

## Recommended research

- Survey wetland bird populations refuge-wide at intervals of roughly every 5 years, and after any large-scale developments.
- Search the wetland fringes for crow nests, concentrating on young spruce stands in uplift meadows. There are indications that crows have declined since the 1986 survey.
- Document the effects on waterbirds of uncontrolled dogs, using the methods of Burger (1986) and Lafferty (2001).
- Document the response of waterfowl to hunting between Sept 30 and Dec 15. Other hunting-related studies could include crop sampling to determine bird diets, and a survey of hunter attitudes toward closed sanctuaries.
- Conduct bird surveys at night (especially foraging waterfowl) and at high tides (especially waterbird resting areas), to fill in gaps that were not addressed in the current study.
- Map areas of intensively clipped vegetation in the sedge low marsh and succulent marsh during late spring and mid fall as an additional measure of where foraging waterfowl are concentrating. In some ways such a survey could be more representative of overall use than actual bird counts, as clippings show cumulative presence better than do isolated observations. (Droppings also show bird presence but are left by resting as well as foraging waterfowl. Goose droppings are easily distinguished from those of Mallard and other ducks.)
- Document harassment of geese on Auke Lake, and if it is occurring, provide enforcement.
- Shorebirds should be re-surveyed at least every few years. Key period is April 26 to May 23. This could be done on a fairly informal basis if local birders were willing to share their counts with an agency or NGO compiler. Large pulses of spring shorebirds probably do not often slip through the refuge without being detected by one or more of Juneau's active birders.
- Conduct study of tidal current and sediment transport, particularly around spoil islands, as a measure of the ability of tidal scour to "grade" certain sloughs and sparsely vegetated surfaces, offsetting the effects of glacial rebound.
- Potential food resources for fish and wildlife on the wetlands are poorly understood. Studies should address these plant and invertebrate foods and their relationship to changing community structure and distribution.
- Identify all undeveloped or lightly developed private properties containing wetlands contiguous to the Refuge. Purchase of such properties should be among the highest ranking options for mitigation.

## Acknowledgments

Pauline Strong created the phenology mega-table (Appendix C) and the graphs produced from those data. Gus van Vliet contributed information on banded birds seen on and near the Mendenhall Wetlands. Paul Suchanek let us use all of his records of bird sightings on the Mendenhall Wetlands, which had been already entered into Excel. Richard Gordon gave us copies of his many years of bird observations at the mouth of Mendenhall River. Steve Zimmerman reviewed the phenology table and helped fill in the blanks for the accidental and casual birds. Laurie Craig kindly called us whenever she sighted unusual concentrations of birds on the wetlands. We are grateful to volunteers who assisted with the surveys: Sari Saunders, Jenny Purcell, and Mike Tobin.

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On April 29, 2002, Rusty Yerxa flew us over the refuge and surrounding areas. Many of the oblique air photos in this report were taken during that flight. Jack Hodges took us up in the USF&WS Beaver during a zero-foot tide to get vertical photographs of the mudflats and other key wetland habitats. Michelle Kissling, USFWS, had the original concept for this study. She lent us GPS units and laser rangefinder for our initial mapping of hotspots. Bob Christensen of SEAWEAD gave us training and frequent consultation on ArcView 3.2 and ArcMap 8.2, both of which proved instrumental in data analysis.

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## Appendix A

### Common and scientific names

*common names for plants used in text follow Pojar and MacKinnon. 1994*

#### Vascular plants

alkali grass	<i>Puccinellia nutkaensis</i>
arrow-grass	<i>Triglochin maritima</i>
ditch-grass	<i>Ruppia maritima</i>
foxtail barley	<i>Hordeum jubatum</i>
goosetongue	<i>Plantago maritima</i>
hair grass	<i>Deschampsia caespitosa</i>
Lyngbye sedge	<i>Carex lyngbyei</i>
rye grass	<i>Elymus arenarius</i>
sea milkwort	<i>Glaux maritima</i>
Sitka spruce	<i>Picea sitchensis</i>

#### Algae

rockweed	<i>Fucus distichus</i>
“tube algae”	<i>Enteromorpha sp</i>
“mat algae”	<i>Vaucheria sp</i>

# Appendix B

## Species distribution maps

Section 7 contains distribution maps for groups of birds such as gulls and diving ducks. The maps below show distributions for several individual species within these groups. Among dabbling ducks, only Mallard (Map 7.2) and American Wigeon (below) provided enough records for distribution mapping.

Largest dot on each of the following maps had the highest number of birds counted throughout the study period during full surveys. Remaining dots are scaled proportionately. A fraction beside the species name - e.g. 34/456 - means that a total of 34 records was collected for the species during the 18 full surveys, while the largest dot represents an accumulated count for that species of 456 for that particular survey area. (For resident species this may include individuals counted more than once on successive visits. These are therefore not abundances, but reflect the consistent use of certain areas by the indicated species.)





