37.93301	-122.73456
ARHO_15	37.93440	-122.73613
ARHO_16	37.93769	-122.73840
ARHO_17	37.94087	-122.73916
ARHO_18	37.94267	-122.74089
ARHO_19	37.94528	-122.74321

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
??	2005	Viola Toniolo	Undocumented	Undocumented
2005	2008	Humple	Changed into correct format with project, revision history, etc.	Hadn't been converted yet; still needs more by someone who has point counted it.
2008	2010	Humple	Added coordinates & map. DEJU current	Lacked them
2010	2014	Dettling	Clarifying directions, updated GPS ARHO_18	A few landmarks changed. One point had bad GPS point.

Map:

Bear Valley (BEVA), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 16

Getting there: From Bolinas take Hwy 1 north to Olema, turn left onto Bear Valley Rd. Go to Olema Marsh if starting at BEVA_45 or park near the admin offices at the Visitor Center if starting at BEVA_44.

Notes: GPS works well. Small amount of Poison Oak, avoidable. Rubber boots and rain pants for marshy areas and tall grass. BEVA_45 is out of order. Runs parallel to Upper Olema Creek transect; potential for coordination with person counting that transect.

BEVA_45: 100 meters up Olema Marsh Road.

BEVA_30: On trail at intersection of Limantour Road and Bear Valley Road, on willow at gravel drainage ditch. At “WHOA” sign.

BEVA_31: Walk along horse trail until GPS says you are ~15m from point (this is near a 35MPH sign on the opposite side of the road), then go into veg at a spot without Poison Oak. Point is at a group of coyotbrush at the edge of willows.

BEVA_32: Continue along horse trail, point is at overhanging vegetation, willows with furrowed bark. Point is on left side of trail.

BEVA_33: Continue along horse trail, go left under oaks where you can see a meadow on the other side and up the meadow. Point is at end of meadow by willows.

BEVA_34: Back to the trail then off trail as meadow opens up after the fenced off culvert. Point is set back in a nook and into willows ~15m, before first willow “gate.”

BEVA_35: Through first willow “gate,” point is halfway to second willow “gate,” behind big sawgrass patch and into willows.

(Next three points can also be accessed from the trail in a very wet year)

BEVA_36: Through second willow gate, behind sawgrass patch - there is a patch of coyote bush here, next to sawgrass. Point is on willow in ~3m from edge.

BEVA_37: Head SSW and through some alders to the trail. Follow trail to the opening to the next meadow, head through meadow to point. Point is at edge of cattail marsh ~3m into willows and thick sedge.

BEVA_38: Go back to trail. Follow it and take a left when it hits the gravel road. In ~50m, go left through opening in oaks into grassy field. Follow grassy area downhill to point at edge of alders within nettles and hemlock.

BEVA_39: Follow grassy area to maintenance yard. Go around yard on Eucalyptus grove side, then through the parking lot down the fence line to the creek. Point is on creek edge down from the corner of the fence.

BEVA_40: Back out to the edge of the riparian. Follow riparian edge or road to next point. Point is on west side of creek before the road crosses the creek. Bushwhack into point wherever it seems easiest. Point is under a small oak.

BEVA_41: Cross the creek where the road goes over it. Go towards barn. Point is near gravel road that crosses creek. Point is on east side of riparian on a willow.

BEVA_42: Follow riparian edge and hop fence to get onto Earthquake trail. Point is at end of corral, in alders, off paved trail. Go down towards creek under heavily leaning alder.

BEVA_43: Follow paved trail until it curves around, get off and follow riparian zone. Point is in riparian under large bay with trunk leaning over to touch ground to form arch.

BEVA_44: Follow riparian edge. You will hit a trail, follow it to the right for ~80m, then cut through field towards riparian and large oaks. Point is along grassy riparian edge, on willow across from solitary huge oak.

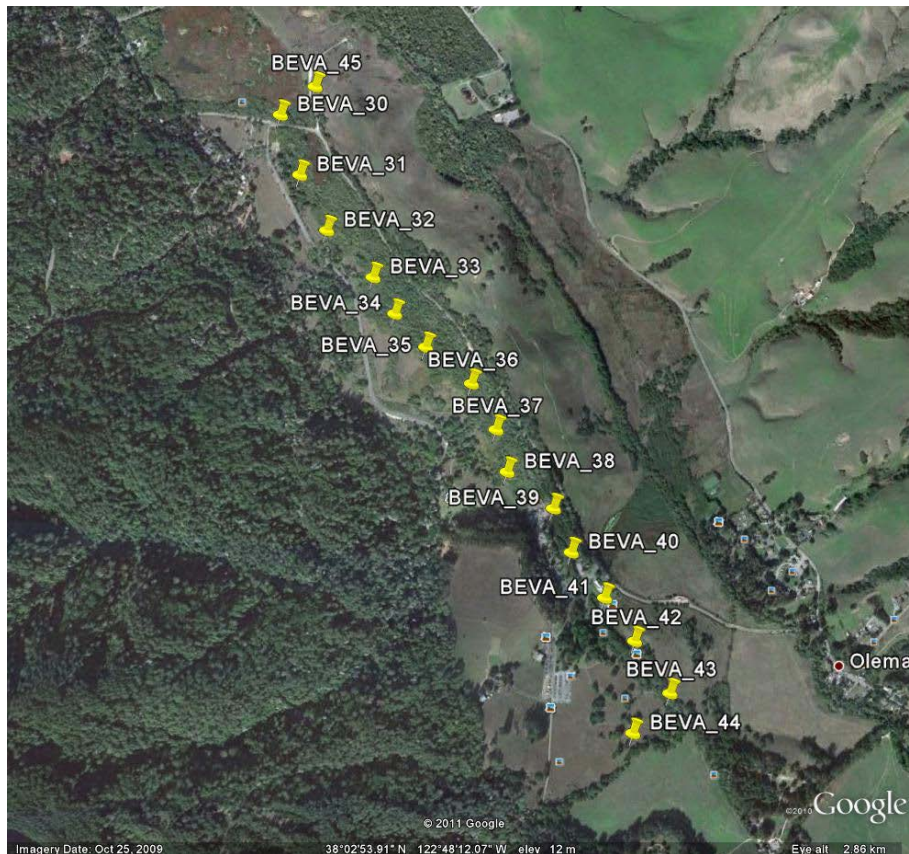
Coordinates: DD, WGS84/NAD83

BEVA_30	38.05809	-122.81108	BEVA_38	38.04657	-122.80176
BEVA_31	38.05618	-122.81049	BEVA_39	38.04539	-122.79986
BEVA_32	38.05436	-122.80917	BEVA_40	38.04399	-122.79914
BEVA_33	38.05343	-122.80768	BEVA_41	38.04252	-122.79778
BEVA_34	38.05167	-122.80637	BEVA_42	38.04114	-122.79656
BEVA_35	38.05059	-122.80510	BEVA_43	38.03947	-122.79512
BEVA_36	38.04941	-122.80322	BEVA_44	38.03821	-122.79665
BEVA_37	38.04793	-122.80221	BEVA_45	38.05901	-122.80965

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1998?	2011	Humple	Standardization	Added coordinates/map
2011	2011	Porzig	corrected descriptions; updated 33 - previous now inaccessible- CADC point updated	Changes had occurred
2011	2014	Dettling	Updated and clarified directions	Updates, standardizing

Map:



Coast Camp (COCA), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 7 (was 8, one dropped COCA_98 in 2014)

Getting there: From Bear Valley Rd take Limantour Spit Road toward Limantour Beach. After 6.4 mile the road makes a steep descent and there is a 4-way intersection before a steep ascent. Take a left at this intersection onto Limantour Spit Road (approximately 1.5 miles before the beach and opposite from Muddy Hollow).

If biking (2.7 miles), park in one of the narrow pullouts at the gate for Coast Trail and bike out the Coast Trail to Coast Camp. There are bike racks at the camp where the trail heads down to the beach; in 2011 I felt comfortable NOT locking my bike here, but these racks accommodate locking if you want.

If hiking (1.8 miles), continue driving past Coast Trail and park at the Clem Miller Environmental Center. Hike out Laguna then Firelane trails to Coast camp.

Notes: GPS is mostly good, but can be unreliable at some points. Unavoidable Poison Oak, come prepared. Difficult transect, lots of bushwhacking. Scout and make trails before first round. Points 93-97 are off trail along the eastern side of the main riparian corridor. Transect was originally laid out to travel in the main riparian corridor; thick veg now makes it easier to climb out of the riparian to the grassy hillsides to get between points. COCA_98 dropped in 2014 because of increased difficulty getting to it, due to post-fire habitat succession, and distance from riparian resulting in it being a scrub not riparian point (see old narratives for info about its location).

COCA_91: Easy to find, on trail to beach at the last bend before the trail dumps out onto the beach.

COCA_92: Also easy, on the second curve of Coast Trail up from the creek on the campground side of the creek.

COCA_93: From COCA_92, walk up trail toward campsites 1-7. Past the first camp site on the left, when the scrub thins enough to do so, leave the trail and climb the small hill between the camp sites and the creek. Drop down the creek side (steep) of this hill into thick Ceanothus and other shrubs, using your GPS to navigate to the point. No landmarks to make finding this point easy- just use GPS as best you can. Trail in marked with pink flag in 2014. Point flagged orange in 2014.

COCA_94: From COCA_93, climb back up the hill between camp and creek, then head inland along this hill/ridge. This ridge is split by a shallow low spot just inland from the last campsite. Cross this low spot then continue NNW on this ridge (don't go NE up the big ridge) to where it drops steeply back down into the riparian. Point is at the top of this drop-off near a dead Bishop Pine, now a stump. GPS good.

COCA_95: From COCA_94 head east into the small side canyon with burned trees on south side. Navigate through thick brush to point which is on a small flat area just south of the actual creek in this side drainage. Route flagged pink in 2014. No good landmarks; GPS good.

COCA_96: From COCA_95, first continue up side canyon and then head north across the side creek when you can. On the other side there is an old road bed, some of which has fallen into the side creek. Follow old road bed to the left up out of side canyon. Road bed is becoming overgrown, so it may be impassable next time. Shortly you will come to an open area where you can start heading towards COCA_96. Bushwhack through coyotebrush and Ceanothus to get to point (route flagged pink in 2014). Flagged orange in 2014.

COCA_97: Get back up out of the riparian the way you came in, and continue up the hill along old road bed (which is becoming overgrown) to open grassy area near top of hill. Then go north around the head of a side gully. Then west to point following GPS. Point is on the southern rim of the next side gully, amongst some tallish Ceanothus. GPS good.

Coordinates: DD, WGS84/NAD83

COCA_91	38.01716	-122.85604	COCA_95	38.02095	-122.85238
COCA_92	38.01855	-122.85484	COCA_96	38.02308	-122.85380
COCA_93	38.01989	-122.85461	COCA_97	38.02384	-122.85174
COCA_94	38.02131	-122.85428			

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1998?	2011	Humple	Created this year; original narrative not located	Added map/coordinates
2011	2011	Jennings	Added narrative info. Moved revision history below map. DEJU updated	None existed
2011	2014	Dettling	Updating narrative due access changes, dropped a point	Veg changes, dropped a point. standardizing

Map:



Coast Trail/Laguna (CTLA), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 13

Getting there: Once in Point Reyes NS, take Limantour Spit Road toward Limantour Beach (direction of Muddy Hollow). Approximately 1.5 miles before the beach and opposite from Muddy Hollow, take a Left onto side road, signed for hostel and Clem Miller Education Center. If starting at 17, continue past the hostel, turn right into parking area for Laguna Trailhead; if starting at 29, park on side of road by Coast Trailhead (near pt 19). ~35 min from Bolinas.

Notes: GPS works well. Bring rubber boots (some marshy spots) and dress for poison oak (bring tecnu, extra set of clothes), unavoidable at a few points. Points are on or off Coast Trail (not Laguna Trail). Points ~200m apart.

