

HOTSPOTS: BIRD SURVEY OF MENDENHALL WETLANDS, APRIL 2002 to MAY 2003

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Introduction

For 14 months we conducted bird surveys on the Mendenhall Wetlands State Game Refuge. The principal goal of this survey was to document areas of the wetlands that hosted large concentrations of birds at various seasons; these areas were called ‘hotspots’ of bird activity. A secondary goal was a rough comparison of present bird abundances with those recorded by Cain et al. (1988), using different methods. A third goal, which emerged as we were conducting the bird surveys, was a synopsis of bird phenology on the wetlands, showing seasonal patterns of use.

1 Methods

Study site and field methods for hotspots.

We surveyed most of the wetlands between the end of the Mendenhall Peninsula and Fritz Cove and the southeastern edge of the Salmon Creek delta (Map 1.1). Primary survey areas are those visited on all full surveys of the wetlands. Secondary survey areas were visited occasionally. One section of the wetlands north of Johnson Creek was not covered, because of poor access (Map 10.4). For place names used in the text, see orthophoto on back cover.

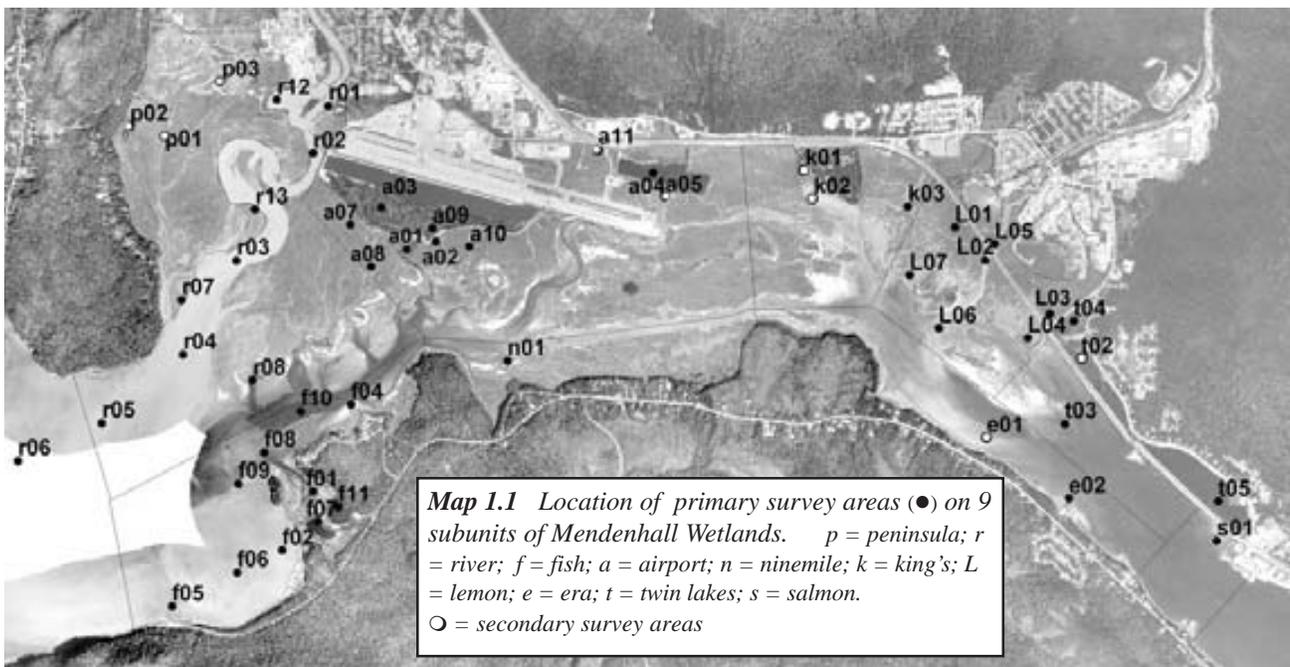
Eighteen full surveys were completed between April 2002 and May 2003 (Table 1.1), unequally distributed among seasons. Seasons were defined as in the American

Birding Association’s publication titled *North American Birds* and the existing Mendenhall Wetlands bird list (Armstrong and Gordon 2002):

- Fall (August–November)
- Winter (December–February)
- Spring (March–May)
- Summer (June–July).

Table 1.1. Dates of full surveys of the wetland. April and early May surveys were done in both 2002 and 2003.

Season	Dates	Number/season
Spring 2002	April 2-5	5
	April 11-14	
	April 27	
	May 3-5	
	May 14	
Summer 2002	June 13	2
	July 1-2	
Fall 2002	August 12-15	5
	September 3	
	September 22-25	
	October 24-25	
Winter 2003-03	December 14	3
	January 21	
	February 18	
Spring 2003	March 20	3
	April 23	
	May 5	



Surveys were conducted by observers on foot, using binoculars and spotting scopes. We recorded all bird concentrations we saw, with notes on tide, weather, location, number of individuals, habitat and activity. Species present in smaller numbers were also recorded in order to build a record of species diversity for each survey area. All full surveys included each of the 42 primary survey areas, timed to center around low tides in daylight hours. Hotspot analyses used only these full-survey records, and omitted observations of single or small bird groups. This basic data set comprised 794 records.

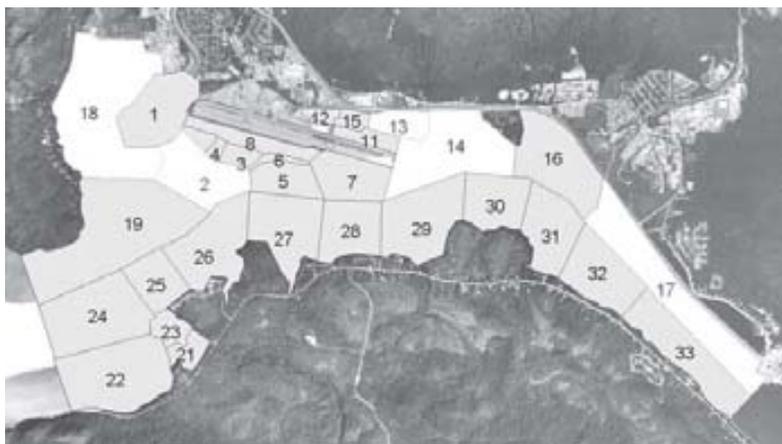
In addition to the 18 full surveys, 41 “ancillary surveys” were done on an opportunistic basis. These occurred irregularly and covered only subsections of the wetland. We also included in our database many reports from reliable observers of bird concentrations in certain areas. Contributions from ancillary surveys and additional reports were analysed separately from full surveys.

