

AVIAN-WIND INTERACTIVE GIS DATABASE FOR WESTERN ALASKA

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A Pilot Project

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Introduction

Interest in wind as an energy source in Alaska's coastal villages has grown as windpower costs have declined while diesel costs have soared. Villages in western Alaska face some of the highest fuel costs in Alaska, but also have the best wind potential in the state (Figure 1). Windfarms have been installed in Toksook Bay and Kasigluk, and windfarm developments have been proposed for many other communities in western Alaska.

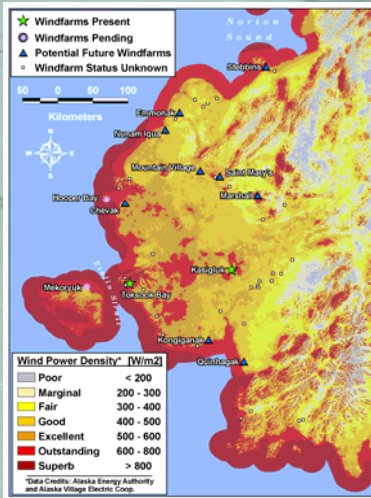


Figure 1. Wind power density and existing, pending or proposed windfarms in western Alaska.

Despite the beneficial aspects of windfarms, they also can have some adverse environmental impacts on birds, through collisions with turbines. Because of potential negative effects, regulatory agencies may require biological assessments before development. In particular, proposed windfarms in western Alaska located near nesting, staging, and/or migratory habitats for threatened eiders, near raptor nesting or concentration areas, or within the range of other species of conservation concern should be identified early in the process to help minimize and mitigate potential impacts.



To improve planning for windfarms in western Alaska, ABR created an interactive information system (GIS) database for western Alaska (defined as the region between southern Norton Sound and northern Bristol Bay). The prime objectives for this database were to compile pertinent avian and related resource information, especially data about threatened and endangered species, which could be used by the diverse group of stakeholders involved in avian-windfarm issues.

Methods

We compiled data from a wide range of sources, including state and federal agencies, scientific consultants, and conservation groups (Table 1). Data-collation techniques included correspondence and interviews with expert ornithologists (in Fairbanks, Anchorage, Juneau, Bethel), review of unpublished survey data, a literature review, and locating sources on the Internet.

Table 1. Data sources and types in the western Alaska Interactive Database

Agency or Company	Data Type
Federal Aviation Administration	Obstruction data
Alaska Energy Authority	Wind-power density
University of Alaska	Arctic Geobotanical Atlas
Alaska Department of Commerce	Community profiles
Alaska Village Electric Cooperative	Met towers—locations
V3 Energy, LLC	Met towers—data period
U.S. Fish and Wildlife Service	Critical Habitat maps: Spectacled Eider, Steller's Eider
Fairbanks Fish & Wildlife Field Office	Telemetry: Steller's Eider
Migratory Bird Management	Breeding-bird densities
Alaska Department of Fish and Game	Spring migration concentrations
U. S. Fish and Wildlife Service	Telemetry data: Steller's Eider
Yukon Delta National Wildlife Refuge	Range maps: shorebirds, raptors
Audubon Alaska	Important Bird Areas
U. S. Fish and Wildlife Service	Golden Eagle nest sites
Juneau Fish & Wildlife Field Office	Peregrine Falcon nest sites
Fairbanks Fish & Wildlife Field Office	Peregrine Falcon nest sites
National Park Service	Telemetry: Gyrfalcon
Denali National Park and Preserve	Peregrine Falcon nest sites
Alaska Department of Fish and Game	Peregrine Falcon nest sites
ABR, Inc.	Peregrine Falcon nest sites
U. S. Fish and Wildlife Service	Seabird Colonies

Results

The database is organized into Regional Information, Community Characteristics, and Avian Data (Figure 2). The categories that would support database queries were the community characteristics and avian data.

Community Characteristics provide information on community profiles, met tower presence, and community-specific avian data, including nearby eider nesting and critical habitat, and known nesting areas for raptors.

Avian Data emphasize information on the bird species of greatest interest for planners, including Spectacled and Steller's eiders, selected species of conservation concern (shorebirds and some raptors), and other species that either have known vulnerabilities to wind-turbine collisions (raptors) or are important as subsistence resources.

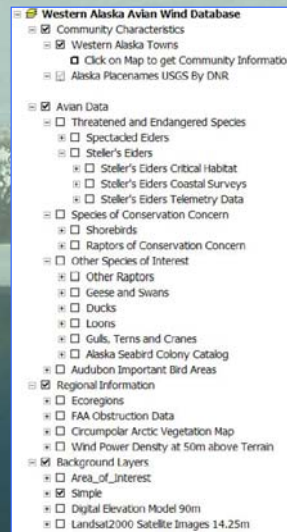


Figure 2. The "table of contents" of the interactive database

Results (continued)

The interactive database allows the user to display single or multiple layers of data at a time, for specific species (Figures 3 and 4). Different base layers are available including a simple vector (line) map, a digital elevation-based layer (shown) and a Landsat image for the most detailed resolution.

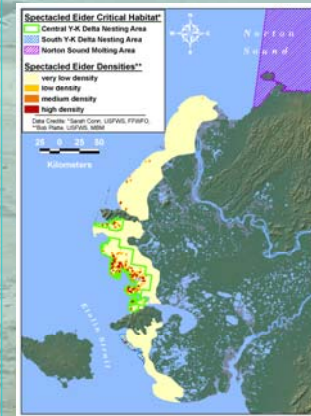


Figure 3. Spectacled Eider Critical Habitat and densities in western Alaska

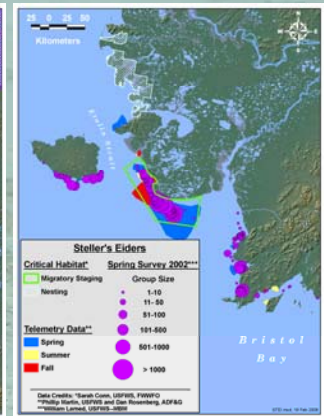


Figure 4. Steller's Eider Critical Habitat, survey numbers and telemetry data in western Alaska.

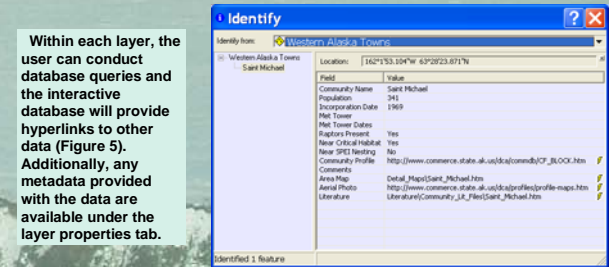


Figure 5. A typical query response page for a community

Within each layer, the user can conduct database queries and the interactive database will provide hyperlinks to other data (Figure 5). Additionally, any metadata provided with the data are available under the layer properties tab.

Conclusions

This pilot project demonstrated that a variety of data from many sources could be pulled together in one place with the tools that would allow users to display information and perform queries easily. This type of interactive tool could help planners from utility companies or other organizations determine, early in the development process, whether there are bird issues that might affect their planning, and hopefully encourage them to contact the appropriate regulatory agency.