Points 17-19 are across from hostel off road between parking lot and Coast Trailhead, off road; **points 20-29** are on or off Coast Trail

CTLA_17: Access via pseudo-path down to creek before bridge that leaves parking lot (on left side of bridge when facing road with back to rest of parking lot), and walking creek up to get as close as you can to point. Point at alder growing horizontally across creek.

CTLA_18: Walk back way you came and walk road towards hostel/Coast Trail. Walk into riparian from road when get close to point, which is at edge of willows and marshy spot, next to grassy hummocks.

CTLA_19: Head back to road and continue in same direction, then follow footpath (becoming overgrown, but still visible) to left just before metal culvert down into riparian, crossing gulch on the way. Point is above creek, becoming overgrown with blackberry.

CTLA_20: Head back to road and continue to Coast Trail to the left. Point is along trail at start of scrub on left side of trail.

CTLA_21: Continue on trail. Point is off trail (Poison Oak), to access look for animal trail in even if overshoot point. Point is on riparian side of first (more northerly) of 2 lone alders in meadow.

CTLA_22: Continue on trail, point is off-trail (Poison Oak) at largest alder at edge of swamp and at far end of meadow. Can't see swamp from trail. Get down at more open forby spot ~20m before brown culvert marker and before nearest spot to point, via animal paths and bushwacking as best you can.

CTLA_23: Continue on trail, point is off-trail on willow in alder patch. Head to riparian on animal path ~10m before brown flexi-plastic culvert markers.

CTLA_24: Continue on trail, point is on trail at willow amidst alder patch, at unmarked brown culvert marker.

CTLA_25: Continue on trail, point is 25m off trail (Poison Oak) under alders at edge of riparian amidst small cattail marsh. Access 30m after brown culvert marker via animal path (bushwacking).

CTLA_26: Continue on trail, point along trail 4m before culvert and brown culvert marker, at end of twinberry patch, at coyote brush.

CTLA_27: Continue on trail and after it crosses the creek, point on right side of trail. Area is wet and marshy underneath alders. Point was moved (only ~10m) in 2014 due to trail improvements.

CTLA_28: Continue on trail, point off trail 15m to right on large alder. Follow GPS to point.

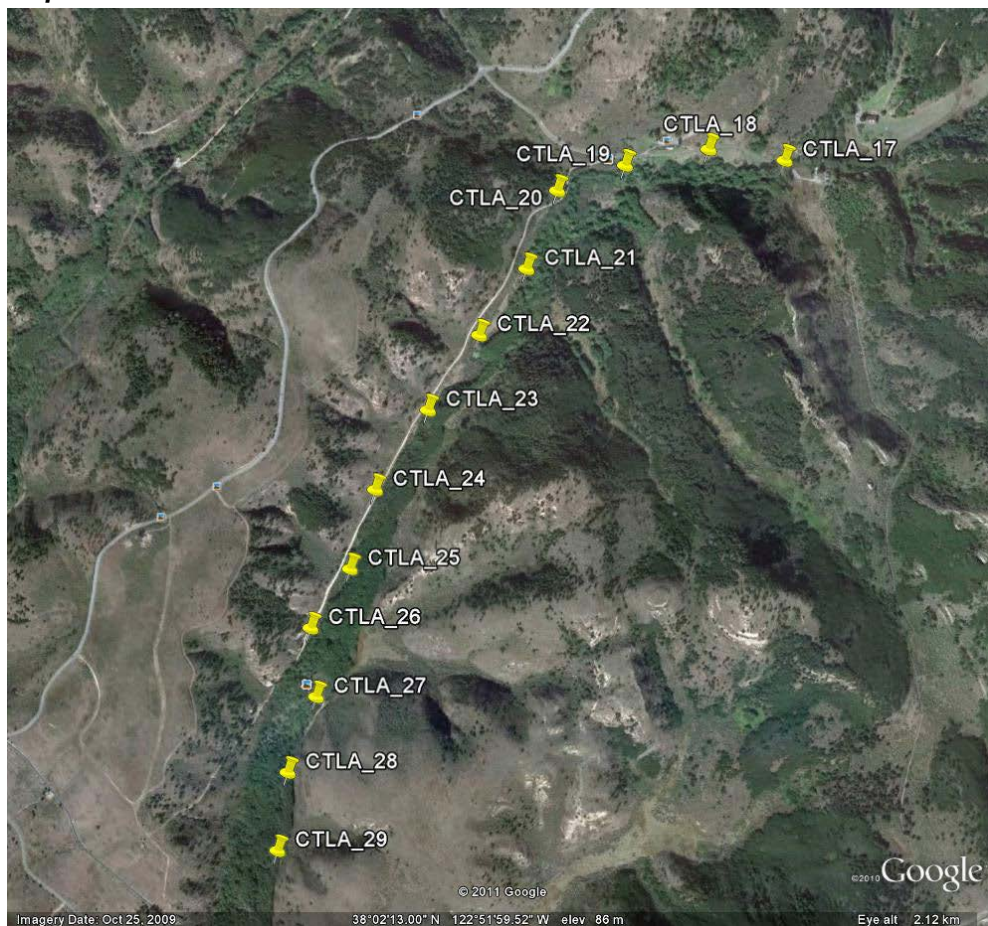
CTLA_29: Continue on trail, point off trail ~40m before trail starts to bend left and along last stretch of alders, go in 15m to right. Follow GPS to point.

Coordinates: DD, WGS84/NAD83

CTLA_17	38.04337	-122.85883	CTLA_24	38.03616	-122.87023
CTLA_18	38.04363	-122.86093	CTLA_25	38.03441	-122.87094
CTLA_19	38.04328	-122.86325	CTLA_26	38.03310	-122.87204
CTLA_20	38.04273	-122.86514	CTLA_27	38.03160	-122.87180
CTLA_21	38.04103	-122.86599	CTLA_28	38.02989	-122.87270
CTLA_22	38.03957	-122.86731	CTLA_29	38.02815	-122.87299
CTLA_23	38.03792	-122.86874			

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1997	??		Note: original documentation in 1997	
2002?	2011	Humple	Standardization, and fine-tuning of point descriptions. DEJU current	Added map/coordinates; changed details since had been so long
2011	2014	Dettling	Standardize, update, moved CTLA_27 due trail improvements	Update, trail changes, standardizing

Map:

Gerbode Valley (GERB), Golden Gate National Recreation Area, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 18

Getting there: Marin Headlands, 2nd Sausalito exit: right off exit, through underpass, left to headlands through tunnel with 5-minute light; take Bunker Road from the tunnel. Pts 20-25 are along or near Bunker Road and can be done by car; 8-19 done on foot with pts 8-13 on or off Miwok/Bobcat Trails, and pts 14-19 continue along riparian from pt 13 but off-trail entire time. ~20 min from Mill Valley (1 hour from Bolinas).

Notes: GPS works well. Bring compass and rubber boots (one marshy spot). Rain pants helpful because of long grass. A couple points with Poison Oak, hard to avoid. Very windy area so helpful to check weather for wind predictions before choosing the best day to count.

GERB_25: Along Bunker Road, 1st point you come to from 101. Park at pullout by side road by Equestrian Xing sign (near GERB_24). Tag on coyotebush (did not see in 2014) which is 2m after 3rd telephone poll when back on Bunker Road from side road. Do from side of road.

GERB_24: Continue west on Bunker Rd, park at side road/pullout by Equestrian Xing sign, on right. Point is off the side road in coyote bush at end of riparian clump which is on same side of road that point is. Construction in 2014 does not look complete, so will likely change.

GERB_23: From GERB_24, walk the side road to the point in willows. In 2014 road was covered in piles of dirt, so it is likely to change.

GERB_22: Back to car, continue west on Bunker Rd, park at next side road which is <50m from point. Point is 302 deg 18m from sickly Doug fir across side road.

GERB_21: Continue in car west on Bunker Rd, very shortly park at next side road across from stables. Follow side road to walking bridge. Point is at riparian edge to left of bridge on far side (away from bridge) of twinberry.

GERB_20: Either continue on side road on foot to parking lot or back to car and drive to parking lot. Point is on edge of riparian and parking lot. Veg might grow quickly making it hard to access point.

For 8-19: continue driving west past pt 20 on Bunker Rd, past Field Rd, cross bridge, park at trailhead on right, just after bridge.

GERB_8: ~3 minutes from trailhead, and 50m after marsh where riparian corridor begins. Point off trail to the right at riparian edge.

GERB_9: Walk along trail to just past willow clump that crosses trail. Then walk off-trail to right along far edge of willows to point, just past 90 degree bend in willows.

GERB_10: Continue on trail. ~75 m further from brown stake on left side of trail and bend in trail. 30m from isolated willow clump on left of trail with white stake. Point is off-trail to right across marsh to riparian edge. Rubber boots nice to have.

GERB_11: Continue on trail. At 1st trail junction go right on Bobcat Trail; at next junction veer left. Point on left just off-trail, 10m in from willow edge at spot where willows slightly leave road edge (may need to do point from edge, dense).

GERB_12: Continue on trail, then head left off-trail just before trail bends slightly left. Go through meadow to willow edge above creek.

GERB_13: Go back to trail and continue. Point is off-trail 85m to left near riparian edge after euc. grove (from earlier narrative: 294 deg at 125m from solo euc and cypress trees). May need to do point from edge of riparian since veg is becoming thick. **Note: after pt 13 do not return to trail but walk along riparian corridor to pts 14-19.**

GERB_14: Walk parallel to riparian for 200m, point is just after gully on north side, on willow edge.

GERB_15: Continue along riparian edge on overgrown but discernable road. Road is helpful for the rest of the points. Point is ~7m in but do from willow edge, across from patch of coyotebush 30m from edge.

GERB_16: Continue along overgrown road/riparian edge. Point is where willows come to a point (126deg 90m from isolated willow patch to east) on westerly side of trail.

GERB_17: Continue along overgrown road/coyotebrush edge. Stay on edge of coyotebrush until near point (~60m), then bushwhack in using deer trails. Point is at willow edge which is hard to get to. Watch for Poison Oak.

GERB_18: Go back out of coyotebrush the way you came in. Continue along overgrown road/coyotebrush edge which will go up a slight rise. Near the top of the rise the coyotebrush thins/shortens, go towards point here. Point is at willow edge. Coyotebrush at willow edge becoming thick, may not be able to get to in future.

GERB_19: Go back to overgrown road and follow it until it peters out, then go past an odd low growing, dark green, evergreen type shrub. Then follow deer trails/bushwhack towards point. Difficult to get to point, cut/flag path while scouting. Poison Oak unavoidable.