Some sites were visited only periodically, including Auke Lake (x01), Twin Lakes (t02), Sunny Point (k01, k02) Wigeon Ponds area (p01, p02), golf course (p03), Fivemile (e01), Temsco turnoff (a11), and the slough at the east end of the runway (a05). Merging the full and ancillary surveys, the data set comprised 1261 records.

Limitations of the survey data Our surveys were done at monthly or fortnightly intervals, and so they obviously missed short pulses of birds, particularly those on migration. We have little information on the distribution and abundance of birds at high tides or at night, and clearly those distributions could be different from those at diurnal low tides. The picture we present therefore is necessarily only part of the story of birds on the wetland.

GIS mapping of data

Bird observation data were first entered into Excel spreadsheets, then into ArcView, 3.3, where patterns could be analysed spatially. Map 1.1 is excerpted from the ArcView project. The base photo is a 1996 digital orthoquad georeferenced by the US Forest Service. Because our observations were all associated with survey areas shown on the map, we could isolate any combination of parameters spatially. For example, a query might isolate



all observations for Canada Goose involving resting groups of more than 100 birds, then compare that to all feeding observations for groups of similar size. All dots (survey areas) satisfying the query change color.

To compare our observations to those of Cain et al. (1988) we also entered 422 of their largest counts (biggest bird concentrations - equivalent to our hotspot records) into ArcView. In that study, counts were listed for 32 separate units of the refuge, a slightly different approach than in our hotspot study, which was more focused on key concentration areas. Still, the two ArcView projects make it possible to detect changes or consistency in use by different species over time. In Map 1.2, an example query is shown for wigeon. All units with records of more than 30 birds are shown in yellow. In an equivalent query of our 2002-03 hotspots ArcView project, dots instead of entire units change color, but spatial patterns can still be compared.

To produce the “scaled-dot” maps of species distributions in section 7 and Appendix B, we used ArcMap 8.2, a more advanced version of ArcView. We also used ArcMap to georeference vertical air photos of the refuge taken on a flight with USFWS on Oct 8, 2002. The photos were then used to map vegetation zones.

Phenology

We amalgamated all available records of birds on the wetlands. These were entered into Excel spreadsheets, to compile a summary of the seasonal patterns of avian abundance on the wetlands, by species.

The information presented in this section represents 10,881 bird observations on the Mendenhall Wetlands since 1986. For example, one observation could be 30 crows counted on a particular date. These observations were gathered from a variety of sources that included the following:

Paul Suchanek’s observations from 1990 to 2002. Paul has recorded over 5,500 observations of birds on the Mendenhall Wetlands. His observations form a solid foundation for the phenology database.

Cain, S.L., J.I. Hodges, E. Robinson-Wilson. 1988.

Bird use of the Mendenhall Wetlands in Juneau, Alaska.

U.S. Fish and Wildlife Service. Juneau Office.

They conducted bird surveys from February 19, 1986 to February 12, 1987. Units near the airport were visited twice weekly, and more distant units twice monthly. Their emphasis was on waterfowl and other highly visible species, but all birds seen were counted.

Map 1.2 Exported from ArcView project created for Cain et al. (1988) records. Numbers identify the 32 subunits of the refuge used in that study (there was no unit 20). Units shown in white are those with records for more than 30 American Wigeon

Bob Armstrong's and Richard Carstensen's point counts of birds on airport property from January through December, 2002. This work was done for SWCA, consultants hired to produce the Environmental Impact Statement for expansion of the Juneau Airport. Counts were conducted monthly throughout the year, with occasional additional surveys during the breeding season.

Data from the present hotspot study conducted from March, 2002, through May, 2003. Complete bird surveys of the Mendenhall Wetlands were conducted at least monthly.

Observations by local birders Richard Gordon, Steve Zimmerman, Gus van Vliet, and Laurie Craig.

Limitations of the phenology data Combining 18 years of data into one chart and assuming that chart represents the current pattern could, if the timing has changed significantly, lead to erroneous conclusions. The data by year may not be sufficient to determine whether or not a change has occurred. Such comparisons are beyond the scope of our work. However, we have included, with this report, the complete data set in Excel for anyone wishing to work with it.

Determining the highest count by week is possible for a given species. However, when species are combined - e.g., shorebirds - the highest count per week may be misleading. This limitation occurs because when you combine several years data different species may have higher counts in different years, which could have an effect of artificially inflating the numbers. However, we believe this method may accurately represent the potential occurrence of a group of birds by week and hence provides useful information.

Connections.

Information on where the birds seen on the wetlands have come from was derived from a number of sources (American Ornithologists' Union 1998,

Carstensen 2000, Lincoln 1979, Pogson et al. 1999, Rothfels 1998, Terborgh 1989).

