

Point-count Surveys of Bird Use in Olema Marsh  
Spring and Autumn 2004

A report to the Point Reyes National Seashore

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## INTRODUCTION

Breeding bird censuses were conducted at Olema Marsh in from 1984-1994 (Evens and Stallcup 1985, 1986, 1991, 1992, 1993, 1994). These censuses used spot mapping to quantify the number of occupied territories indicated by the presence of territorial (singing) males (I.B.B.C. 1970, Ralph et al. 1993). Spot-mapping is best used to quantify the number of the breeding songbird pairs, but it is less effective for monitoring the use of an area by polygynous marsh birds (e.g., Marsh Wren, Red-winged Blackbird), non-territorial breeders (e.g., American Goldfinch, Mourning Dove), and nesting waterfowl (e.g., Ruddy Duck, American Coot, Gadwall). Breeding-bird use of Olema Marsh was last evaluated in 1993 and a survey of bird use in autumn has not been conducted since 1984 (Evens and Stallcup 1985). To generate more current information on bird use in Olema Marsh and to more effectively measure the densities and occurrence of breeding marsh birds, we conducted a series of point counts (Ralph et al. 1995) in the spring and fall of 2004. Point counts of wintering birds are being conducted during January of 2005. Although we included detection distances in all counts to allow for the estimation of detection probabilities and breeding bird densities, this report presents only the uncorrected point-count totals as indices of species abundances.

## METHODS

We established nine point-count stations around the perimeter of the Olema Marsh (Figure 1). Count stations were at least 150 m apart to allow distance sampling

within a radius of 70 m. At this distance between points, the count stations saturated the perimeter of the marsh, although distant areas between points were not intensively surveyed because bird detection probabilities were low. The 70-m radius of each count area sampled bird use over most of the interior marsh vegetation. The location of each station was marked with flagging. We also recorded the coordinates of each station with a GPS for reference in establishing future surveys. When establishing stations, we tried to minimize the potential for disturbance or creation of predator-access trails. At each point count station, we recorded bird use only within the proportion of the 70-m-radius circular plot that was covered by marsh habitat; this proportion was measured at each station.

Rich Stallcup conducted all counts. Each station was surveyed on each of six count days in spring (19, 29 April, 4, 11, 17, 27 May), distributed as widely as possible to maximize species detections, and three count days in autumn (16 September, 5, 12 October) during the peak migration period. Censuses began 30 min after sunrise and were completed before 10:30 AM. A one-minute rest period preceded each station count to allow for the equilibration of bird activity after the observer arrived at each station. The duration of time spent counting at each station was 5 min (Ralph et al. 1995). After the initial 5-min count period, the observer continued recording species and distances for a 3-min secondary count period to maximize the detection of secretive species. After 8 min of passive detections, the observer broadcasted pre-recorded Black Rail vocalizations for 30 seconds then recorded the responses of all additional birds for one minute.

During each station-count period, the observer (1) counted each bird heard or seen within 70 m of station, (2) recorded the estimated horizontal distance to its location when first detected, and (3) indicated whether the detection was visual, by call, or by song. To ensure statistical independence of detection distances, individuals of each

species that were detected in a flock or group were recorded in a single record indicating the species name, group detection distance, and group size. The observer was careful to record each individual bird only once in each 5-minute count period. The accuracy of estimated detection distances was checked periodically with a laser range-finder.

Stations were sampled in a standard sequence but, to ensure equal diurnal sampling among stations, the first station to be sampled was advanced two steps in the sequence on successive count days. For this report, we used the number of individuals detected within 70 m at each station over the full 9-min count period as an index of abundance.