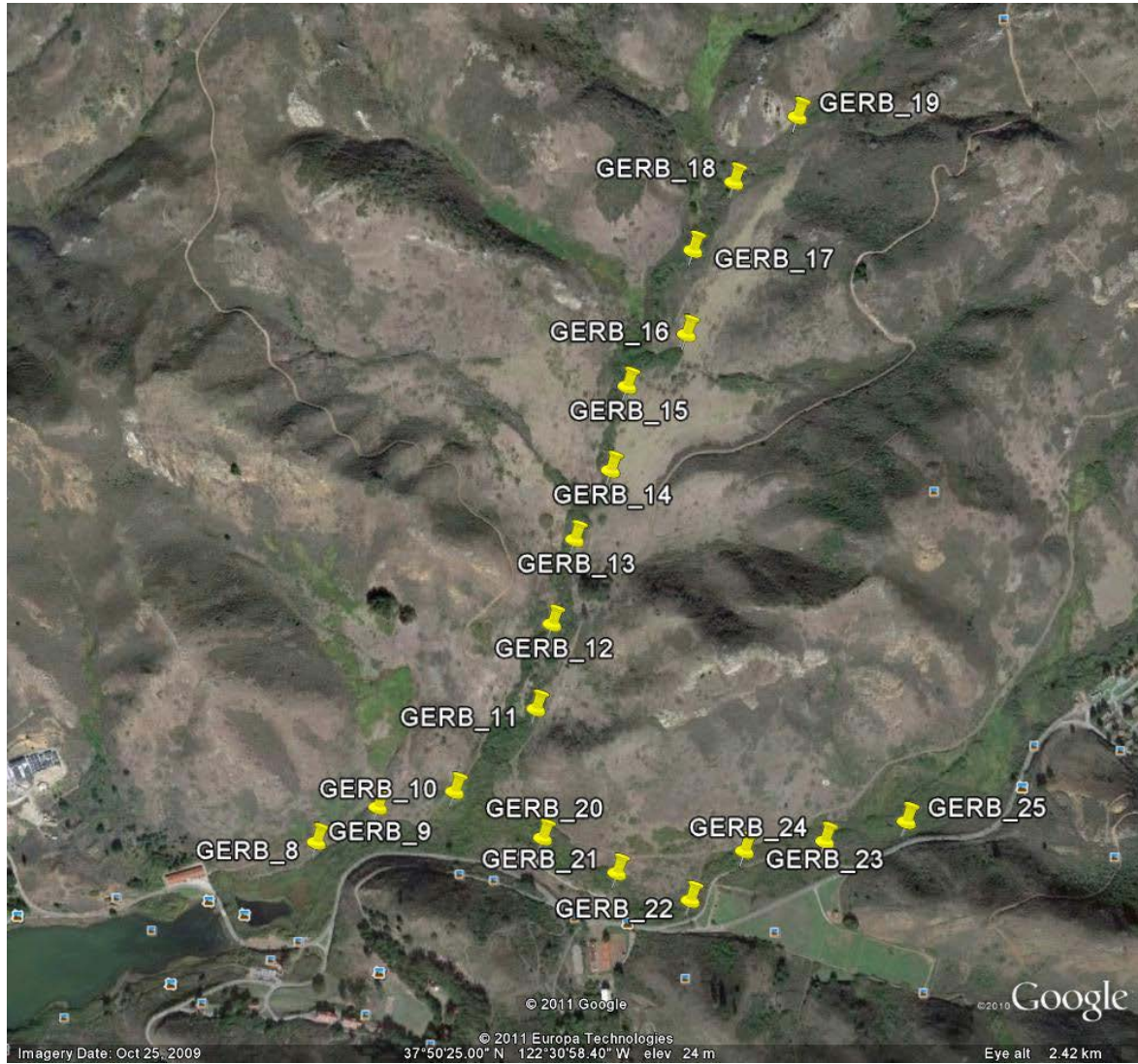
Coordinates: DD, WGS84/NAD83

GERB_8	37.83315	-122.52359	GERB_17	37.84601	-122.51318
GERB_9	37.83392	-122.52188	GERB_18	37.84745	-122.51208
GERB_10	37.83426	-122.51975	GERB_19	37.84880	-122.51039
GERB_11	37.83608	-122.51749	GERB_20	37.83327	-122.51730
GERB_12	37.83794	-122.51704	GERB_21	37.83251	-122.51525
GERB_13	37.83978	-122.51642	GERB_22	37.83194	-122.51323
GERB_14	37.84128	-122.51543	GERB_23	37.83302	-122.51175
GERB_15	37.84310	-122.51498	GERB_24	37.83325	-122.50955
GERB_16	37.84421	-122.51335	GERB_25	37.83369	-122.50733

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1998?	2011	Humple	Standardization & Word version created; modified point descriptions due to changes that had occurred. DEJU current	Needed map/coordinates; site changes had occurred and/or details different
2011	2014	Dettling	Updates to descriptions	Changes in veg, construction, standardizing

Map:



Lagunitas Creek (LACR), Golden Gate National Recreation Area, Marin County, CA

Project: Palomarin (PALO)

No. Points: 18 points

Getting there: To begin at LACR_65, park at Platform Bridge Rd/Sir Francis Drake Blvd. and walk up the bike path. To begin at LACR_62, park in the large turnout on Platform Bridge Rd. at the point. Points 48-62 are all located on the west (riparian) side of Platform Bridge Rd.

Notes: Points all along bike path or along or just off road. 200 meter interval. GPS works well. Points 63-65 on the Cross Marin Trail. Historically marked with pink/black or orange flagging and tree tags. Can easily bike transect if you're comfortable leaving bike by side of road at the handful of points that you have to go in towards the creek to do. Rain pants not necessary (helpful only at a couple points) and thick pants helpful (blackberry). Rubber boots not necessary and in fact sturdy hiking boots more helpful. Some Poison Oak. Lots of car noise.

LACR_65: The point is 400 meters down the bike path trail, the tag is on a willow across from a willow patch. Willows on both sides of trail – point at brown plastic stake/marker (CM37).

LACR_64: Backtrack on bike trail. Point is flagged pink (in 2014) on creek side of path across from an alder grove. Near 10ft tall exposed rock on uphill side of trail.

LACR_63: Located before the bike trail goes under the bridge if walking from LACR_64 to LACR_63. The tag is on an oak (*Quercus agrifolia*) on the creek side of the bike path, directly across from a cement retaining wall.

LACR_48: Go north on Platform Bridge Rd. The point is on a roadside willow located about 10 meters before beginning of the gravel turnout with the gate and road into the meadow (banding station). Orange flag low on willow in 2014.

LACR_49: Go through the gate, towards the riparian until you hit the gravel wash, and walk north on the gravel wash. The tag (not seen in 2014) is on a large willow in a small group of large willows, near Net # 5 (on road-side not creek-side of net, near to net end that's closer to net 6). Area changes annually! Flagged medium sized willow with orange in 2014.

LACR_50: Go back up to the road, then north to mile marker 2.02. Good entrance to riparian across from sign (some poison oak, watch for barbwire though didn't see any in 2014), then ~20m downstream. Tag is on a large alder that has fallen across the creek (but tag still visible). Point is at creek's edge. Also nearby is a large alder at creek's edge with many exposed roots.

LACR_51: Go back up to the road. The point is at a box elder (*Acer negundo*) which is down the bank of the creek visible from the road. Do point on road – point across from telephone pole with small metal #13 on it.

LACR_52: Go back to the road and continue northward. Cross the barbed wire fence directly across from telephone pole with small #16, and go straight towards the creek, the point is on large willow with split broken trunk. Need to crash through willows to get to point (only ~5m in now). This is before the open area on riparian side. Watch for poison oak! Flagged a willow with orange in 2014. Point moved slightly in 2014.

LACR_53: Continue along road to the solitary bay with shorter support telephone pole under it on creek side. Go towards the creek. The point is at the edge of the creek, directly in from the bay. Flagged a willow with orange in 2014.

LACR_54: Continue on the road, go to riparian creek edge at forby spot across from building with "750" painted in large letters on it. The tag (can no longer be seen) is on a large alder tree. Point @ 6 large/close-growing alders (flagged orange in 2014) with poison oak growing up them.

LACR_55: Continue on the road, past the bend to just past mile marker 1.35. The point is on a large roadside Oregon ash through a little blackberry. Flagged ash orange in 2014.

LACR_56: Walk on the road. Can find point by walking down steep bank at the large turnout. Watch for poison oak! Point on medium sized black willow with "S" bend in the trunk. Flagged willow orange in 2014.

LACR_57: Go back out to the road, continue for 200 m. Point is on a bay with an NPS boundary sign.

LACR_58: Continue along road for 200 m. Head in toward creek 25m past mile marker 1.04. Walk 25m in towards creek to the point. Flagged orange in 2014.

LACR_59: Point on road, 200 meters further (25m before mile marker with .88 and 1.416). Low Poison Oak. Elderberry at point.

LACR_60: Continue 200 meters further along road. Point is across from an oak tree. ~28m before mile marker 0.74. Flagged orange on low horizontal willow in 2014.

LACR_61: Continue 200 meters further along road. Point is 20 meters before the 30 mph right hand curve sign.

LACR_62: Continue 200 meters further. Point is at the end of the turnout on willow tree next to small buckeye with orange flag (2014).

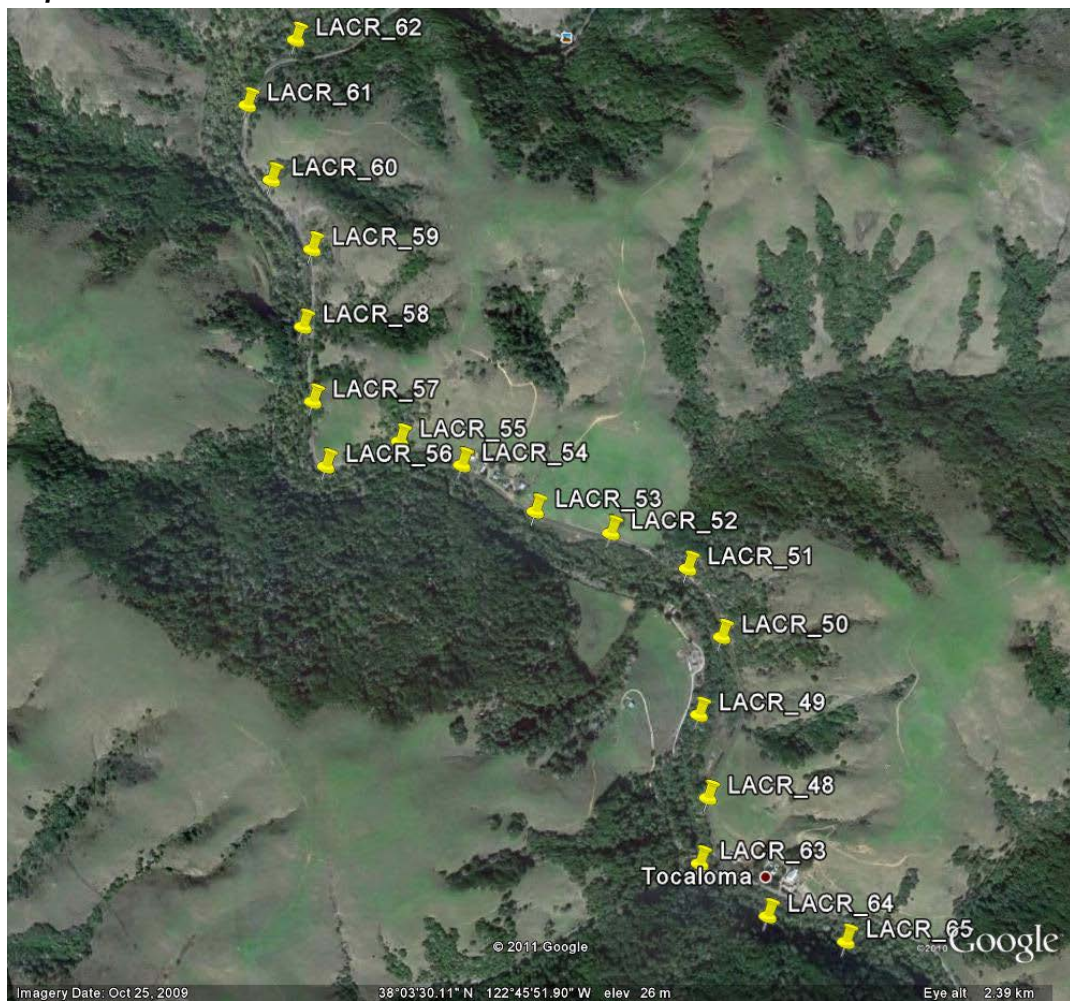
Coordinates: DD, WGS84/NAD83

LACR_48	38.05128	-122.75968	LACR_54	38.05893	-122.76687	LACR_60	38.06549	-122.77243
LACR_49	38.05304	-122.75984	LACR_55	38.05947	-122.76868	LACR_61	38.06723	-122.77316
LACR_50	38.05497	-122.75927	LACR_56	38.05890	-122.77085	LACR_62	38.06873	-122.77173
LACR_51	38.05654	-122.76026	LACR_57	38.06039	-122.77122	LACR_63	38.04978	-122.75992
LACR_52	38.05749	-122.76251	LACR_58	38.06212	-122.77152	LACR_64	38.04857	-122.75794
LACR_53	38.05786	-122.76472	LACR_59	38.06389	-122.77124	LACR_65	38.04800	-122.75568

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2008?	2010	Gardali & Humple	point & route descriptions updated (Gardali); format changed, and added map, revision history log, and coordinates (Humple	It was time!
2011	2010	Humple	Fine-tuned point descriptions and notes.	Helpful
	2011	Jennings	Confirmed DEJU has right coordinates	
2012	2013	Humple	Fine-tuned point descriptions and notes; changed inaccurate coordinates for pt 49	Helpful
2013	2014	Dettling	Changed descriptions because of veg changes, LACR_52 moved due to thick veg	Updates, standardizing

Map:



Lower Olema Creek (LOOL), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 11 (plus 4 historic ones not being currently surveyed)

Getting there: These points are located off Highway 1 between Dogtown and Five Brooks. They can be accessed from Point Blue's Hagmaier facility (next to the NPS Pacific Learning Center) or the Bat House. Hagmaier is in the middle of the transect.