2 Overview of diversity and abundance on the wetlands

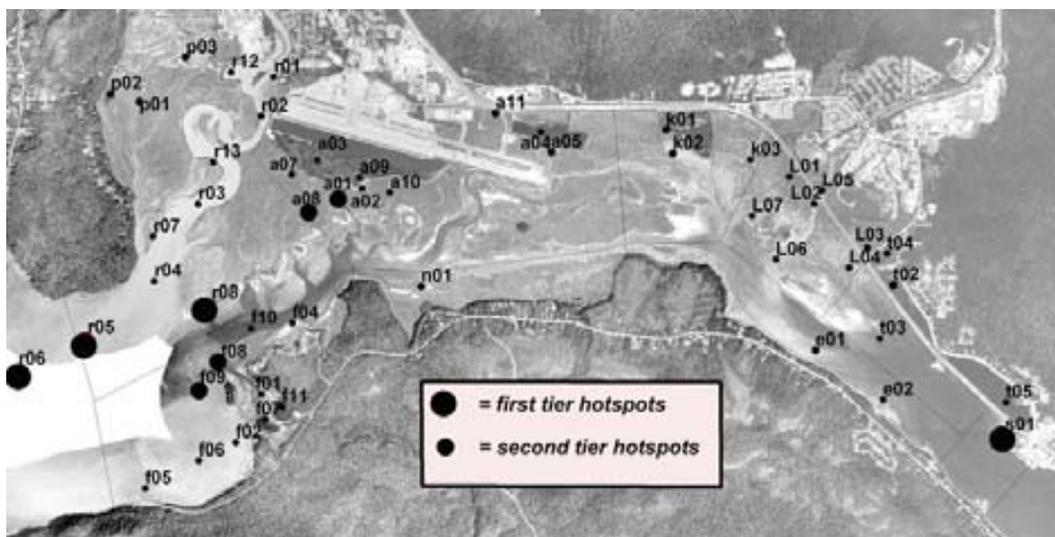
A total of 230 species of birds has been documented to occur on the Mendenhall Wetlands, as of January, 2002 (Armstrong and Gordon 2002). This represents 77% of the 300 bird species seen for the entire Juneau Area - from Taku Inlet to Berners Bay - (van Vliet et al. 2003) and 69% of the 335 bird species seen for all of Southeast Alaska - between Dixon Entrance and Yakutat (Armstrong and Gordon 2001).

The Mendenhall Wetlands are of special importance to waterfowl and shorebirds. At times one can see just about every species of waterfowl and shorebird that occurs in Southeast Alaska. To date, 34 species of waterfowl (40 for Southeast) and 40 species of shorebirds (44 for Southeast) have been seen on the Mendenhall Wetlands.

The numbers of birds occurring on the wetlands can be quite large. In every month except June, over 2,000 birds have been counted in the area at one time (Fig 7.1). During spring migration, in April and May, the total number of birds could reach a daily high of 16,000+ individuals (Fig 7.1). By species the greatest number (over 1,000 at one time) have been Canada Goose, Mallard, Surf Scoter, Ruddy Turnstone, Surf-bird, Western Sandpiper, Bonaparte's Gull, Mew Gull, Glaucous-winged Gull, and Northwestern Crow. Substantial numbers (over 500 at one time) of other species have also been documented: Northern Shoveler, Greater Scaup, White-winged Scoter, Semipalmated Sandpiper, Least Sandpiper, Pectoral Sandpiper, Dunlin, Short-billed Dowitcher, and Common Redpoll.

These daily high counts only represent a small fraction of the total number of individuals that utilize the Mendenhall Wetlands in any given year. For migratory shorebirds this number could be quite high, especially

considering that the daily turnover is rapid; shorebirds, for example, may spend only one to three days at resting and refueling sites on their way to their northern breeding grounds (Iverson et al. 1996).



Map 1.3 Top annual hotspots overall (sums of seasonal means)

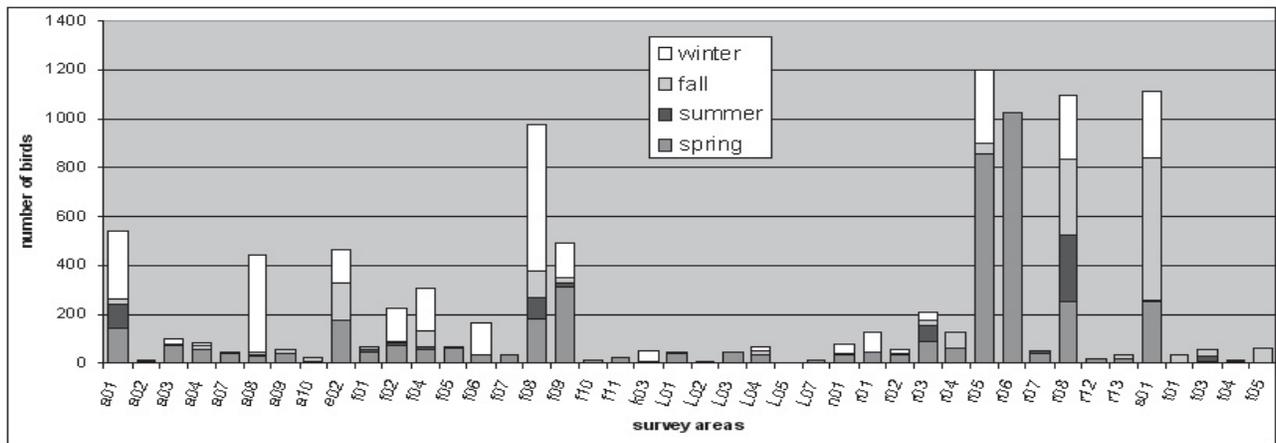


Fig 3.1 Sum of seasonal mean number of birds for each survey point. Points with the tallest bars had the greatest abundance for the year, but the relative contribution of each season clearly differed among points.

3 Summary maps and graphs

In this section we summarize our findings by hotspot and season, based upon analysis of full surveys that included all 42 primary survey areas ($n = 794$ records). We return to a more detailed analysis of spatial and temporal patterns of bird use in section 7 - *Phenology and distribution*. In that section we rely on all available bird records ($n = 10,881$) for the refuge, dating back to the USFWS study in 1986.