## RESULTS

### SPRING COUNTS

Seventy-four bird species were detected in the marsh during April-May 2004 (Table 1). No attempt was made to confirm breeding status, although a detection frequency of more than three of the six count days is a strong indicator of local breeding. Red-winged Blackbird, Marsh Wren, and Song Sparrow were the most abundant species during the breeding season, with averages of 81, 47 and 30 individuals detected per day, respectively. Common Yellowthroats were also present in good numbers, with an average of 11 per day (high count of 18 on 19 April). Observations of singing males and females carrying food suggested at least twelve Common Yellowthroat nesting territories. No evidence of Black Rail was detected in spring, although approximately 12 Virginia Rails (high count of 17 on 29 April) were heard each day. Waterfowl included Canada Goose, Wood Duck, Cinnamon Teal, Mallard and Gadwall. The presence of many riparian species reflects the presence of willow and alder vegetation, particularly in the historic bed of Bear Valley Creek along western edge of the marsh. Unusual visitors

included Rufous Hummingbird, Cassin's Vireo, Lazuli Bunting, and Rose-breasted Grosbeak.

#### AUTUMN COUNTS

Seventy-five species were recorded in Olema Marsh in Autumn (Table 2). The mixture of riparian forest, emergent marsh vegetation, open water, and seasonal wetlands provides habitat suitable for range of species observed. Red-winged Blackbird, Virginia Rail, Marsh Wren, and Song Sparrow were the most abundant species, with averages of 39, 15, 12, and 10 individuals detected per day, respectively. Sora, Black Phoebe, Fox Sparrow, and Common Yellowthroat were also common in the marsh, occurring on all days and in 52%, 48%, 37%, and 33%, respectively, of the station counts. Nineteen species (25%) were detected only once, although many of these species are known residents in the area. The assemblage of species in autumn reflects low-water conditions at the end of the dry season: 24 species (32%) were wetland-dependent species and 15 (20%) were species that normally depend on open water or emergent vegetation.

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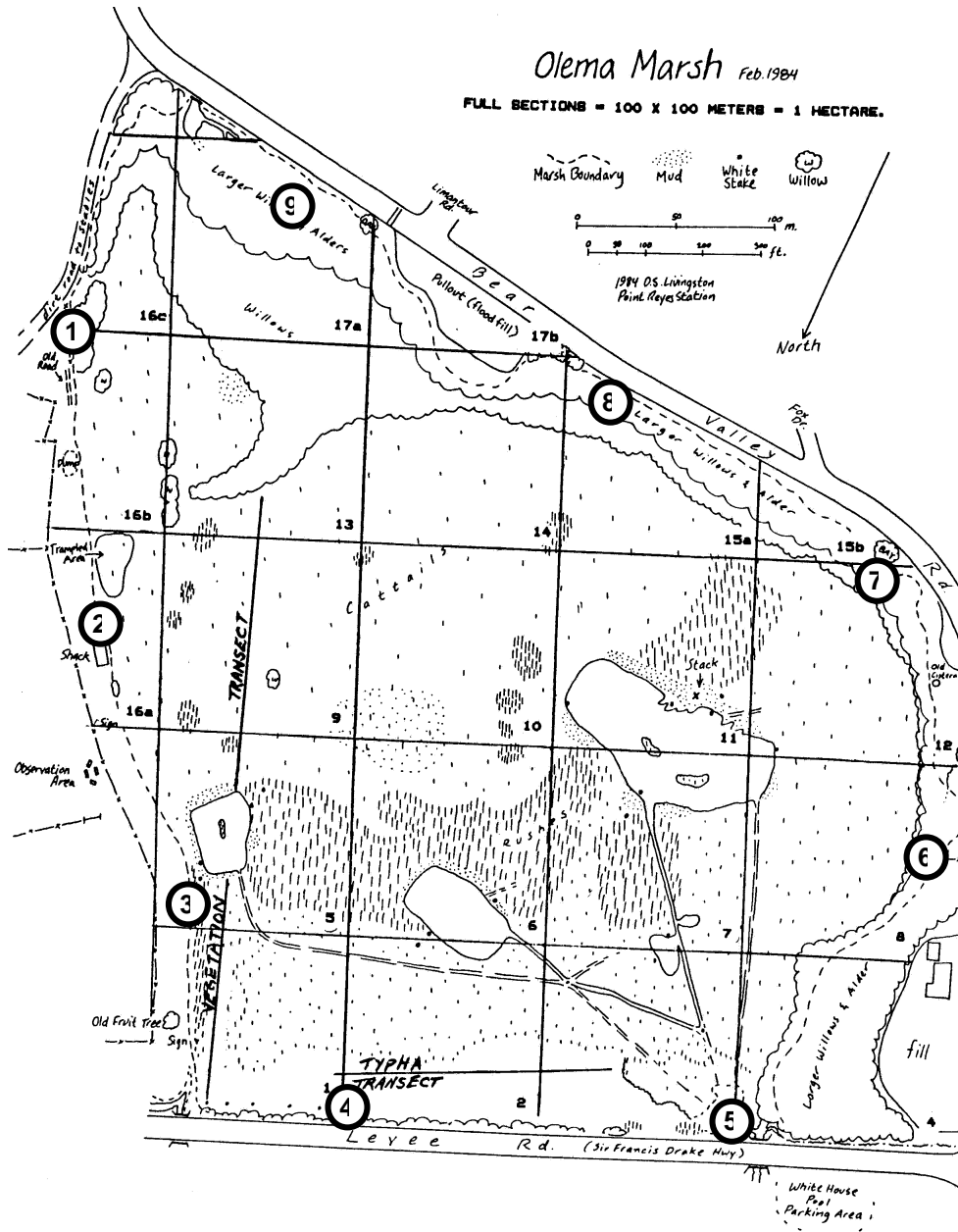


