Identifying areas of potential conflict between seabirds and wind power development

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Abstract

This project was designed to provide a proof-of-concept example of the utility of using conservation planning tools in a geographic information system (GIS) to guide decisions for long-range land management and coastal management in British Columbia in the context of renewable energy development. Marine bird data were chosen as an indicator of biodiversity and conservation concern. Coastal wind energy development was selected as an alternative energy industry and its requirements were used with the marine bird data to indicate where areas of importance to marine birds may overlap with areas of high suitability for wind energy development offshore.

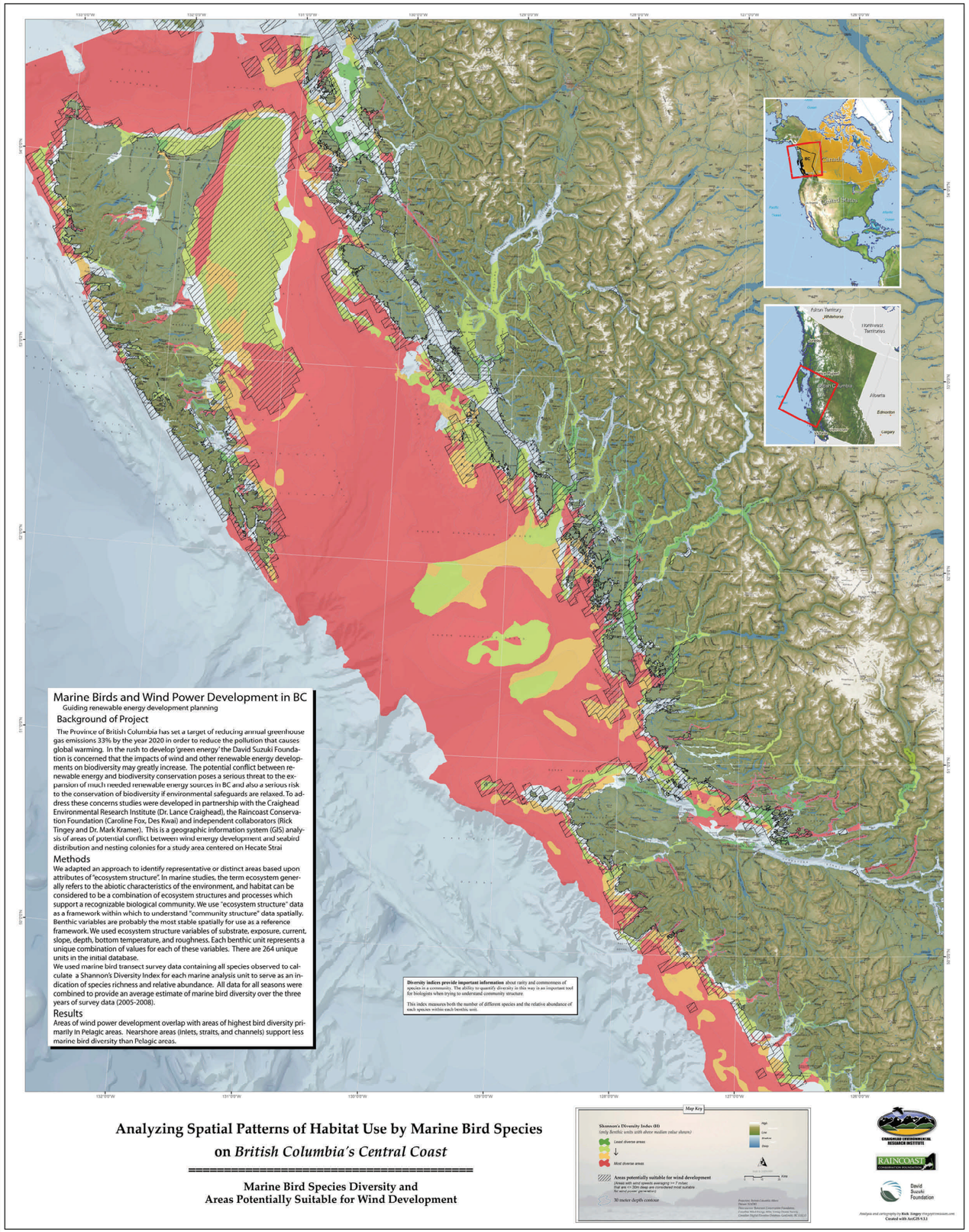
Introduction and statement of purpose

The Province of British Columbia has set a target of reducing annual greenhouse gas emissions 33% by the year 2020 in order to reduce the pollution that causes global warming. Government actions are focused on many sectors of the economy, one of which is providing sustainable energy solutions and minimizing the impacts of fossil fuel energy production and consumption. In the rush to develop 'green energy' the David Suzuki Foundation is concerned that the impacts of wind and other renewable energy developments on biodiversity may greatly increase. The potential conflict between renewable energy and biodiversity conservation poses a serious threat to the expansion of much needed renewable energy sources in BC and also a serious risk to the conservation of biodiversity if environmental safeguards are relaxed. To address these concerns two studies were developed in partnership with the Craighead Environmental Research Institute (Dr. Lance Craighead), the Raincoast Conservation Foundation (Caroline Fox, Des Kwai) and independent collaborators (Rick Tingey and Dr. Mark Kramer). A Literature Review on marine birds examined the state of knowledge and data for the coast of British Columbia and provided the background for a Technical Report. The Technical Report presents a geographic information system (GIS) analysis of areas of potential conflict between wind energy development and seabird distribution and nesting colonies for a study area centered on Hecate Strait.

The maps in this poster session summarize some of the results of the GIS analysis.

Photos of places discussed

Photos of the study area in Coastal British Columbia are displayed with the posters.