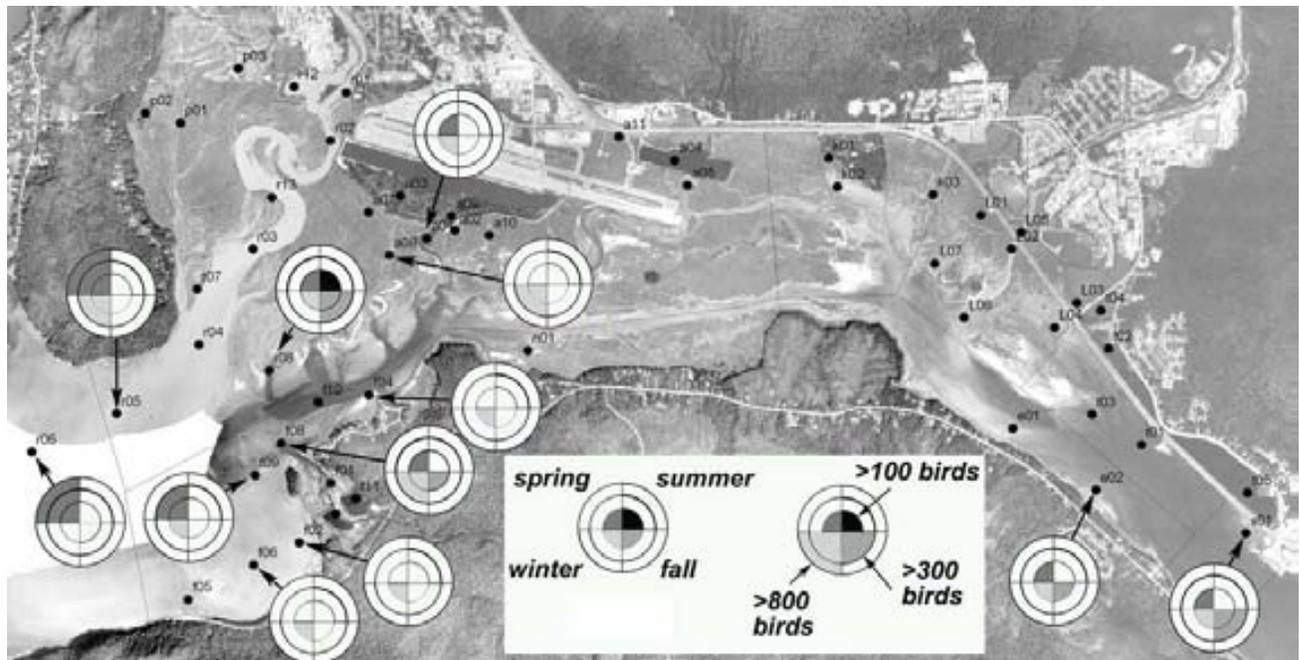
Several of our primary survey areas emerged as consistent ‘hotspots.’ Others were active only seasonally, and some we eventually designated as ‘coldspots.’ The top hotspots of bird activity over the entire year were Mendenhall River mouth (r05), Fritz Cove (r06), Western Mudflats between river mouth and channel (r08), and

Salmon Creek estuary (s01). Total birds seen in these areas during full surveys over 14 months ranged from 4890 to 8186.

“Second tier” hotspots included Fish Creek estuary (f08), Western Channel (f09), Otter Pond (a01), sedge flats west of Otter Pond (a08), and ERA (e02). Counts at these survey areas ranged from 1487 to 3160 (Map 1.3).

There were strong seasonal differences, however, in the use of areas on the wetland. Heaviest use of the wetland occurred in spring and winter, and fewest birds were seen in summer (Map 3.1; Fig 3.1). The western mudflats (r08) received heavy use in all seasons, and Salmon Creek estuary (s01) was well used in three seasons (spring, fall, winter). Otter Pond (a01) and the sedge area west of Otter Pond (a08) were used most in winter.

Different categories (“groups”) of birds used the wetlands in differing ways, concentrating in different



Map 3.1 Top hotspots by season. All bird groups combined.