Figure 1. Locations of spring and autumn point-count stations at Olema Marsh, 2004.

Table 1. Mean, standard error (SE), and maximum number of birds detected, and frequency of occurrence among count days ( $n = 6$ ) and station counts ( $n = 54$ ; 6 days x 9 stations) at Olema Marsh during April-May, 2004.

Species	Days ( $n = 6$ )				Station counts ( $n = 54$ )			
	Mean	(SE)	Max.	Freq.	Mean	(SE)	Max.	Freq.
Red-winged Blackbird	81.2	12.5	132	6	9.02	1.23	38	49
Marsh Wren	47.3	4.0	60	6	5.26	0.30	11	53
Song Sparrow	30.0	2.0	35	6	3.33	0.18	6	53
Tree Swallow	17.2	2.7	27	6	1.91	0.34	10	25
Virginia Rail	12.0	1.1	17	6	1.33	0.18	5	35
American Goldfinch	11.7	2.3	22	6	1.30	0.32	11	22
Common Yellowthroat	11.3	1.9	18	6	1.26	0.16	6	42
Wilson's Warbler	7.3	0.7	9	6	0.81	0.11	3	31
Mallard	6.0	1.7	11	6	0.67	0.27	10	9
Warbling Vireo	6.0	0.9	9	6	0.67	0.12	4	25
Chestnut-backed Chickadee	5.2	0.9	8	6	0.57	0.16	5	15
Swainson's Thrush	4.7	1.2	7	6	0.52	0.10	3	22
Mourning Dove	4.5	0.7	7	6	0.50	0.15	5	14
Pacific-slope Flycatcher	4.2	0.9	8	6	0.46	0.13	6	17
Brown-headed Cowbird	3.8	1.5	10	5	0.43	0.16	5	8
Allen's Hummingbird	3.7	0.4	5	6	0.41	0.08	2	20
Black-headed Grosbeak	3.5	0.8	6	6	0.39	0.08	2	19
Purple Martin	3.5	1.9	12	3	0.39	0.17	7	6
Bushtit	3.3	2.0	11	3	0.37	0.21	8	4
Gadwall	3.0	1.2	8	5	0.33	0.14	5	6
Wood Duck	3.0	0.7	5	6	0.33	0.12	4	9
Western Wood-Pewee	2.8	0.7	5	5	0.31	0.09	3	11
Cinnamon Teal	2.3	1.0	6	4	0.26	0.11	4	6
Purple Finch	2.3	0.7	5	5	0.26	0.07	2	12
American Coot	2.2	0.6	4	5	0.24	0.08	2	8
Black Phoebe	2.2	0.8	6	6	0.24	0.12	6	6
Pied-billed Grebe	2.2	0.3	3	6	0.24	0.06	2	12
Turkey Vulture	2.2	1.0	6	3	0.24	0.14	6	3
Violet-green Swallow	2.0	0.6	3	4	0.22	0.09	3	7
Barn Swallow	1.8	0.2	2	6	0.20	0.08	2	6
Downy Woodpecker	1.8	0.5	4	6	0.20	0.08	3	8
Cliff Swallow	1.7	0.9	6	5	0.19	0.12	6	5
Hairy Woodpecker	1.7	0.2	2	6	0.19	0.06	2	9
Wrentit	1.7	0.4	3	5	0.19	0.07	2	7
Anna's Hummingbird	1.5	0.2	2	6	0.17	0.05	1	9
California Towhee	1.5	0.4	3	5	0.17	0.06	2	8
Golden-crowned Sparrow	1.5	1.1	7	2	0.17	0.11	6	4
Bewick's Wren	1.3	0.2	2	6	0.15	0.05	1	8
Green Heron	1.3	0.4	3	5	0.15	0.05	1	8
Nuttall's Woodpecker	1.3	0.3	3	6	0.15	0.06	2	7