Notes: Points are approximately 200 meters apart. GPS works well. Rubber boots are helpful on this route as there are a couple creek crossings and tall grass. Poison Oak at a couple points and along road. Historic points 57-60 are not being surveyed as part of the monitoring, are at Five Brooks, and must be driven to. See older versions of narratives for details if you need them.

LOOL_46: Across Hwy 1 from first euc tree to the northerly end of white "bat house", at willow edge on riparian side of a coyotebrush clump.

LOOL_47: Walk south along riparian corridor along Hwy 1 (careful!). Point in line with 4th telephone pole after bat house, at willow edge; right after "turn out" sign.

LOOL_48: Walk south along riparian corridor following GPS to point.

LOOL_49: Go to Hwy 1, then south along the road to the Olema Valley Trail (this takes you well south of 49). Follow the trail north to the point. You could try to bushwhack from 48 to 49, but it is advised against. The point is on left side of trail before the bridge across a shrubby patch from a fir.

LOOL_50: Walk 200 m, following the riparian and GPS. You will see a short mound with sparse coyotebrush, the point is near the base of this mound. Point is along willow edge next to a coyotebrush.

LOOL_51: Follow riparian edge. Point is between willow patch and riparian.

LOOL_52: Out to the trailhead by going a little bit north to find an easy way to the trail, then south along Hwy 1 and into the Hagmaier driveway. Point is ~20 m north of driveway along willows. There are no trees between the point on the willow and the highway.

LOOL_53: Go back out driveway to Hwy 1 and enter field to the south at the Pacific Coast Learning Center sign (easiest access). Follow riparian edge to a line of coffeeberry and cut towards creek following open grassy areas. Weave your way following GPS to point.

LOOL_54: Go back out to Hwy 1 the way you came in. Go south on Hwy 1 past the Eucalyptus grove and then into field towards riparian. Lots of hummocky grass. Follow riparian south of 54 to a marshy, treeless spot. Go under old barbwire and cross creek. Then go back north to point following GPS and deer trails. Point moved in 2014 due to thick veg.

LOOL_55: Staying on west side of riparian, go south. Follow grassy sparsely bushed area up a small rise. Go past lone Douglas-fir on top of rise, then turn into riparian along deer trails and following GPS. Point is under willows ~5m in from willow edge. Point moved in 2014 due to thick veg.

LOOL_56: From 55, go back to marsh treeless spot, cross creek. Then go up east side of riparian to a part of the creek without willows. Go under barbwire to willow edge on west side of creek. Point is at willow edge. Corresponds approximately to mile marker 19.87 (can park near here).

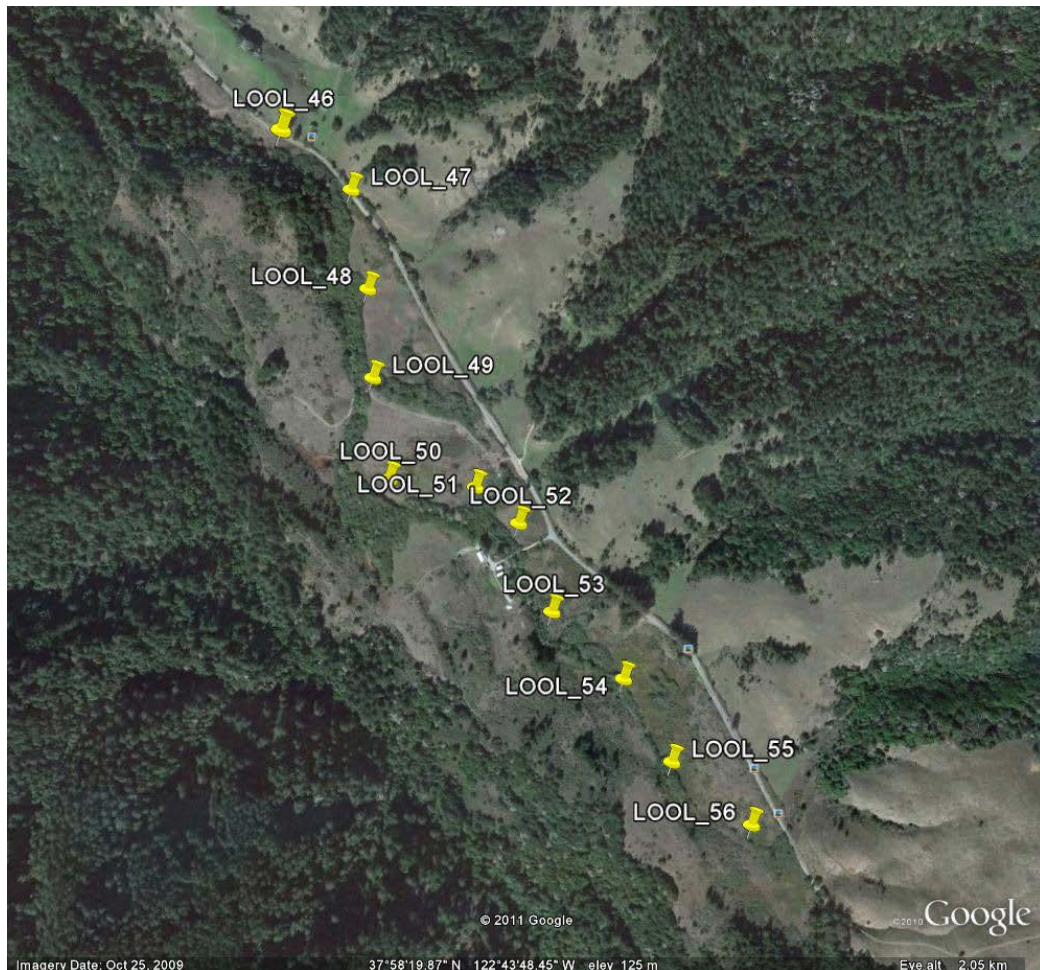
Coordinates: DD, WGS84/NAD83

LOOL_46	37.97881	-122.73628	LOOL_52	37.97127	-122.73043
LOOL_47	37.97770	-122.73454	LOOL_53	37.96958	-122.72963
LOOL_48	37.97578	-122.73412	LOOL_54	37.96818	-122.72787
LOOL_49	37.97406	-122.73400	LOOL_55	37.96655	-122.72662
LOOL_50	37.97212	-122.73360	LOOL_56	37.96552	-122.72480
LOOL_51	37.97196	-122.73149			

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2005	2011	Humple	Created standardized document. Also, 57-60 were not in most recent version.	Need maps / coordinates / and to reinstate pts 57-60
2011	2011	Porzig	Updated narrative. DEJU current	Trail re-routed
2011	2014	Dettling	Updated narrative. Moved LOOL_54 and LOOL_55 due to thick veg	Veg growth required new access, standardizing

Map:



M Ranch (MRAN), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 8

Getting there: Park at the big pullout at the “School Bus Stop 400 Feet” sign, just before you reach Drakes Bay Oyster Farm sign when heading out from Inverness towards the Lighthouse.

Notes: GPS works well. No Poison Oak. All the points are near the riparian vegetation along the creek, but are to be surveyed from the road due to the marshy nature of the vegetation. From MRAN_1 simply go back along the road headed toward Inverness to reach points 2-8. Do the point from the side of the road that the riparian habitat is on; when it crosses the road, you should do the same.

MRAN_1: Point is at the edge of the pullout (the furthest edge from the oyster farm sign; i.e., the first end you reach).

MRAN_2: This point is just after the power-line crosses the road, but before it crosses back (by about 50 m) to the riparian side.

MRAN_3: This point is about eight meters past the first pole, once the power line crosses across from the riparian. Across from a few willows on upland side of road.

MRAN_4: Directly across the road from the drainage with pine trees. Again in a spot where the power line begins crossing back to the riparian side. Near “Caution Flooded” sign that can fold up.

MRAN_5: Follow GPS to point. Across from steep bank with alders. Power lines running parallel and directly over the road.

MRAN_6: Across from ranch/pasture. This point is about 10 m. upstream of the culvert where it goes under the road.

MRAN_7: Go about 25m up the road to the Estero trail off of Sir Francis Drake. Point is on east side of Estero road at bridge over creek.

MRAN_8: Just before an alder on the creek side (a little hard to see over willows), and a pine across the street (~60m from point). This spot is primarily willow right at the roads edge.

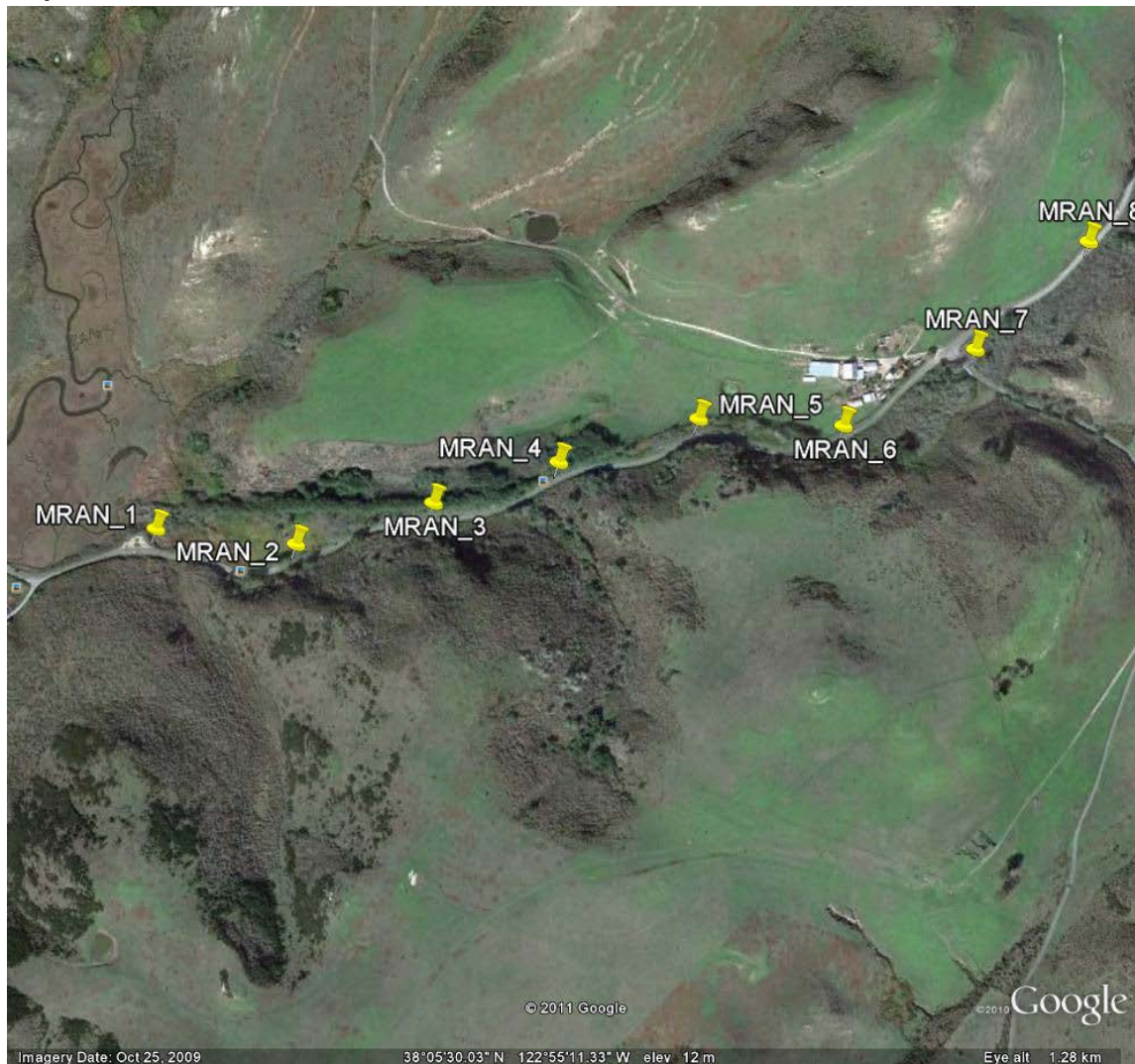
Coordinates: DD, WGS84/NAD83

MRAN_1	38.09158	-122.92609	MRAN_5	38.09285	-122.91808
MRAN_2	38.09141	-122.92402	MRAN_6	38.09277	-122.91596
MRAN_3	38.09188	-122.92199	MRAN_7	38.09364	-122.91404
MRAN_4	38.09235	-122.92014	MRAN_8	38.09488	-122.91239