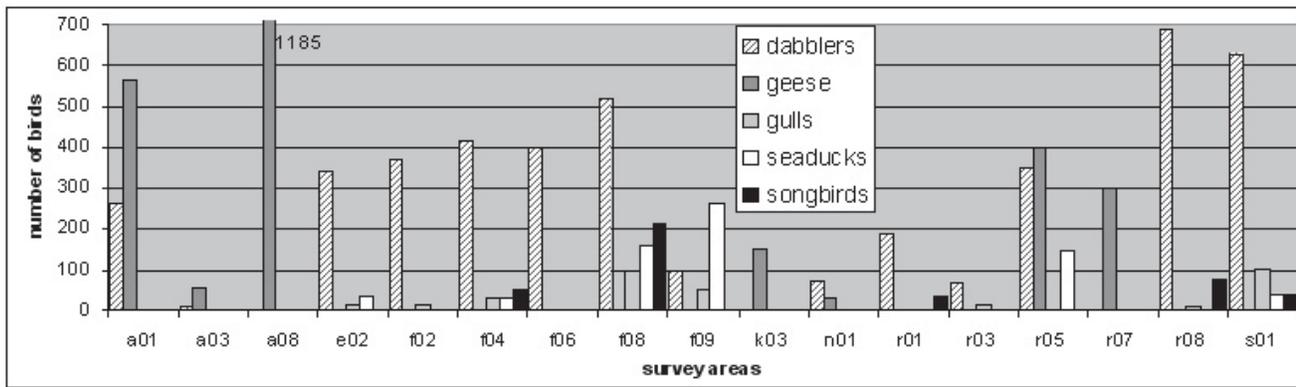
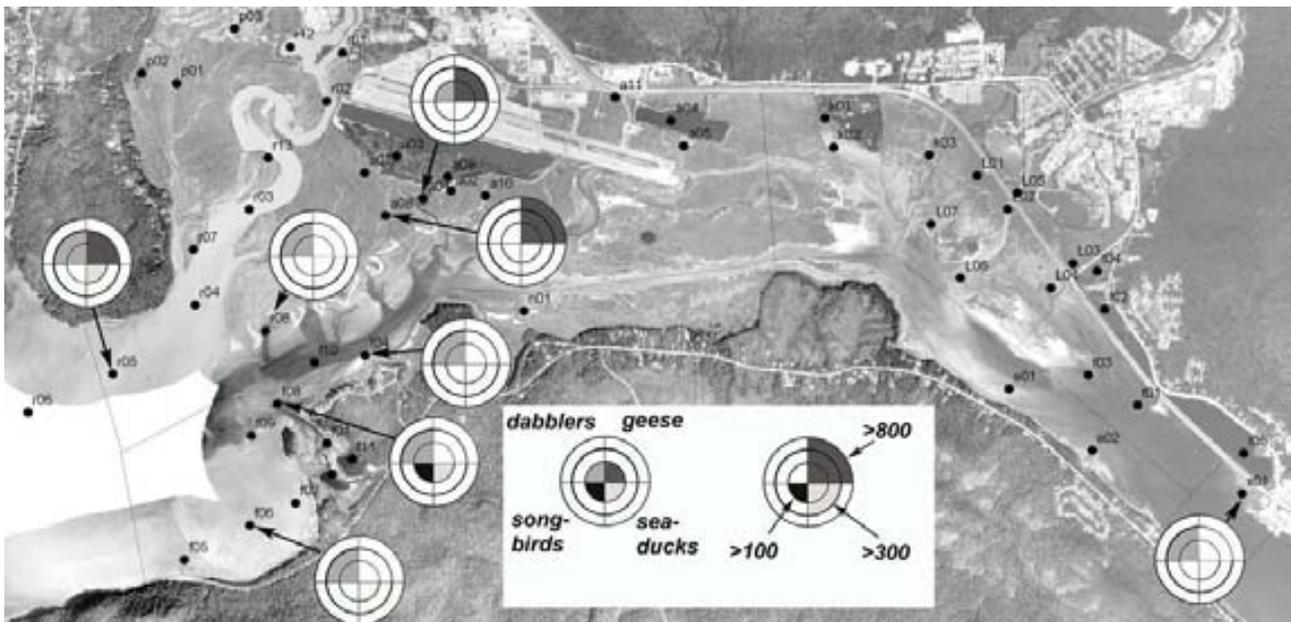


Fig 3.2 Winter distribution of birds on the wetlands. These values are totals, not means, for use only within season, to visualize which groups contributed most to the seasonal pattern.



Map 3.2 Top winter hotspots by bird group

places and different seasons. Rather than following a strictly taxonomic classification, our groupings were closer to the concept of “guild” or foraging strategy:

- divers** (loons, grebes, cormorant, alcids)
- sea- or diving ducks** (dive, rather than tip up)
- dabblers** (shallow water “puddle ducks”)
- geese** (Canada, Snow, White-fronted)
- swans** (Trumpeter, Tundra)
- shorebirds** (plovers, sandpipers)
- gulls** (includes terns)

songbirds (for large groups on the wetlands this mostly means Northwestern Crows, but also swallows, longspur, etc.)

Some species were placed in their own “group” because of distinctive foraging behavior: **heron, crane, eagle**.

Winter (Map 3.2; Fig 3.2): Geese were the most numerous birds on the wetlands, concentrated in the sedge area west of Otter Pond (a08), followed by Otter Pond (a01) and Mendenhall River mouth (r05). Dabbling ducks were more widespread, concentrated along western

Gastineau Channel (r08, f04, f08, the river mouth, and at the mouths of many streams). Gulls were not numerous but were found mostly at Salmon Creek estuary (s01) and Fish Creek estuary (f08). “Seaducks” (including diving ducks) occurred chiefly at Fish Creek estuary, Western Channel (f09), and Mendenhall River mouth. “Songbirds” (mostly Northwestern Crows) concentrated at Fish Creek estuary. Eagles and shorebirds were seldom seen in large numbers.

On Map 3.2, only those survey areas where more than 400 birds were counted for the season are shown. Only those bird groups with more than 100 counted for the season are included.

Spring (Map 3.3, Fig 3.3a & b): The most numerous groups were “seaducks”, followed by dabblers and gulls. “Seaducks” were concentrated in Fritz Cove (r06) and secondarily at Western Channel (f09). Dabblers were seen especially at Mendenhall River mouth (r05), Salmon Creek estuary (s01), Fish Creek estuary (f08), and Otter Pond (a01) and secondarily at Mendenhall River near the trailhead at the end of Radcliffe Road (r01), Fish Creek (f01), Lemon Creek estuary (L06), Western mudflats (r08). Geese

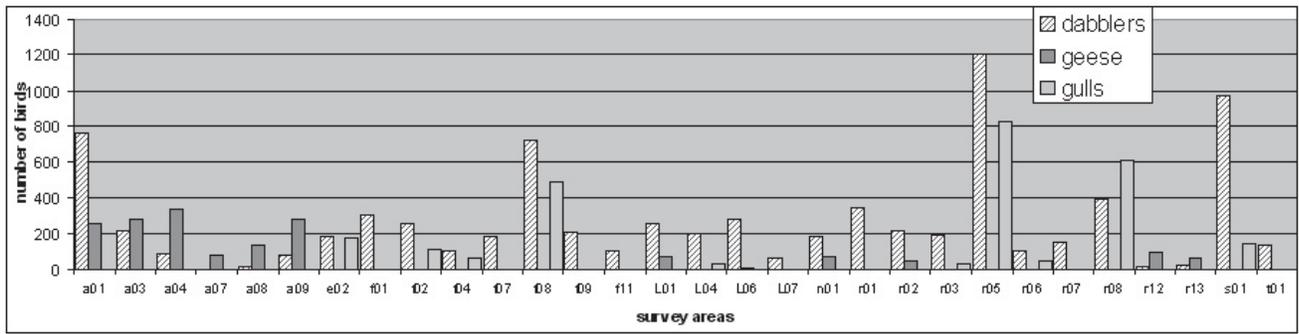


Fig 3.3a Spring distribution of dabblers, geese and gulls on the wetlands. See explanation, Fig 3.2