Table 1. (continued)

Species	Count days ( $n = 6$ )				Station counts ( $n = 54$ )			
	Mean	(SE)	Max.	Freq.	Mean	(SE)	Max.	Freq.
Osprey	1.3	0.3	2	5	0.15	0.06	2	7
Canada Goose	1.3	1.0	6	1	0.13	0.11	6	1
Red-shouldered Hawk	1.3	0.5	2	1	0.15	0.06	2	1
Common Raven	1.0	0.7	4	2	0.11	0.06	2	3
Hutton's Vireo	1.0	0.4	2	4	0.11	0.04	1	6
Pine Siskin	1.0	0.4	3	4	0.11	0.06	3	4
Western Scrub Jay	1.0	0.5	3	3	0.11	0.04	1	6
Acorn Woodpecker	0.7	0.4	2	2	0.07	0.05	2	2
American Crow	0.7	0.3	2	3	0.07	0.04	2	3
Ash-throated Flycatcher	0.7	0.3	2	3	0.07	0.04	1	4
Black-crowned Night-Heron	0.7	0.3	2	3	0.07	0.04	1	4
Brewer's Blackbird	0.7	0.4	2	2	0.07	0.05	2	2
Greater Yellowlegs	0.7	0.7	4	1	0.07	0.07	4	1
Northern Rough-winged Swallow	0.7	0.3	2	3	0.07	0.04	1	4
European Starling	0.5	0.5	3	1	0.06	0.06	3	1
Great Blue Heron	0.5	0.2	1	3	0.06	0.03	1	3
House Finch	0.5	0.5	3	1	0.06	0.06	3	1
Orange-crowned Warbler	0.5	0.2	1	3	0.06	0.03	1	3
Red-tailed Hawk	0.5	0.2	1	3	0.06	0.03	1	3
Steller's Jay	0.5	0.3	2	2	0.06	0.03	1	3
White-tailed Kite	0.5	0.2	1	3	0.06	0.03	1	3
California Quail	0.3	0.2	1	2	0.04	0.03	1	2
Oak Titmouse	0.3	0.2	1	2	0.04	0.03	1	2
Spotted Towhee	0.3	0.3	2	1	0.04	0.03	1	2
Western Tanager	0.3	0.2	1	2	0.04	0.03	1	2
Belted Kingfisher	0.2	0.2	1	1	0.02	0.02	1	1
Band-tailed Pigeon	0.2	0.2	1	1	0.02	0.02	1	1
Cassin's Vireo	0.2	0.2	1	1	0.02	0.02	1	1
Cooper's Hawk	0.2	0.2	1	1	0.02	0.02	1	1
Lazuli Bunting	0.2	0.2	1	1	0.02	0.02	1	1
Rose-breasted Grosbeak	0.2	0.2	1	1	0.02	0.02	1	1
Rufous Hummingbird	0.2	0.2	1	1	0.02	0.02	1	1
Sharp-shinned Hawk	0.2	0.2	1	1	0.02	0.02	1	1
Winter Wren	0.2	0.2	1	1	0.02	0.02	1	1