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1998?	2011	Humple	Standardization	Needed map/coordinates
2011	2011	Jennings	DEJU current	
2011	2014	Dettling	A couple edits	Edit wording, standardizing

Map:



Muddy Hollow (MUHO), Point Reyes National Seashore, Marin County, CA

Project: Palomarin (PALO)

No. Points: 15 (originally 17 but points 76 and 77 have not been repeated since 1998, due to the thickness of the off-trail vegetation post-fire, which causes quite a disturbance plus takes a long time to navigate through. Please see older narratives if interested in the location of these points.

Getting there: On road to Limantour, turn right at sign for Muddy Hollow (left is Youth Hostel and Clem Miller Environmental Center), park in lot. Points are in both directions from Muddy Hollow parking lot. Points #70 - #61 are south, down Muddy Hollow Trail. Points #71 - #77 are north, up the Bayview Trail. Have to return to parking lot between each of the two sets of points.

Notes: Landmarks change rapidly here - i.e. snags fall down, heavy vegetation growth, etc. Pts ~200 m apart. Need rubber boots as point 65 typically flooded. Degrees relative to magnetic not true north. Note that trail rerouting (and lack of old trail maintenance) will influence points 65-66 & may make access difficult in future. Rain pants helpful for those pts. Not oaky. Flagged yellow or orange.

MUHO 70: Through gate at parking lot, point is about 50m down trail, left side of trail at a willow sapling (flagged) in front of 2-trunked medium-sized willow. Is 20m beyond the first telephone pole. Is 10m before willow immediately to right of trail that has a huge and odd-growing base (that in 2014 had woodrat nest in it).

MUHO 69: Point is ~15m just before 3rd pole, left side of trail on mid-sized alder (closest alder to trail); flagged by trunk.

MUHO 68: Halfway between the 4th and 5th telephone poles, ~40m before turn off to Estero Trail on right. Point is ~10m off trail on right side of trail at 2nd shrubby/willow patch, patch between separated alders (pt on side of willow patch closer to 4th telephone pole than 5th), ~50m past 4th pole.

MUHO 67: 20 meters before the pump shed on the right side of the road. Point is 10 meters off the road to the right at the edge of elderberry patch and by coyotebush under alders.

MUHO 66: Continue on trail, then go on OLD trail following powerline [i.e., do not take main trail when curves left]; b/c not maintained may take longer to access in future. Just before end of alders on right side of trail (last alder trunk flagged). About 20 m beyond the 2nd telephone pole after the pump shed (which is 1st pole after leave main trail). Point is about 5 m off the trail to the right.

MUHO 65: Very hard to access; takes a while to get to. Narrative changed from historical description due to major change in vegetation. Follow GPS. Continue on old trail/powerline and go off to right of "trail" in alder forest by 3rd telephone pole you pass after you've left the main trail (after next pole > pt 66). Note: understory vegetation, status of alder trees, retired trail location, and slough locations subject to seasonal changes due to extensive winter flooding in this area as well as extreme mud deposition. In 2013: point in sedge marsh in dying alder forest with new alder understory @ edge of patch of dead alders; flagging in live alder.

MUHO 64: Narrative AND location changed from historical description/old narrative, due to changes in trail system and flooding. Go back the way you came along trail and take new bridge/trail to right between points 66 + 67 (was to your left when you were walking to point 66), which will get you on the far side of the riparian. Do not attempt direct "shortcut" from 65. Decent walk between points 65 and 64. Point is on far side of huge *Ceanothus* that is in scrub and just to right of trail and point above the riparian and slightly downslope of trail (moved point again in 2013).

MUHO 63: Continue along main trail. Point is at break in willows where can see the marsh/sedge area to your right through trees (view mostly closed in now with alders). Willow just after this break is flagged. Just after you get out of alders that are directly along trail.

MUHO 62: Continue on main trail. Point is about 25 meters before lone fir tree on left, and on large alder to right across trail from bishop pine.

MUHO 61: Near end of willow patch at edge of marsh on right of trail, just before view of open marsh (what used to be pond; highly variable).

The following points once again start from the Muddy Hollow parking lot, but are along the Bayview Trail to the north (pt 74 is actually before the trail).

MUHO 71: Along Muddy Hollow Rd walking towards Bayview Trailhead, at 1st scrubby clearing on right, turn in as if walking to net 10, pt ~25 meters into clearing, along willows. Is about 15 meters from the 1st pole of net 10, about 10m before big alder, and adjacent to large coyote bush.

MUHO 72: From 71, walk back to fire road, then turn off road to your right up the signed Bayview Trail. Go through cypresses, point is on right side of trail at the 2nd drainage that crosses the trail and goes to the creek once you hit the red elderberry shrubs lining the trail, and before you pass the first large live alder directly on the left.

MUHO 73: After you've come down hill, point is near beginning of big scrub meadow to the right of the trail and at middle of the smaller first distinct and bowl-shaped part of the meadow; across from buckeye patch on left, point is set back about 10-15 meters off trail to right, at (flagged) coyotobush by low blackberry patch that's near lupine and in opening.

MUHO 74: At first bridge, left side of trail before crossing creek.

MUHO 75: About 20 meters before fork in trail, point is on large alder ~1m to right of trail, at top of incline where trail goes uphill about 3 feet.

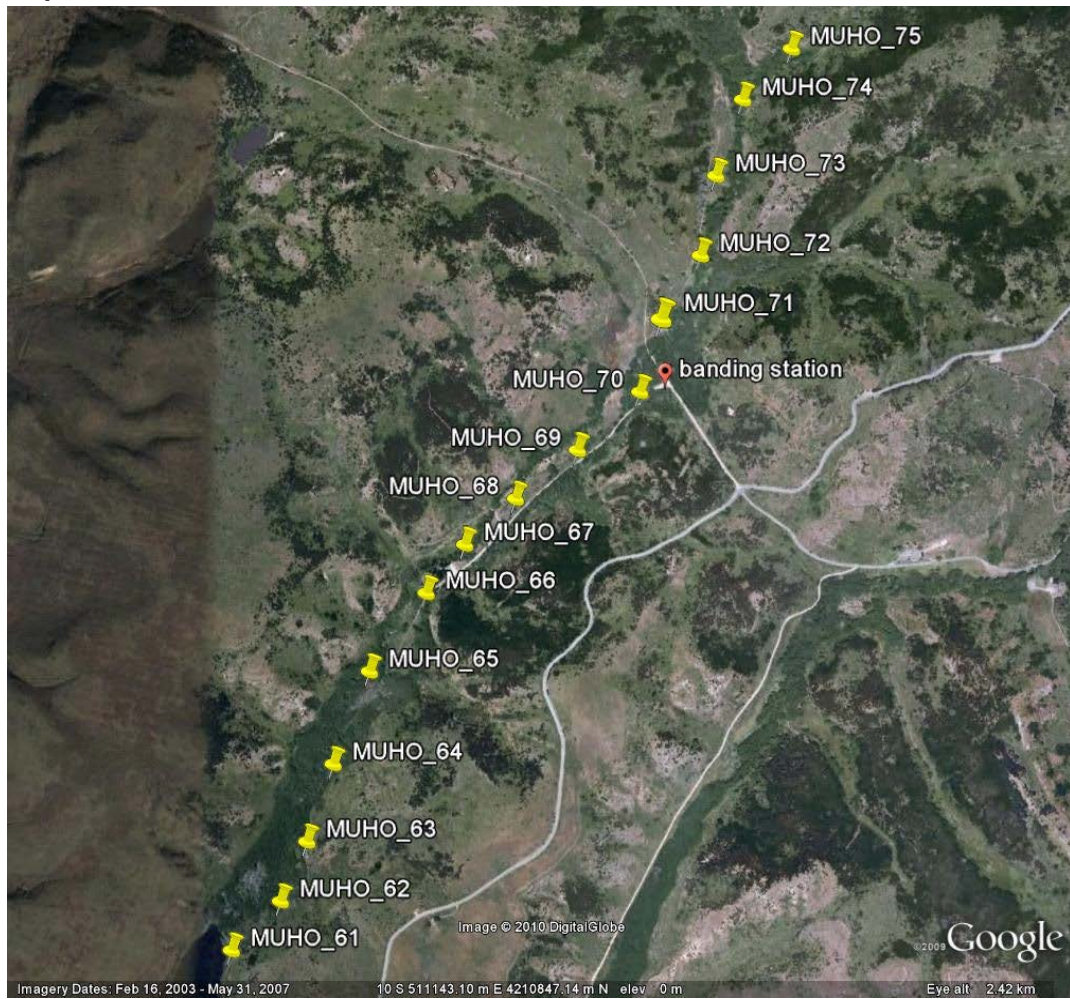
Coordinates: UTM, NAD83, Zone 10S

MUHO61	510319	4209648	MUHO69	511224	4210941
MUHO62	510448	4209775	MUHO70	511387	4211091
MUHO63	510517	4209930	MUHO71	511440	4211271
MUHO64	510600	4210120	MUHO72	511545	4211444
MUHO65	510680	4210369	MUHO73	511585	4211650
MUHO66	510817	4210571	MUHO74	511647	4211833
MUHO67	510929	4210697	MUHO75	511783	4211978
MUHO68	511062	4210815			

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2005	2006	Humple	Redid narrative style to match new one; updated details, especially veg, at a few pts.	Change in narrative protocol; veg changes
2006	2007	Humple	Made just a few changes	Improvements to point descriptions
2007	2008	Humple	Made one change to point 73	Improvements to point descriptions
2008	2010	Humple	Access details for points 61-66; added map	Trail rerouting and restoration
2010	2011	Humple	Added map and fine-tuned details as per current conditions	Map and site changes
2012	2012	Humple	Fine-tuned details as per current conditions	Site changes
2012	2013	Humple	Fine-tuned details as per current conditions; changed coordinates for point 66 & 74 (inaccurate), 64 (needed to slightly move it again due to trail changes and access)	Site changes, coordinate updates
2013	2014	Humple	Fine-tuned details as per current conditions	Site changes

Map:



Pine Gulch (PIGU), Marin County Open Space, Marin County, CA

Project: Palomarin (formerly Coastal NPS Monitoring, even though not on NPS land)

Getting there: Park at pullout on Olema-Bolinas Road next to Pine Gulch Forest, and take trail into forest. Same location as mist-netting station

PIGU_1: At end of net number one (end that is closer to net 2 than net 5).

PIGU_2: At end of net number 2, closer to trail that you walk into Pine Gulch on then to the end that is nearer to net 1.

PIGU_3: Follow path through willow swath by net 10; trail turns into opening by farm, and head left into willows about 20 feet to do point. Point between willows and single wild plum (?) tree. Path becoming difficult to see with nettle and blackberry growing up and some downed willows.

