

Golden Gate National Recreation Area  
Winter 2001-2002 Waterbird Survey Results

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## Introduction

Surveys of wintering waterbirds were conducted at Big Lagoon, Rodeo Lake, and Tennessee Cove Pond in the Golden Gate National Recreation Area, in order to determine the presence or absence of waterbirds at each survey site. This report summarizes the results of this year's surveys and compares them to the results of Michael Osbourn's surveys last winter.

## Methods

Waterbird surveys began on December 12, 2001, and were conducted approximately every two weeks at all three sites until February 12, 2002 (with the exception that surveys at Tennessee Cove Pond did not begin until January 8, 2002). In total, 5 surveys each were conducted on Rodeo Lake and Big Lagoon, and 3 surveys were conducted on Tennessee Cove Pond. The best location for viewing each body of water was determined on the first survey, and returned to for each subsequent survey. Big Lagoon was divided into three subsites: Pasture A, Pasture B, and the Riding Ring, which were each surveyed independently. The viewing locations for each site were approximately the same as in last year's study, and are shown in Figures 1, 2, and 3.

The duration of each survey was at least 15 minutes per site, but depended heavily on the number of birds present. During each survey, air temperature, percentage of cloud cover, and approximate wind speed (using the Beaufort Wind Scale, see Appendix C) were recorded. Waterbirds were then located and identified using 8x42 binoculars and a 60mm spotting scope. The species, number of individuals, location (open water, submergent zone, or emergent zone), and behavior were recorded for all waterbirds present. All recorded data was entered into an Access database (*K:/Common/Winter 2001-2002 Waterbird Survey/Winter 2001-2002 Waterbird Survey Data*). A summary of survey data is presented in Appendix A.

Unique to this season's surveys was the recording of water depths at Big Lagoon subsites A and B. A stake was placed in approximately the lowest spot of each subsite, with sections of a PVC pipe secured over the stake. The PVC pipe had a measuring tape marked in increments of 0.01 feet. Water level was recorded on each visit. Water depth transects were also conducted once during the season in order to determine the topography of subsites A and B. Using the PVC stake as the center of the transect, a 100m measuring tape was stretched out 50m in opposite directions, with a bearing of 142°, approximately parallel to the levee road, and crossing through the deepest portions of the Big Lagoon subsites. Depths were recorded using a measuring rod at 4m intervals, starting at 0m at the north-western end of the tape, and continuing until excessively dense vegetation prevented further progress. In addition, the area of open water during each survey was approximated for subsites A and B by outlining these areas on a map (see Appendix B).

## Results

### Big Lagoon

Early rains this winter resulted in large open water areas at Big Lagoon early in the season, which then slowly shrank as the season progressed. Photos of each subsite, as viewed from their respective survey points, are shown in Figures 4, 5, and 6.

The peak number of waterbirds observed at Big Lagoon was on December 20, 2001, with 27 individuals, a 125% increase over the peak number observed last winter. Surveys on other dates might have recorded as many or more waterbirds had the roadwork on the adjacent levee trail not created excessive noise. In fact, during the two surveys that took place while roadwork was in progress (December 12, 2001 and January 23, 2002), the least number of birds were observed.

Despite this interference, species diversity also increased from last year's survey, which reported only Mallards (*Anas platyrhynchos*) at Big Lagoon. This season, three species of birds were observed: Mallard, Killdeer (*Charadrius vociferus*), and Bufflehead (*Bucephala albeola*), however the Mallards were still the most common by far. Killdeer and Bufflehead represented only 12% of the total number of individuals observed.

Water depth transects were conducted at Big Lagoon, Subsites A and B, on January 29, 2002. The results of these transects are presented in Figures 7 and 8. At their deepest points, neither of these subsites reached 1 meter in depth. It is possible, however, that after some of the heavy storms that took place earlier in the season, greater depths may have been reached.

#### Rodeo Lake

Waterbird populations at Rodeo Lake were very low compared to last year's report. The peak number of observed waterbirds was on December 12, 2001, the first survey of the season, with only 8 individuals, compared to last year's peak of 142. Four species were observed this season, making this the survey site with the highest species diversity: American Coot (*Fulica americana*), Pied-billed Grebe (*Podilymbus podiceps*), Great Egret (*Ardea alba*), and American Widgeon (*Anas americana*). The American Coots and the Pied-billed Grebes were present for every survey, while the Great Egret and the American Widgeons only made an appearance for one survey each. Unlike last year's survey, no Mallards were observed at Rodeo Lake.

#### Tennessee Cove Pond

The peak number of waterbirds observed at Tennessee Cove Pond was on January 23, 2002, the second of the three surveys conducted there, with 8 individuals. This was also the day with the greatest number of species present: American Coot, Bufflehead, and Greater Scaup (*Aythya marila*). On each of the other two surveys, only American Coots were observed.

#### Cloud Cover, Temperature, and Wind Speed

Weather factors recorded during each survey did not appear to be related to the number of individual waterbirds or the number of species present (see Figures 11-13). It is quite likely that the low sample size contributed to the overall apparent lack of a relationship between cloud cover, temperature, or wind speed on the presence or absence of waterbirds.