Table 2. Mean, standard error (SE), and maximum number of birds detected, and frequency of occurrence among count days ( $n = 3$ ) and station counts ( $n = 27$ ; 3 days x 9 stations) at Olema Marsh during September-October, 2004.

Species	Count days ( $n = 3$ )				Station counts ( $n = 27$ )			
	Mean	(SE)	Max.	Freq.	Mean	(SE)	Max.	Freq.
Red-winged Blackbird	39.0	28.8	178	3	8.67	6.07	165	12
Virginia Rail	14.8	6.7	35	3	3.30	0.29	8	27
Marsh Wren	11.5	5.4	27	3	2.56	0.30	6	24
Song Sparrow	10.0	4.5	22	3	2.22	0.24	5	25
Bushtit	6.8	4.4	24	2	1.52	1.07	24	2
Mallard	6.2	4.7	29	2	1.37	0.86	22	4
Chestnut-backed Chickadee	5.7	3.7	20	2	1.26	0.57	12	6
Ruby-crowned Kinglet	4.5	3.0	17	2	1.00	0.49	10	5
Pine Siskin	4.3	2.9	17	2	0.96	0.61	16	5
American Goldfinch	3.8	2.0	11	3	0.85	0.33	7	7
Townsend's Warbler	3.8	2.3	13	3	0.85	0.40	9	6
Golden-crowned Sparrow	3.7	2.9	18	2	0.81	0.38	8	6
Long-billed Dowitcher	3.7	3.7	22	1	0.81	0.81	22	1
Hutton's Vireo	3.0	1.6	10	3	0.67	0.27	6	8
Sora	3.0	1.6	10	3	0.67	0.15	3	14
White-crowned Sparrow	2.7	2.5	15	2	0.59	0.56	15	2
Black Phoebe	2.5	1.1	6	3	0.56	0.12	2	13
Wood Duck	2.3	2.3	14	1	0.52	0.44	12	3
Fox Sparrow	2.0	1.0	6	3	0.44	0.12	2	10
Brewer's Blackbird	1.7	1.7	10	1	0.37	0.37	10	1
Common Yellowthroat	1.7	0.8	4	3	0.37	0.11	2	9
Gadwall	1.5	1.5	9	1	0.33	0.30	8	2
California Towhee	1.2	0.8	5	3	0.26	0.16	4	4
Cedar Waxwing	1.0	0.7	4	2	0.22	0.16	4	2
Western Scrub Jay	1.0	0.6	4	3	0.22	0.08	1	6
Warbling Vireo	1.0	1.0	6	1	0.22	0.13	3	3
Yellow Warbler	1.0	0.8	5	2	0.22	0.12	3	4
American Crow	0.8	0.8	5	1	0.19	0.19	5	1
California Gull	0.8	0.8	5	1	0.19	0.19	5	1
Green-winged Teal	0.8	0.8	5	1	0.19	0.19	5	1
Lincoln's Sparrow	0.8	0.4	2	3	0.19	0.09	2	4
Pacific-slope Flycatcher	0.8	0.5	3	2	0.19	0.09	2	4
Steller's Jay	0.8	0.7	4	2	0.19	0.11	2	3
Wrentit	0.8	0.4	2	3	0.19	0.11	2	3
American Coot	0.7	0.4	2	2	0.15	0.09	2	3
Red-shouldered Hawk	0.7	0.5	3	2	0.15	0.07	1	4
Savannah Sparrow	0.7	0.7	4	1	0.15	0.12	3	2
Winter Wren	0.7	0.5	3	2	0.15	0.07	1	4