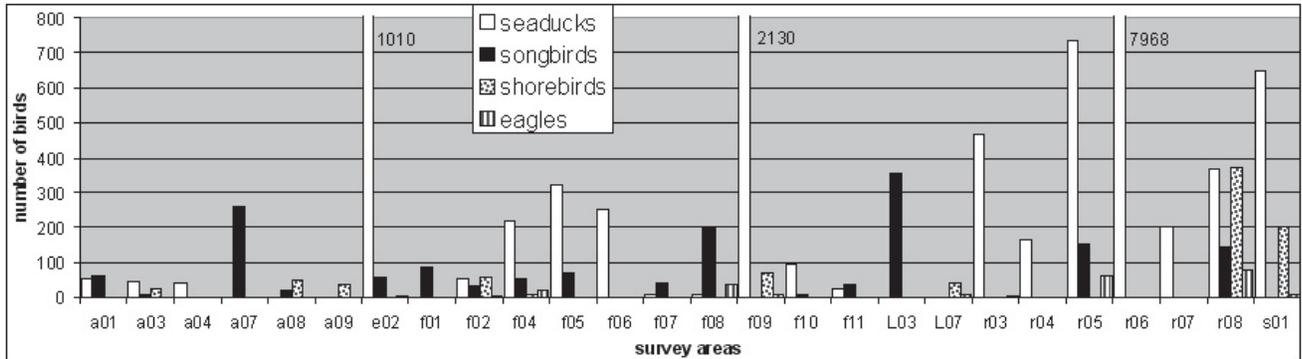
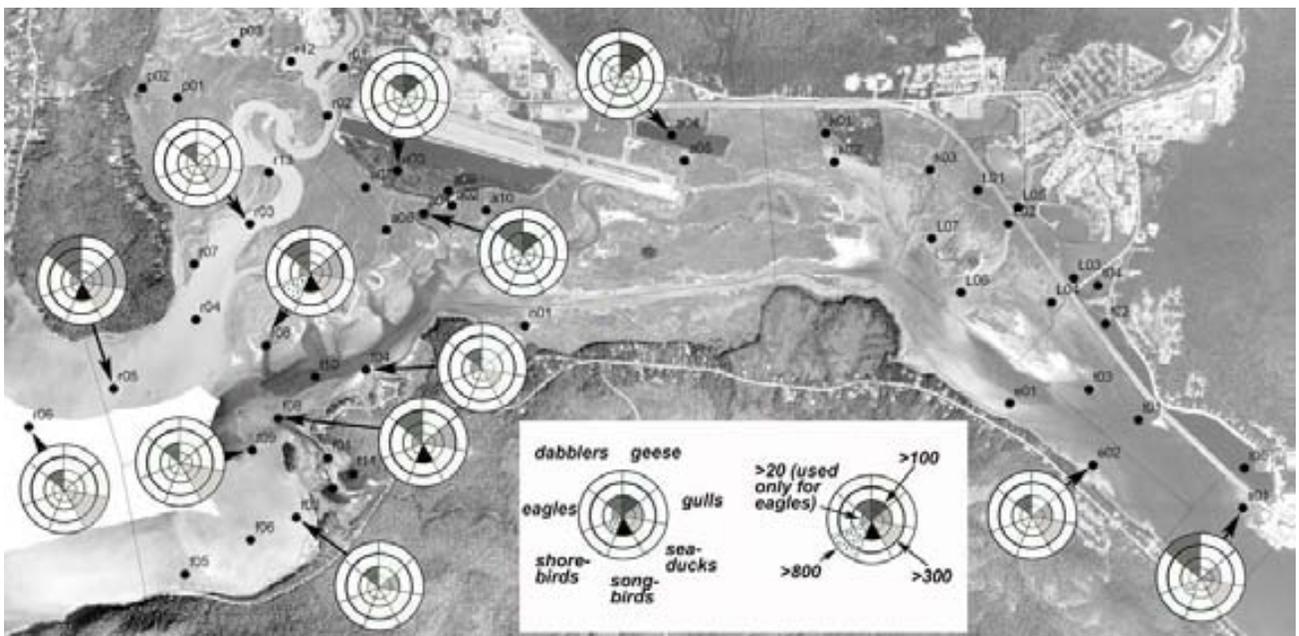


Fig 3.3b Spring distribution of seaducks, songbirds, shorebirds and eagles on the wetlands. See explanation, Fig 3.2



Map 3.3 Top spring hotspots by bird group

were found especially at Otter Pond (a01), Miller-Honsinger pond (a04), and the finger ponds near the Dike Trail (a03 and a04). Relatively heavy use by eagles was observed at Gastineau Channel near Bayview subdivision (f04, $n = 23$ observations), Fish Creek estuary; (f08, $n = 36$ obs.), Mendenhall River mouth; (r05, $n = 62$ obs.), and Western Mudflats; (r08, $n = 79$ obs.).

As on Map 3.2, only those survey areas where more than 400 birds were counted for the season are shown. Only those bird groups with more than 100 counted for the

season are included. (An exception is made in the case of eagles, for which groups larger than 20 are shown - in order to indicate major feeding areas.)