PIGU_4: At “far” end of net number 9 (end that is furthest from trail).

PIGU_5: At “far end of net number 6 (end that is furthest from trail).

Coordinates: DD, WGS84/NAD83

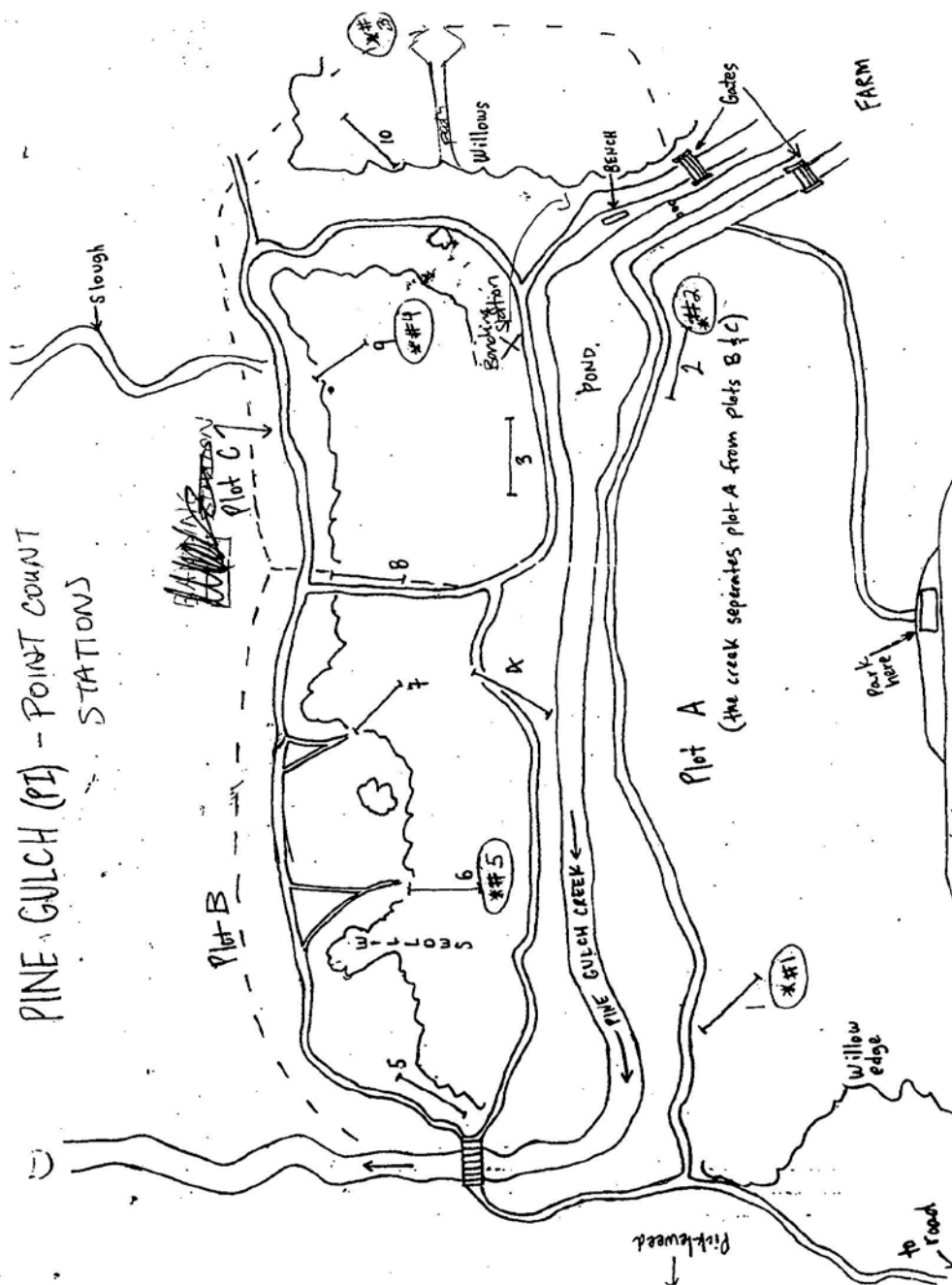
****NOTE: most people do not use coordinates to find points, but use map with net locations. Would suggest using GPS for PIGU_3.**

PIGU_1	37.92141	-122.69075
PIGU_2	37.92010	-122.69095
PIGU_3	37.91917	-122.69028
PIGU_4	37.92042	-122.68904
PIGU_5	37.92133	-122.68957

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2005?	2006	Humple	Complete re-do; added map to same document as narrative; added coordinates	Old and outdated
2006	2008	Humple	Changed project to Palomarin	All Palo-run transects now in project=Palomarin
2008	2010	Humple	Added coordinates & checked them in google earth that seem correct	
2010	2014	Dettling	Small edits to description	Veg changes, standardizing

Map:



Redwood Creek (RECR), Upper Section, Golden Gate National Recreation Area, Marin County, CA

Project: Palomarin (formerly Coastal NPS Monitoring)

No. Points: 14

Getting there: ~35 min. drive from Bolinas. From Hwy 1 head S from Bolinas; turn left onto Muir Woods Road at town of Muir Beach just past the dirt road to the RECR banding station. The lower end of transect (REC_45) is just up Muir Woods Rd from volleyball net area you will see on your left; park at Santos Meadow a little further up road. The upper end of it (RECR_47) is by NPS nursery area on left, park on right across from nursery at pullout on right before No Parking/Fire Lane sign.

Notes: GPS works well. Some mostly avoidable Poison Oak. Flags generally orange & red; intervals ~200m. Rubber boots required. Rain pants & compass helpful, as would be a nest stick to get through thick veg in some spots. Bearing are likely magnetic north. Veg makes access difficult at some points. Done as a separate transect from the “Lower Section”; numbers unique, but all are called RECR. Points unusually ordered!

RECR_47: Enter nursery area at “No Parking Fire Lane” sign on left side of road; go past and in to before greenhouses (turning right just after big buckeye that’s right after driveway). Cross the small field with coyote bush and hemlock. The point is under a large buckeye on left of opening that is beneath a huge alder. Flagging on alder.

RECR_46: Walk back out to road, then towards Hwy 1 along dirt road/path that runs along Muir Woods Rd (opposite side of road from parking spot). The point is 252 deg. from large Doug-fir before you reach a telephone pole across road (basically on other side of fir from path). In some years can be hard to access because of vegetation, and may need to do point on path-side of fir. Orange flagging on live, bent over willow.

RECR_36: Continue down road. Go in toward riparian from Muir Woods Rd at buckeye which is near C107 M1.99 k M3.202 sign across road. Go beneath buckeye. Watch for poison oak! Flagging on large elderberry ~20m in from road. Moved point toward road slightly due to thick veg (Old UTM: 538046, 4193412).

RECR_35: Continue down road; go down Redwood Creek Trail (to left of paved road when heading down to Hwy 1; across from fire road). Point is about 50m down trail from road, and 8m from the trail, to right. Can be hard to access. No flagging too close to trail. **Note: after this, whenever trail forks, never take trail to road; stay mostly along creek.**

RECR_37: Continue along trail. 22m after bridge; tag on a large buckeye with contorted trunk on right side of the trail before a large redwood tree. Could not find tag in 2014, no flagging.

RECR_38: Off right side of trail before trail intersection. Hard to get into veg. Point moved in 2014 due to very thick veg. No flagging.

RECR_39: Continue on trail; do not fork left (if coming from RECR_38), stay on Redwood Creek Trail. When near point cut across grassy/coyotebrush field to creek. Point is on the creek bank in the alder grove to right of trail and before solid willow patch. Flagging on alder branch at creek edge.

RECR_40: Continue on trail. Fork left (staying on Redwood Creek Trail). Point is down creek bank at level ground in an alder patch before the creek. On trail, turn in before coyote brush and blackberry patch that comes out to trail on the right. Flagging on medium sized alder.

RECR_41: Continue on trail. 9m past southerly wall of abandoned building (on far side if coming from RECR_40); at willow edge. Watch for poison oak! Flagging on willow with crooked trunk.

RECR_42: Continue on trail. Cross bridge and pass short spur trail to road. Follow GPS to point on left side of trail at willow edge. Flagging (~1m high) on willow. Do from trail. Point updated in 2014 for better accuracy.

RECR_66: Continue on trail. Go down bank on left of trail to level alder patch which is directly across from willow patch adjacent to Muir Woods Rd (road to right of trail). Go into herbaceous (nettle and horsetail) area, point (flagged) on left-most of 3 huge alders with old fence post ~2m away from it.

RECR_43: Continue on trail. Go left towards the creek at willows ~15 m before junction of the trail that goes toward the road. Flag on willow trunk cut at ~2m high in clump of many willow trunks.

RECR_44: Continue, cross bridge (taking left fork of trail immediately after bridge). At Redwood Creek/Frank Valley sign, bear to the right; continue walking parallel to riparian corridor. The point is approx. 15m past the sign and 7m in from the trail, on right (may have to do from edge). Bushwhacked to point in 2014. Flag on elderberry. If doing transect in reverse order, from RECR_45, go back to horse trail and go up opposite side of creek from road.

RECR_45: From RECR_44, continue down trail to creek, turn left into creek, then walk toward bridge. The point is on the 3rd alder before auto bridge on left. To get out, climb up beneath this bridge to the road, or retrace your steps and find horse trail that takes you out to road across from Santos Meadow (it's near where you first hit the creek when coming from RECR_44 to RECR_45). If starting at this point, cross road from Santos Meadow and walk in the Frank Valley Horse Camp Spur trail and down to creek, then walking in creek towards bridge (to the right) until you get to point.

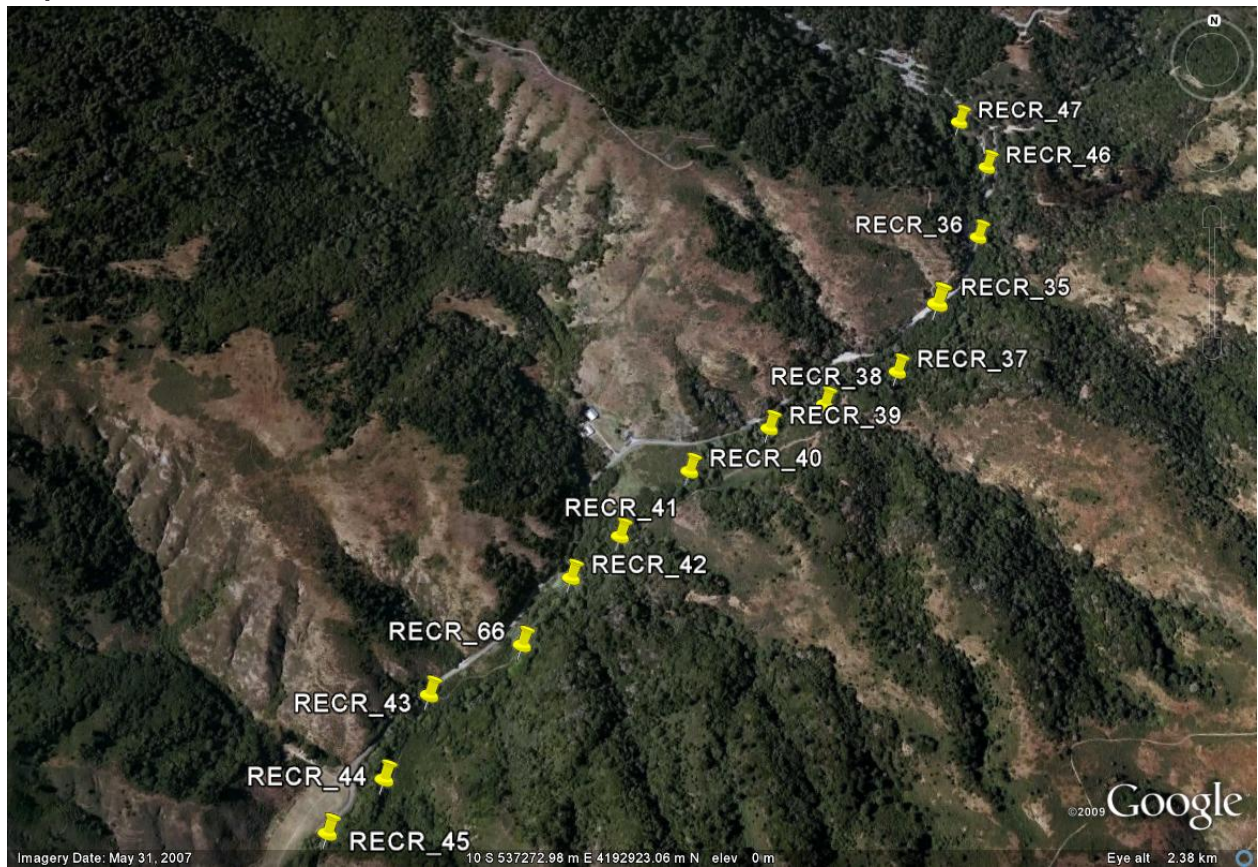
Coordinates: DD, WGS84/NAD83

RECR35	37.88583218	-122.5684441	RECR42	37.87993	-122.57765
RECR36	37.887651	-122.567264	RECR43	37.87744223	-122.5808198
RECR37	37.88437842	-122.5694741	RECR44	37.87585972	-122.5817049
RECR38	37.88361	-122.57108	RECR45	37.87484585	-122.5829119
RECR39	37.88304268	-122.5727571	RECR46	37.88904546	-122.5670493
RECR40	37.88207171	-122.5747527	RECR47	37.89007543	-122.5677789
RECR41	37.8806877	-122.576421	RECR66	37.87847756	-122.5786633