Analyzing Spatial Patterns of Habitat Use by Marine Bird Species on *British Columbia's Central Coast*

Important Bird Areas (IBA), Areas in Proximity to Marine Bird Colonies, and Areas Potentially Suitable for Wind Development

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Methods or tasks involved

We used Canadian government datasets to develop a set of marine analysis units or "benthic units" based upon the ecosystem structure variables of substrate, exposure, current, slope, depth, bottom temperature, and roughness. Each benthic unit represents a unique combination of values for each of these variables. There are 264 unique units in the initial database. This study represents a brief snapshot in time. The marine environment is much more dynamic than terrestrial systems and subject to greater variability over time. The marine bird transect data used in this study, which were the best data available, represent only 3 seasons of data. Additional data from subsequent years should reveal changes in bird distribution and abundance as changes occur in the marine environment.

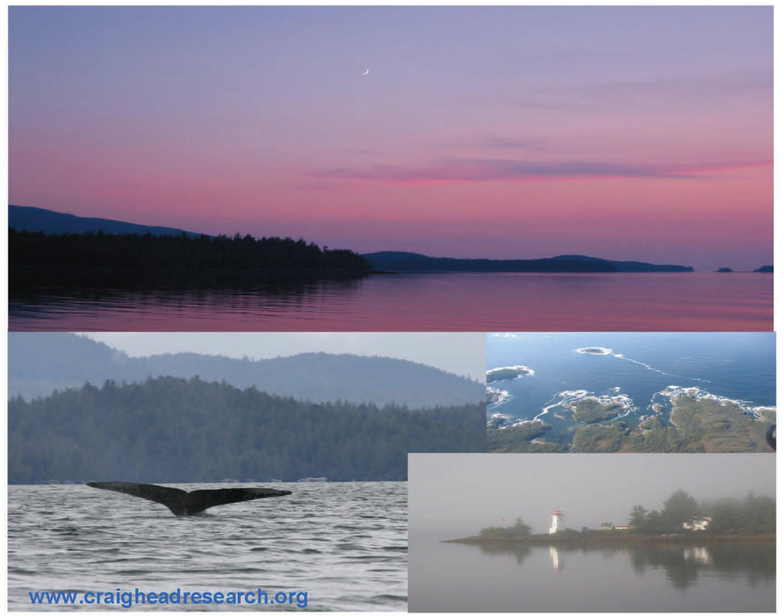
Results of research

Areas within foraging distance of marine bird colonies and Important Bird Areas are relatively fixed locations of great importance to marine birds. These areas should be the last choice for wind power development and will require detailed site specific studies of marine bird use to determine if development can be attempted. Because of their conservation status, Marbelled Murrelets are an important consideration for wind farm development. Any sites within 2000 m of a shoreline should be carefully studied during the Marbelled Murrelet breeding season to determine whether they use the area and whether they would be likely to have conflicts with wind turbines.

All species of loon may be at great risk from wind turbines because they fly at heights where they are susceptible to collisions and because they are slow, heavy fliers that cannot manouever quickly. Densities have been estimated within a proposed wind farm site where some areas contained loons at over 50% of the maximum density of any cell measured: 39.2 birds per km2. Our data indicate that Pacific loons use the proposed wind farm site at densities greater than would be expected during spring, summer, and fall. In addition cormorants, auks (murres, murrelets, gillemots, and puffins), shearwaters, and sea ducks (scoters, mergansers, oldsquaw, goldeneye, bufflehead, and harlequin), and Sandhill cranes either cruise at susceptible elevations (300-900 m) or could pass through wind farms while climbing or descending.

Implications to protected area stewardship

As wind energy development technology advances future wind farms will not be restricted to areas less than 30m in depth. Deeper turbine towers and floating turbine platforms are likely to be feasible in the near future. This study should also provide broad-scale guidance for areas where development further offshore is most likely to come into conflict with marine bird use and where protected areas or development restrictions may be warranted.



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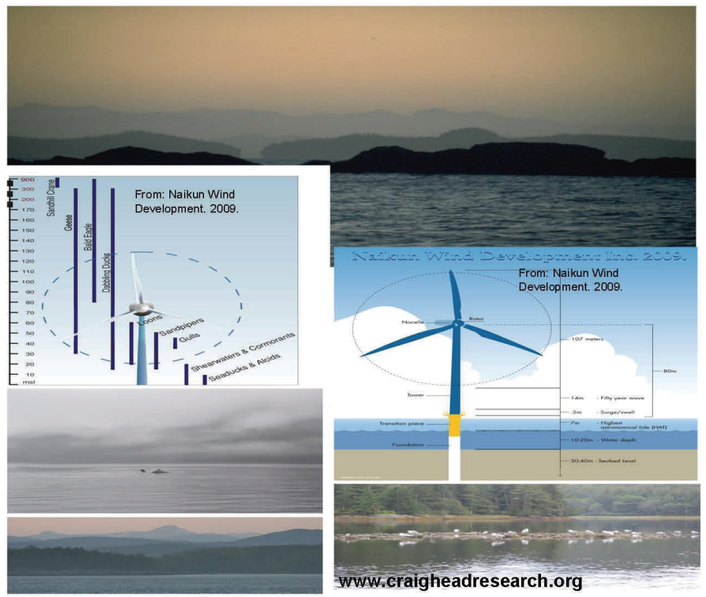

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Benthic Units with Greater Than Expected Year-Round Use by Pacific Loons and Areas Potentially Suitable for Wind Development

Analyzing Spatial Patterns of Habitat Use by Marine Bird Species
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Benthic Units with Greater Than Expected Year-Round Use by Gulls and Areas Potentially Suitable for Wind Development