Summer (Map 3.4; Fig 3.4): Summer is a slow time for birding on the wetlands. Nesting songbirds were of course numerous throughout the refuge perimeter in supratidal habitats. But these species were dispersed and did not show up in our hotspot counts. Gulls and shorebirds were the most numerous groups of flocking birds on the

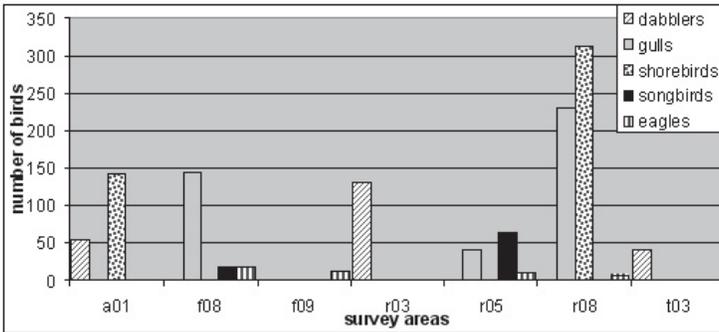
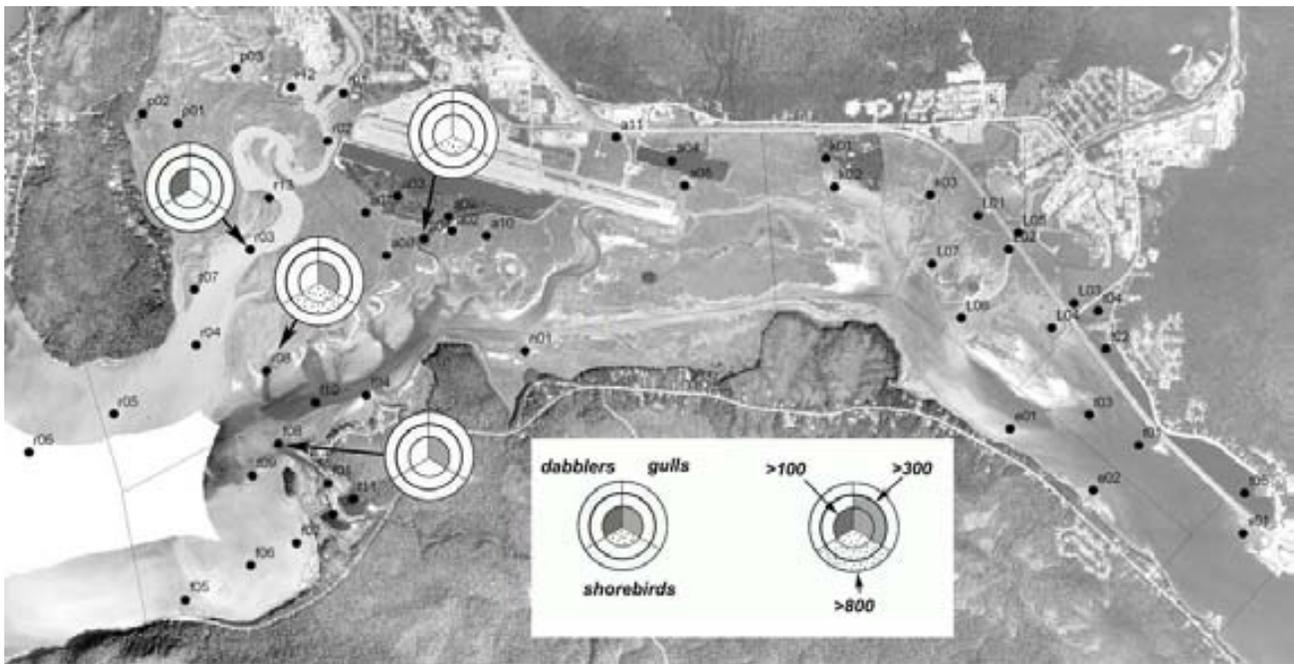


Fig 3.4 Summer distribution of birds on the wetlands. See explanation, Fig 3.2

wetlands, concentrated at Western Mudflats (r08) with a secondary concentration of shorebirds at Otter Pond (a01). Dabblers were seen mostly near the collapsed barge on the river edge (r03). Eagles were regularly seen at Fish Creek estuary (f08, $n = 19$ obs.). Other groups were scarce.

The summer season is defined as June and July.

Generally this serves to isolate the breeding season from spring and fall migration seasons. In the case of shorebirds, however, an early southbound movement begins in July. If summer were redefined to exclude this migratory occurrence, the paucity of bird records would be even more striking.

Unlike the other seasonal hotspot maps (3.2, 3.3 and 3.5), Map 3.4 includes 3 survey areas where less than 400 birds were counted for the season. Using the 400-bird minimum as a “hotspot criterion” would have excluded all observation areas except r08. Minimums for bird groups, however, are the same as for the other seasonal maps; only those bird groups with more than 100 counted for the season are included.

Fall (Map 3.5; Fig 3.5): Gulls were the most numerous birds on the wetland, concentrated at Salmon Creek estuary

Map 3.4 Top summer hotspots by bird group

(s01) and at ERA (e02), with secondary concentrations elsewhere. Dabblers were concentrated at Western Mudflats (r08), with secondary concentrations at several sites. Shorebirds were seen mostly at Salmon Creek estuary, followed by Phalarope Slough (a10). “Seaducks” occurred mostly at Fish Creek estuary (f08), “songbirds” (mostly North-western Crows) at Western Mudflats, Mendenhall River oxbow (r13), and the sedge area west of Otter Pond (a08). Relatively heavy use by eagles occurred at Western Mudflats ($n = 23$ obs.) and Western Channel (f09, $n = 14$ obs.).

As on Map 3.2 and 3.3, only those survey areas where more than 400 birds were counted for the season are shown. Only those bird groups with more than 100 counted for the season are included. (Except for eagles, where groups larger than 20 are shown.)