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2005	2006	Humple	Redid narrative style to match new one; updated information at a few points.	Change in narrative protocol; some changes observed
2006	2007	Humple	Updated information on a few points	To make it easier to find points, especially with vegetation changes.
2007	2008	Humple	Changed project to Palomarin	Changed long-term Palo run sites to project=Palomarin
2008	2010	Humple	Updated information on a few points; added map	To make it easier to find points, especially with vegetation changes.
2010	2011	Jennings	Moved point 36. DEJU updated	Couldn't get to original point anymore
2011	2012	Humple	Misc. site description changes	Increasing precision or addressing changes
2012	2014	Dettling	Moved RECR_38 (veg), reGPS RECR_42 (bad point), updates	Point coords, updates. standardizing

Map:



Redwood Creek (RECR), Lower Section, Golden Gate National Recreation Area, Marin County, CA

Project: Palomarin (formerly Coastal NPS Monitoring)

No. Points: 10

Getting there: ~35 min drive from Bolinas. Points 32-34 and 68-69 are around Muir Beach, the rest follow creek upstream. Take Hwy 1 S from Bolinas to town of Muir Beach. For lower points, if being dropped off turn right at Muir Beach Rd. just after the Pelican Inn, and get dropped off at Muir Beach parking lot. There is no public parking on Muir Beach Road in early morning, so if you are driving and starting at the lower end or the middle, instead park in the middle; turn left off (if coming from N) Hwy 1 onto the banding station dirt road, and park on pullout on right (putting you in middle of transect). To start at the upstream end, turn left off Hwy 1 up Muir Woods Road and park on left at pullout above the volleyball net area along creek (if you hit Santos Meadow you've gone too far). **Rain pants are a good idea!**

Notes: GPS works well. Rubber boots needed. No Poison Oak. Flagging if present is usually orange or yellow; intervals ~200 m. This is done as a separate transect from the RECR "Upper Section", and numbers are unique. Pts 70-73 are part of restoration, so landmarks, especially vegetation, are changing. Consider bringing machete (perhaps before PC season) to get to point 68, or at least nest stick, and more flagging for trail.

RECR_32: When going to parking lot, go to the left before bridge over creek on what used to be fire road. Not flagged. Fire road mostly removed for restoration. Newly restored in 2014. Point is on bank of creek ~10m before overhead power line crosses creek.

RECR_33: Walk along bank and streambed to RECR_33 (using GPS); on opposite side of creek as RECR_32. Point is between clump of 7 alder and clump of 4 alder. Might be difficult to access as restoration matures. Not flagged.

RECR_34: From RECR_33, cross creek and walk downstream to bridge. Cross bridge to parking lot and then down towards point through restoration (2014). Go into alder grove, point is on the NW edge of the alder grove, at the pond/channel edge. Area changed drastically as parking lot was moved prior to 2014 field season. Flagged on alder edge.

RECR_68: Bottom line: this point is hard to get to (consider nest stick, or macheting before breeding season). In 2014 (dry year) was able to access from Pelican Inn parking lot near shed with white door (~40m from point) and bushwhacking. In wet years, this may not be an option, try following older directions: Point is ~100m in from Muir Beach Rd along "trail" (it's barely a trail and there are many other barely-trails around). Go in just past the Pelican Inn parking lot (if you were heading towards Muir Beach from Hwy 1), between the two no parking signs, following "trail" in on the Pelican Inn side of the road. Following yellow flagging (if found), basically you have to maneuver your way in the direction of your point, which is straight in from the entry point off the road, along whatever trail-like vegetation breaks you can find. Use GPS. If doing the transect from upstream to downstream, still approach RECR_68 this way as trying shortcuts will just cause frustration. Was able to get 5-10m from point in 2014. Flagged orange on small alder right next to medium sized alder in 2014.

RECR_69: From RECR_68, go back to Muir Beach Rd, Pelican Inn and Hwy 1, walk N on Hwy 1. Take 1st dirt road to left (NOT the dirt driveway into a van parking area); residential addresses posted at the beginning of the dirt road (e.g., 1821, 1795). Point is at 1st tall elderberry on left before Quail in Area sign (which is on right). Flagged orange low on an elderberry in 2014.

RECR_70: Follow the dirt road to the Hwy, go left (north) along the Hwy to the private road on right (road to banding station). Continue ~130m up road and head towards creek. Point flagged on an alder, about 5 m from creek side of net #9, in direction of Hwy 1, on 3rd alder over.

RECR_71: Go back out to the road. Follow the road until the creek turns. Turn right into the grass and continue paralleling the creek. Point is ~15m before net #1, but can be accessed by using net lane to get into riparian. Point near old alder which is broken off ~4m up trunk in young alders. Flagged on small willow.

RECR_72: Continue to parallel creek for another 200m through grass and other veg. Point near a very narrow area of dead alders. Now lots of young alders, widening the riparian (getting hard to access). Point is at thimbleberry wall at edge of creek. Flag on small alder.

RECR 73: Continue to parallel creek. ~50 m past 1st telephone pole, walk down to creek to right, and cross creek to reach point. Point is on the far side of the creek, flagging on dead, broken alder limb on big alder 10m upstream from 6-trunked alder that's also on far side of creek.

RECR 74: >200m from last. From 73, go back across creek and continue upstream. Walk almost all the way to the cypresses at end of valley, then cross the human area with wooden structures to your right. Flagging is hanging from low willow limb adjacent to field (possibly mowed), ~15m from elbow (L-shape) of willow patch, and at willow edge. If you are accessing point #74 first in your transect order, via the volleyball/junkyard parking area, you will have to cross a walking bridge to get to this point.

Coordinates: DD, WGS84/NAD83

RECR32	37.8632587	-122.5748707	RECR70	37.86702989	-122.5795055
RECR33	37.86159037	-122.5743718	RECR71	37.8687983	-122.5804953
RECR34	37.86046	-122.57568	RECR72	37.86992668	-122.581941
RECR68	37.86474465	-122.5757826	RECR73	37.87166474	-122.5827188
RECR69	37.86634861	-122.5768823	RECR74	37.87376224	-122.5835074

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2005	2006	Humple	Redid narrative style to match new one.	Change in narrative protocol
2006	2007	Humple	Added details to point descriptions; changed parking instructions	Details will help find people points; parking instructions updated since can't park at lower end of transect anymore
2007	2008	Humple	Added details and modifications to point descriptions; changed project to Palomarin	Details will help find people points; changed some (e.g., point 73) for which landmarks had changed; changed long-term Palo run sites to project=Palomarin
2008	2010	Humple	Added details and modifications to point descriptions; changed coordinates for point 34; added map	Changed some for which landmarks had changed. Also, point 34 had to move 15m due to flooding and channelization from restoration at Big Lagoon; changed coordinates.
2010	2011	Humple	Added map and fine-tuned some details	Needed map and observed some changes at points plus restoration
2011	2012	Humple	Fine-tuned some details	Observed some changes at points, plus restoration at Big Pond.
2012	2013	Humple	Fine-tuned some details; modified GPS coordinates for point 71	Observed some changes at points, plus restoration at Big Pond.
2013	2014	Dettling	New parking lot, Fine-tuning	Updating and standardizing

Map:



Tennessee Valley (TEVA), Golden Gate National Recreation Area, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 13 (plus 1 historic one not continuing to survey)

Getting there: Take Hwy 1 to Mill Valley. After Tam Junction and a little before GG Bridge entrance, turn south (right if coming from Bolinas/Palo) on Tennessee Valley Road. If starting with northern points, park ~100m from point 27 at giant Tennessee Valley sign; walk back up road ~90m to 2nd Oakwood Valley Trail (not labeled right there). If starting with southern points, park where the road ends at the big parking area near Miwok Livery Stables.

Notes: pt 67 established and surveyed in 1998 only, dropped from transect afterwards and not included here. Points 1-7 are separated from points 26-31; it's not really slightly handy to bike between the sections as you have to ditch your bike in the bushes for much of it (parts of both sections are on no-bike-allowed trails). Description below is in the order of doing southern points first, but starting in middle of transect; for other visit, best order of points requiring least backtracking is 27-26-31-30-29-28, then 7 through 1. Some poison oak. Rubber boots may not be needed in dry years (waterproof hiking boots helpful due to some wet grass) but a couple points require creek crossings so wear rubber boots in wet years. Point 1 to 28 takes ~ 45 min.

Points 7-1: From main parking lot by Miwok Livery Stables, head down Tennessee Valley Trail. Signpost for that trail was broken in 2014, but it is trail that goes straight ahead and downhill from where you drive into parking area from road. To get to 7, stay on main trail until intersection where trail crosses creek; stay right following sign to Tennessee Beach.

TEVA 7: ~20 min from parking. On left of trail, across from side drainage/wash on right.

TEVA 6: Continue; take left fork on Lower TEVA Trail; walk down to riparian before shrubs start on left of trail, survey at riparian edge.

TEVA 5: By trunk of tagged Monterey Pine just to left of trail.

TEVA 4: continue on trail; after it crosses creek on bridge, take immediate left on spur trail (Wolf Ridge Trail). Point is on east side of the creek, just off trail and ~2m behind trail blockade (possibly on an old trail?), just past next footbridge.

TEVA 3: Trail rerouting may have made access more difficult; go back to Lower TEVA and continue same direction (SW) Cut in off-trail and cross creek at closest spot to point (~50m away); in all but driest years need rubber boots. Point across from coyote bush clump on east side of creek and near outermost bend in willows.

TEVA 2: Cross back over to W. side of creek and continue SW. on trail. Point on E. side of Lower Tennessee Valley Trail and W. side of creek, at W. edge of cattails just off trail (likely trail rerouting makes this not match earlier narrative descriptions).

TEVA 1: Continue on trail, then main trail; > 400m from pt 2. Pass pond. Point on east side of trail, just past where willows end. After you're done: consider continuing on for a beach picnic! Or if haven't done northern points: it's ~45min to pt 28.

Points 26-31: Note the non-numerical order of these points. If started with pts 7-1: return to parking area via main or lower trail.

TEVA 28: From the main parking lot, take the Miwok Trail (starts where the paved road becomes gravel) for a few dozen meters; go left (upstream) off the trail before the riparian reaches the trail, point at edge of riparian corridor. Watch for p.o.

TEVA 29: Back to Miwok Trail and continue. Turn right at trail fork onto Rhubarb Trail (parallels road). Point along trail at second-to-last live oak.