### Discussion

For areas that are not flooded year round, as in Big Lagoon, waterbird population size and species diversity may be related to rainfall amounts prior to peak wintering season. The overall increase in population size and species diversity this winter at Big Lagoon (despite the ongoing roadwork) may be attributable to heavy early winter rains and large open water area this season, compared to last year's low early rainfall and lack of open water during the peak of the wintering waterbird season. In addition, the presence or absence of loud roadwork near Big Lagoon also seems to affect the waterbirds. It is not unreasonable to presume that some birds more sensitive to the noise than mallards were deterred from wintering at Big Lagoon as a result of the roadwork, resulting in an overall reduced number of birds than would have been expected due to the heavy early rains.

It is difficult to compare the numbers and species diversity of birds observed at Big Lagoon with those observed at Tennessee Cove Pond and Rodeo Lake, simply because the habitats are so different. Big Lagoon is a seasonal wetland, and when it is flooded, it is very shallow in most places, as the water depth transects confirmed. It is also bordered on two sides by roads (Pacific Way and Highway 1) and on two sides by trails (the levee and Green Gulch trails), which are used by people and horses.

Tennessee Cove Pond and Rodeo Lake, on the other hand, are permanent wetlands and are much deeper. Rodeo Lake is also bordered on two sides by a road, but the other two sides are largely unused. Tennessee Cove Pond is bordered on two sides by trails, which rarely have vehicles on them, and the other two sides are also unused. Big Lagoon's higher degree of disturbance by people, horses, and cars may make it a less suitable wintering site than a less easily accessed body of water such as Tennessee Cove Pond.

In addition, Big Lagoon's lack of depth would make it more suitable to birds which feed on certain types of aquatic vegetation or invertebrates which do not need to be in flooded environments year-round, whereas Rodeo Lake or Tennessee Cove Pond may be better suited to birds favoring vegetation, invertebrates, or even fish and amphibians requiring year-round flooded environments. For example, for the three species observed at Big Lagoon, Mallard and Bufflehead feed primarily on aquatic vegetation and associated invertebrates, and Killdeer feed primarily on benthic invertebrates (Philip Williams & Associates, Ltd.). By comparison, Great Egrets, one of which was observed at Rodeo Lake, are piscivores (Philip Williams & Associates, Ltd.).

### **Future Studies**

Future surveys can contribute greater knowledge of waterbird populations utilizing these survey areas by beginning at the start of the rainy season, when Big Lagoon becomes a suitable wintering site, and continuing through the end. This would allow the capture of the entire "bell curve" of the waxing and waning of wintering waterbird populations. Water depths during each survey should be recorded more consistently, and water depth transects should be conducted during the peak of the rainy season to capture the highest depths at Big Lagoon. Surveyors should also continue to record open water area and weather data (including rainfall amounts) in order to probe further the relationship, if any, between the amount of open water, cloud cover, temperature, or wind speed and the presence or absence of waterbirds.

### **References**

- National Geographic Society. 1999. Field Guide to the Birds of North America, Third Edition. Washington, D.C.
- Osborn, Michael. February 2001. Winter 2000-2001 Waterbird Survey, GGNRA.
- Philip Williams & Associates, Ltd. January 1994. A Preliminary Environmental Assessment of Wetland Restoration Alternatives for Big Lagoon at Muir Beach, Marin County (Draft). San Francisco, CA.
- Sibley, David Allen. 2000. The Sibley Guide to Birds. Alfred A. Knopf, Inc., New York.

## Winter Waterbird Survey Field Guide:

**Record:**

Location  
 Date  
 Start Time  
 Total Time  
 Cloud Cover (%)  
 Temperature (°C)  
 Wind Speed (Beaufort Scale)  
 Species observed  
 Bird Location  
 Number of individuals  
 Behavior

**Common species:**

American coots  
 American wigeons  
 Mallards  
 Pied-billed grebes  
 Ring-necked ducks

**Bird Locations:**

Open water (open)  
 Emergent vegetation (em)  
 Submergent vegetation (sub)

**Behavior types:**

Foraging  
 Flocking  
 Taking off for flight  
 Flying overhead

**Equipment:**

Binoculars  
 Spotting scope  
 Notebook  
 Field guide (National Geographic)  
 Thermometer  
 Pencil/Pen

**Beaufort Wind Scale:**

#	Classification	MPH	Description
0	Calm	< 1	Calm; smoke rises vertically
1	Light air	1-3	Ripples on water; smoke drifts slightly
2	Light breeze	4-7	Wind felt on face; leaves rustle; vane moved by wind
3	Gentle breeze	8-12	Leaves and small twigs in constant motion; wind extends flag
4	Moderate breeze	13-18	Raises dust and loose paper; small branches are moved
5	Fresh breeze	19-24	Small trees in leaf begin to sway; crested wavelets form on inland waters
6	Strong breeze	25-31	Large branches move; umbrellas used with difficulty
7	Moderate gale	32-38	Whole trees in motion; inconvenience in walking against wind
8	Fresh gale	39-46	Twigs break off trees; generally impedes progress
9	Strong gale	47-54	Slight structural damage occurs
10	Whole gale	55-63	Trees uprooted; considerable structural damage