Table 2. (continued)

Species	Count days ( $n = 3$ )				Station counts ( $n = 27$ )			
	Mean	(SE)	Max.	Freq.	Mean	(SE)	Max.	Freq.
Bewick's Wren	0.5	0.3	2	2	0.11	0.06	1	3
Black-throated Gray Warbler	0.5	0.3	2	2	0.11	0.08	2	2
Cinnamon Teal	0.5	0.3	2	2	0.11	0.08	2	2
Common Moorhen	0.5	0.2	1	3	0.11	0.06	1	3
Downy Woodpecker	0.5	0.2	1	3	0.11	0.06	1	3
Hairy Woodpecker	0.5	0.3	2	2	0.11	0.06	1	3
Lesser Goldfinch	0.5	0.5	3	1	0.11	0.11	3	1
Nuttall's Woodpecker	0.5	0.3	2	2	0.11	0.06	1	3
Oak Titmouse	0.5	0.5	3	1	0.11	0.08	2	2
Orange-crowned Warbler	0.5	0.3	2	2	0.11	0.08	2	2
Wilson's Warbler	0.5	0.3	2	2	0.11	0.06	1	3
Anna's Hummingbird	0.3	0.2	1	2	0.07	0.05	1	2
Dark-eyed Junco	0.3	0.3	2	1	0.07	0.07	2	1
Northern Flicker	0.3	0.2	1	2	0.07	0.05	1	2
Pied-billed Grebe	0.3	0.2	1	2	0.07	0.05	1	2
Sharp-shinned Hawk	0.3	0.2	1	2	0.07	0.05	1	2
Swainson's Thrush	0.3	0.3	2	1	0.07	0.05	1	2
Yellow-rumped Warbler	0.3	0.3	2	1	0.07	0.05	1	2
Acorn Woodpecker	0.2	0.2	1	1	0.04	0.04	1	1
American Pipit	0.2	0.2	1	1	0.04	0.04	1	1
Barn Owl	0.2	0.2	1	1	0.04	0.04	1	1
Black-crowned Night-heron	0.2	0.2	1	1	0.04	0.04	1	1
Belted Kingfisher	0.2	0.2	1	1	0.04	0.04	1	1
Blackpoll Warbler	0.2	0.2	1	1	0.04	0.04	1	1
California Quail	0.2	0.2	1	1	0.04	0.04	1	1
Cooper's Hawk	0.2	0.2	1	1	0.04	0.04	1	1
Golden-crowned Kinglet	0.2	0.2	1	1	0.04	0.04	1	1
Green Heron	0.2	0.2	1	1	0.04	0.04	1	1
Grasshopper Sparrow	0.2	0.2	1	1	0.04	0.04	1	1
House Finch	0.2	0.2	1	1	0.04	0.04	1	1
MacGillivray's Warbler	0.2	0.2	1	1	0.04	0.04	1	1
Purple Finch	0.2	0.2	1	1	0.04	0.04	1	1
Red-tailed Hawk	0.2	0.2	1	1	0.04	0.04	1	1
Spotted Towhee	0.2	0.2	1	1	0.04	0.04	1	1
Swamp Sparrow	0.2	0.2	1	1	0.04	0.04	1	1
Wilson's Snipe	0.2	0.2	1	1	0.04	0.04	1	1
White-tailed Kite	0.2	0.2	1	1	0.04	0.04	1	1