Coldspots ‘Coldspots’ also occurred on our surveys. In general, the area with the lowest recorded mean levels of avian activity occurred in the narrow part of Gastineau Channel, from about n01 to Hendrickson Point, in all seasons. Other ‘coldspots’ included the Fish Creek ponds (f07, f11), three areas of the Mendenhall River (r07, r12, r13), JunkCar Slough (a02), and Phalarope Slough (a10). However, the fact that the seasonal means were low should not obscure the additional fact that some of these spots could occasionally host bird concentrations (see occasional hotspots pgs 27-32). Examples include: 1000 Rock Sandpipers at Vanderbilt estuary (L04) on May 2003; 120 Lesser Yellowlegs at Phalarope Slough (a10) on July 2, 2002. Furthermore, human and dog activity very likely influence spatial patterns of bird use, especially near the Dike Trail, and probably account for infrequently observed

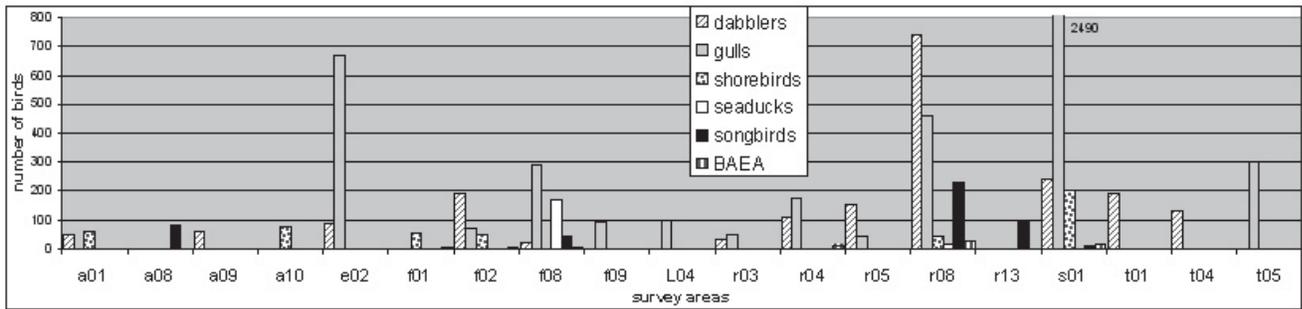
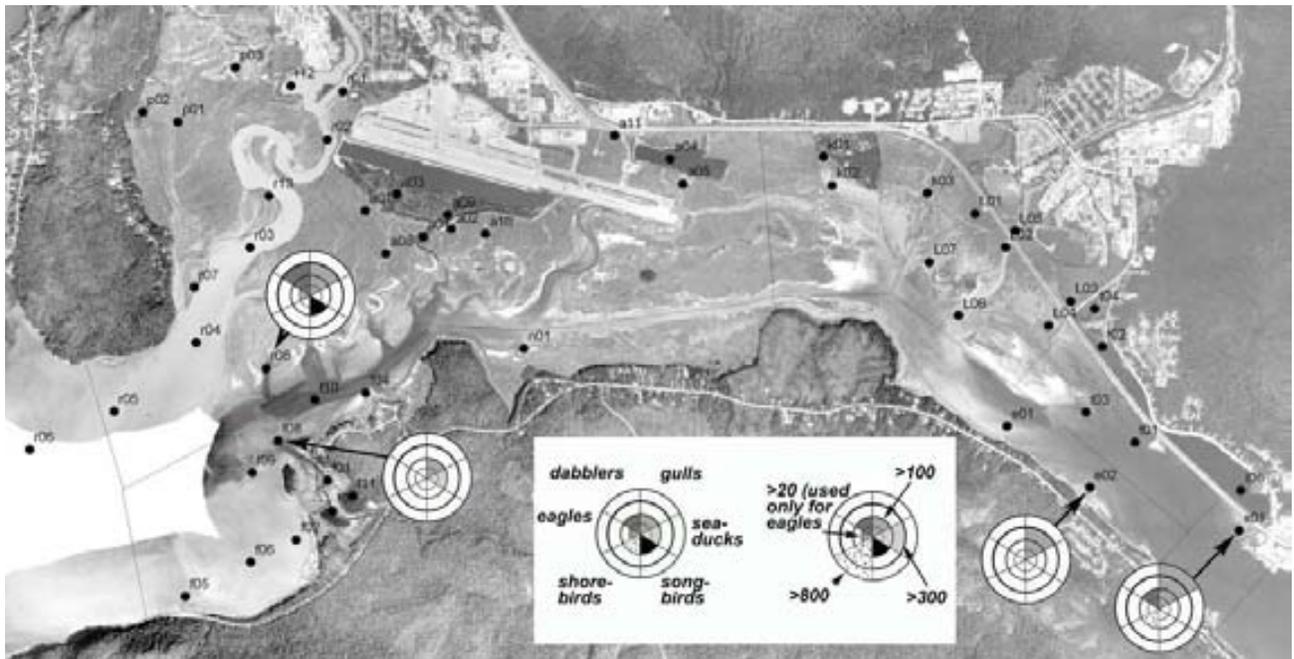


Fig 3.5 Fall distribution of birds on the wetlands. See explanation, Fig 3.2



Map 3.5 Top fall hotspots by bird group

concentrations there.

Ancillary surveys. These observations made in addition to the 18 full surveys provided additional information on high counts of some species. Important examples included:

- Western Sandpiper - 2000 at r08, late April 2002
- Rock Sandpiper - 1000 at L04, early May 2003
- Mallard - 560 on Auke Lake, Oct 23 2002; 540 at f01, Apr 9, 2002;
- Dunlin - 500 at r08, Apr 30, 2002
- Bald Eagle - 20 at R03, Apr 20, 2002; 100 at f08, Apr 21 2002; Sept 7, 2002; 21 at r05, Apr 17, 2003; 44 at r03, Apr 26 2003; 20 at r08, Aug 22, 2002.

However, most of the counts from the ancillary surveys did not exceed those of the full surveys.

Ancillary surveys also documented some additional species that may be of special interest. Included in this list are:

- Sandhill Cranes - 200 on Sept 19, 2002
- Lesser Snow Geese - 35-47 on May 2-7, 2002,
- Black Turnstones - 90 on May 2, 2002
- Black-bellied Plovers - 50 on Apr 30, 2002

Bank Swallows - 150 on July 28, 2002

Lesser Yellowlegs - 50 on July 25, 2002

Two things can be especially noted about the sites that were visited only periodically: heavy use of Auke Lake by Canada Geese and Mallards in fall and early winter, and considerable use of Wigeon Ponds by Mallards and Canada Geese in spring and early summer.