TEVA 30: Continue on trail; cross gully on bridge and continue; the pt is between that gully and next euc groves, where to left of trail is very large partially-dead coyotebush covered with poison oak.

TEVA 31: Continue on trail; the point (and tag if found) is on a euc tree which is part of a big euc grove; tree is on the trail side of the creek (may be dry), off trail ~ 12m, and before bridge. Watch for p.o.!

TEVA 27: Next point ~600m away. Continue on trail (north) to Tennessee Valley Rd, cross road, and continue N. on road (left). There are two unlabeled Oakwood Valley Trails to your right ~50+m apart. Take the second Oakwood Valley Trail (~90m more north and across from private bridge with red wood). After passing red-leaved trees visible off to right, pass prune/pine tree with

fence posts at base immediately to right; go off trail to right on grown-over old footpath (note, there are a few of these) at more open area (pine needle understory). Have to bushwack a bit; beware of P.O. Point at incense cedar beneath big pines.

TEVA 26: Continue up Oakwood Valley Trail. Point is off-trail to right in middle of euc grove between oak tree and toyon.

Coordinates: UTM, WGS84/NAD83

TEVA_1	37.84326	-122.55145	TEVA_26	37.86815	-122.52536
TEVA_2	37.84643	-122.54851	TEVA_27	37.86915	-122.52691
TEVA_3	37.84683	-122.54662	TEVA_28	37.86157	-122.53598
TEVA_4	37.84741	-122.54453	TEVA_29	37.86316	-122.53442
TEVA_5	37.84859	-122.54275	TEVA_30	37.86473	-122.53348
TEVA_6	37.84923	-122.54039	TEVA_31	37.86612	-122.53233
TEVA_7	37.85037	-122.53905			

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
1998?	2011	Humple	Standardization & Word version created	Needed map/coordinates
2011	2011	Porzig	Updated narrative.	outdated
2011	2014	Humple	Updated narrative, updated GPS coordinates for a few points (5-7, 27)	Outdated site descriptions; GPS coordinates off for 5-7, 27 (for site 6 original coords inaccessible, unknown if coordinates were just off)

Map:



Upper Olema Creek (UPOL), Point Reyes National Seashore, Marin County, CA

Project: Coastal NPS Monitoring (CNPSM)

No. Points: 13

Getting there: To get to UPOL_78 from Olema, go 1.9 miles north on Hwy 1, turn L on Sir Francis Drake, and first point is 0.3 miles after the intersection (park at large turnout / parking area for Olema Trail on L side of road). To get to UPOL_90 from Olema, turn left towards PRNS HQ, and park at large pullout on right ~0.4 m from Hwy 1.

Notes: GPS works well. Some poison oak (rain pants helpful). Need rubber boots, marsh and tall grass. Runs parallel to Bear Valley (BEVA) transect; potential for coordination with person counting that transect. Points are 200-250m apart. Transect is not along a trail, and some points require serious bushwacking, so start early and prepare for a long survey. Helps to cut/flag trails while scouting. Potentially do points 89 + 90, then drive further up road to park on other side of marsh to access 88, and do 88-78 on foot from there.

UPOL_90: Across pasture from large pullout on Bear Valley Road between Olema and Bear Valley Headquarters. Can get through blackberry at road edge from deer trail just south of pullout (other side of willow). Do point from a few meters into the willow edge.

UPOL_89: Go downstream along edge of willows and cattails. Point is into willows a few meters, away from cattail marsh.

UPOL_88: Crossing marsh from UPOL_89 is strongly inadvisable. Quickest to return to vehicle from points 89/90, drive or walk further up road past PRNS HQ, and park on right at pullout with yellow bicycle/share the road sign, across from white & green park buildings. Cross gate and walk on far side of marsh edge back toward riparian. Point at lone piece of wooden fence at riparian edge well before large live oak.

UPOL_87: Continue along riparian edge, first head up slope towards fence and around oaks, then head through riparian to point when ~100m from point. Point in willow patch near edge of grassy meadow on other side of riparian (meadow to East of point, and another riparian swath to East of meadow). Point next to old creek bed. In high water years, creek may be difficult to cross. Unsure of best way to get from 88 to 87, scouting is required.

UPOL_86: Go to creek, cross and follow west side until it's easy to exit riparian into field. Continue downstream. Point is on riparian edge where alder, live oak, and willow come together.

UPOL_85: Walk along west edge of riparian and continue north along riparian/meadow edge. Point beneath live oak.

UPOL_84: Continue same direction. Point on metal fencepost at north/far end of meadow. Becoming thick with blackberry and nettle.

UPOL_83: Difficult access. Continue downstream along creek (even in creek when possible), and as soon as possible get above riparian (west side) and continue along edge of meadow. On giant Live Oak that is along fence. Path flagged (pink) in 2014.

UPOL_82: Continue downstream, then uphill slightly and around a fence. Go up small hill and stay on the grassland side of the clump of trees. Continue along the edge of the trees to the point. Point on willow edge with some Poison Oak around.

UPOL_81: Continue on riparian edge, go up around fence (or cross 2 fences) and continue along edge to point. Point along willows and fence on side of grassy hill, 40 m upstream from distant fence (that's perpendicular to riparian edge and fence you've been following).

UPOL_80: Continue NW to fence line, then left along the fence to the gate. Cross swallow box meadow towards point. Bushwhack through willows to large alder. Point is at alder.

UPOL_79: Continue along riparian edge of bird box meadow. At 2nd telephone pole after (downstream of) house, turn into riparian at opening. Bushwhack into willows ~5m. Point on willow with several trunks on ground.

UPOL_78: Go back out to riparian edge by second telephone pole and head north along edge, passing ponds. At far (downstream/N) end of 2nd pond, turn to R (NE) at corner where willows along stream meet willows along road. Do from willow edge. Note, to get out to road from here (or to get to the point from the road) come out via old 2-track/trail just west of where telephone wire you've followed intersects with road and telephone wire along road. To return to your car at other end of transect, take Olema Trail South (this is the trail/2-track) and then turn left when you hit road and walk along road. Point moved in 2014 due to thick veg.

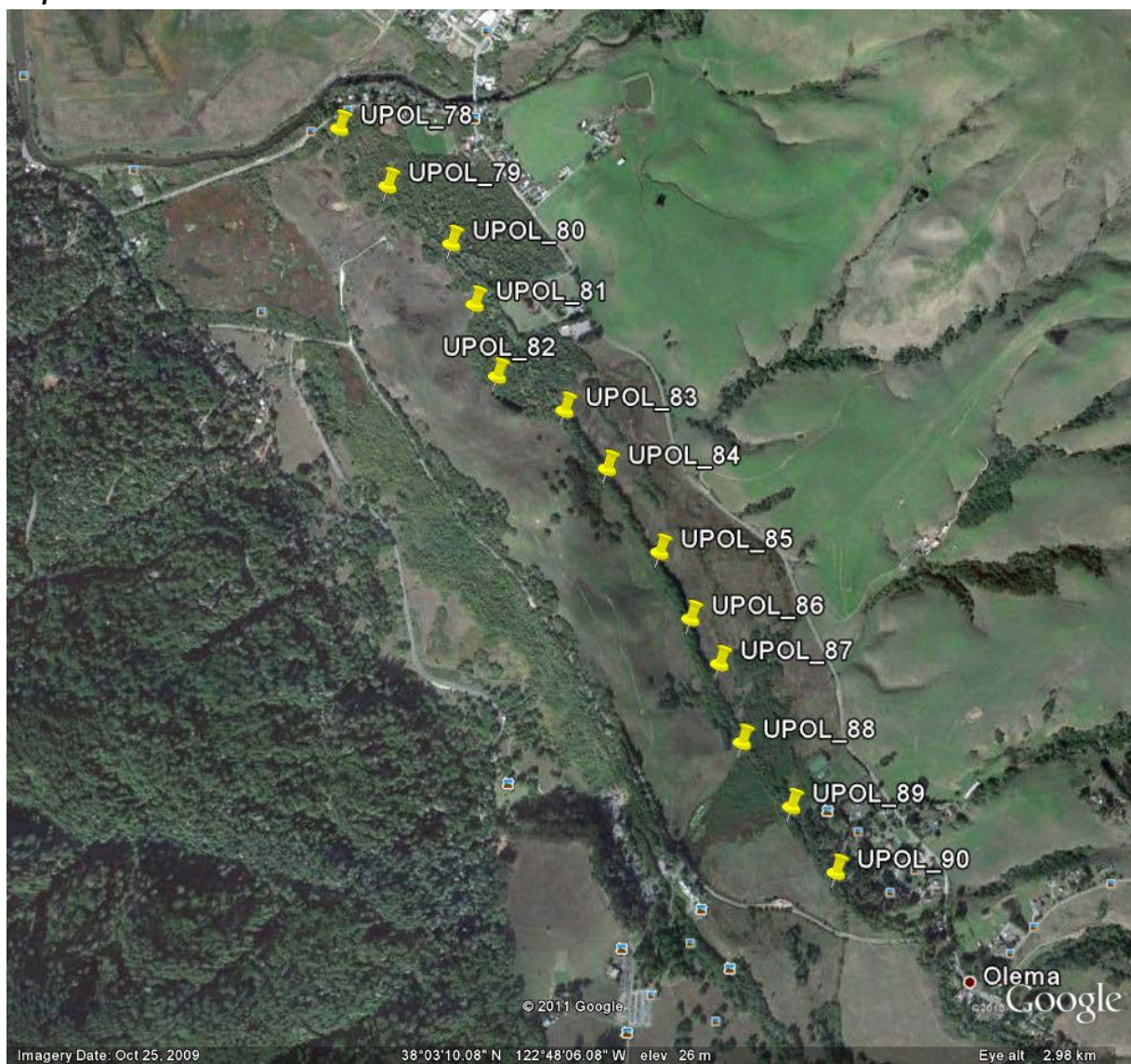
Coordinates: DD, WGS84/NAD83

UPOL_78	38.06332	-122.81029	UPOL_85	38.05194	-122.79888
UPOL_79	38.06190	-122.80829	UPOL_86	38.05014	-122.79781
UPOL_80	38.06033	-122.80607	UPOL_87	38.04892	-122.79682
UPOL_81	38.05867	-122.80527	UPOL_88	38.04679	-122.79604
UPOL_82	38.05672	-122.80449	UPOL_89	38.04505	-122.79435
UPOL_83	38.05579	-122.80217	UPOL_90	38.04327	-122.79281
UPOL_84	38.05422	-122.80069			

Revision History Log:

Previous Version Year	Revision Year	Author	Changes Made	Reason for Change
2005?	2011	Humple	Standardization; changed site descriptions as per habitat changes. DEJU current	Needed map/coordinates; habitat change
2011	2014	Dettling	Moved UPOL_78 due to thick veg, updates	Veg changes, moved point, standardizing

Map:



Appendix B. Representative Photos for Each Transect

A photo from one point along each transect was chosen to illustrate the type of habitat surveyed by the transect. Each photo below is labeled with the transect name and the point number. Photos from each survey point can be found in Supplement A.

Abbott's/Keyhoe – ABKE_4



Arroyo Hondo – ARHO_18



Bear Valley – BEVA_38



Coast Camp – COCA_93



Coast Trail Laguna – CTLA_25



Gerbode Valley – GERB_15



Lagunitas Creek – LACR_60



Lower Olema Creek – LOOL_48



M Ranch – MRAN_4



Muddy Hollow – MUHO_70



Pine Gulch – PIGU_1



Redwood Creek (Lower) – RECR_70



Redwood Creek (Upper) – RECR_42



Tennessee Valley – TEVA_5



Upper Olema Creek – UPOL_82



Supplement A. Photo Documentation of the Riparian Point Count Locations in the Golden Gate National Recreation Area and Point Reyes National Seashore.

See separate DVD provided to National Park Service (not part of electronic version of report).

The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS 641/130252, 612/130252, October 2015

National Park Service
U.S. Department of the Interior



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