Using a Fish and Wildlife Landscape Assessment Approach for Informing Watershed-based Management Planning in Birch Bay, Whatcom County

Schuett-Hames, Joanne[1], John Jacobson[1], John Carleton[1], Ann Eissinger[2], and Bob Zeigler[1]

[1]*Washington State of Fish and Wildlife,* [2]*Nahkeeta Northwest Wildlife Services*

Introduction

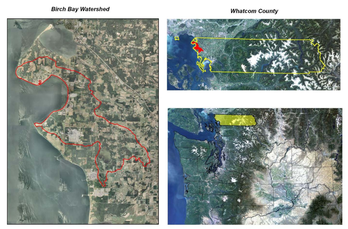
Under the auspices of several state laws, including the Growth Management Act (RCW 36.70A) and the Shoreline Management Act (RCW 90.58), local governments in the State of Washington are responsible for making and implementing land use decisions that accommodate expected growth while limiting environmental impact. The Washington Department of Fish and Wildlife (WDFW) is supporting local government planners in these efforts by developing fish and wildlife habitat suitability assessment tools and providing guidance applicable over multiple spatial scales.

We applied these assessment tools in the Birch Bay watershed, Whatcom County, to inform a collaboratively developed watershed management plan.

Integrating our results with a characterization of watershed processes by Washington Department of Ecology, we designed a conceptual plan to guide biodiversity conservation in the Birch Bay watershed.

Assessment Location

Birch Bay is a coastal embayment in Whatcom County, Washington, five km from the Canadian Border. Area of the watershed is about 80 km^2 and consists of the drainages of Terrell Cr. and several small unnamed streams.



Fish and Wildlife

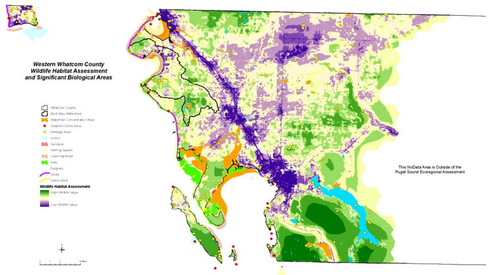
Because of its location on the Pacific Flyway and its mosaic of forested, open grassland, wetland, and marine habitats, Birch Bay and its watershed support a rich and diverse fauna. Of approximately 230 terrestrial and avian species, 80 are listed as Priority Species by WDFW, and 21 are considered “Species of Greatest Conservation Need” under Washington’s Comprehensive Wildlife Conservation Strategy.

Broad Scale Habitat Assessment

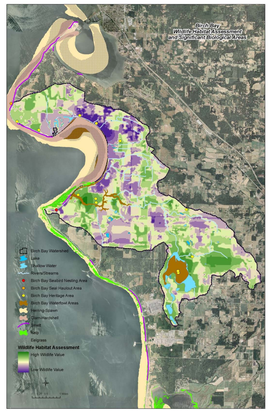
Our broad scale assessment combined information from several sources. Ecoregional Assessments represented regional biodiversity priorities. WDFW Priority Habitats and Species data were used for locally important habitats. The relative impact of land use changes was taken into account through incorporating land cover and road density data.

After smoothing the data and converting to raster format, each 30 m^2 pixel was scored on a 1 to 10 scale for each data layer. We used ArcGIS 9.2 geographic information system (GIS) software to sum the pixel values, then color-coded the output. Higher relative score was interpreted as higher general suitability of habitat.

We carried out this modeling separately for Whatcom County and the Birch Bay watershed. The maps demonstrate patterns of habitat quality and connectivity.



Habitat assessment for western Whatcom County. Dark green represents the highest quality habitat, grading to dark purple as the most impacted habitat.



Habitat assessment for the Birch Bay watershed. The southern half of the area holds the greater concentration of mid- to high quality habitat.

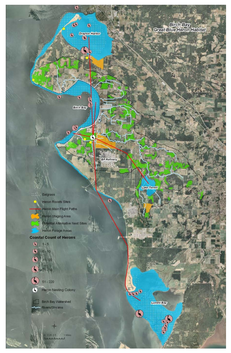
Care should be taken to avoid use of the model at the site scale, even though a great deal of detail is shown. Data smoothing and conversion to raster images reduces the spatial precision of the results, as does the inability, within the land cover data set, to distinguish unused grassy areas from those actively cropped or used for pasture.

Mid-scale Habitat Assessment

We used a stressor-based approach for the mid-scale analyses. This involved examination of the effects of development on habitat composition, configuration, and connectivity, on ecosystem processes, and on interspecies relationships. We narrowed the scope to a smaller set of representative focal species or species groups, chosen with the help of local experts, and designed to cover all major taxa. Four of the twelve focal species/groups we used were:

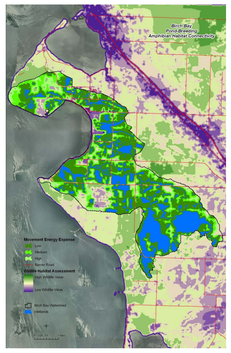
- Great Blue Heron
- Northern Red-legged Frog, Western Toad
- Waterfowl
- Grassland/open habitat birds

For each focal species or group, we used ArcGIS 9.2 to analyze the capacity of the watershed to support critical life needs and examine the extent of development-related impact. Priority Habitats and Species point and polygon data, land cover, soil type, and road network data layers were central to these analyses.



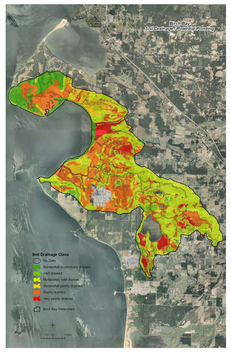
Analysis map for Great Blue Heron, showing the current heronry site, common roosts, foraging areas, and flyways, known staging areas, and potential alternate nesting sites featuring mixed forest.

This colony is regionally significant, the third largest in the Salish Sea, with about 300 nesting pairs.



Analysis of habitat connectivity for pond-breeding amphibians. Potential breeding areas are shown in blue; all shades of green are within the seasonal movement range of the animals. Roads shown in red are considered barriers to movement.

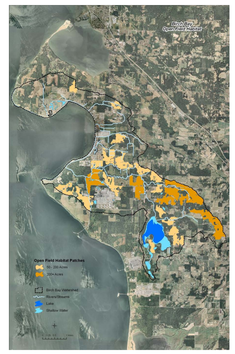
The watershed is currently rich in wetlands and relatively rich in permeable habitat. The southeast portion is also relatively free of high traffic roads.



Soil drainage class map, used as a surrogate for potential wintering waterfowl habitat. Birch Bay is on the Pacific Flyway and is used by large concentrations of these birds. Ponded areas are important for loafing and feeding, as well as serving as refugia during the coldest winter weather.

Open field patches within the Birch Bay watershed. These areas are a very important part of the habitat mosaic, necessary for Short-eared Owl, Western Meadowlark, and Northern Harrier.

A subset of these open fields has been out of agricultural production or pasture use for many years. Where this is combined with a re-growth of hedgerows and trees, and occurs adjacent to forest, these habitats support the greatest diversity of birds of any habitat type in the watershed.



Habitat Conservation Overlay

As a final step, we used the results of all analyses to design a conceptual conservation plan to guide citizens and planners in sustaining the area’s biodiversity in the future. The plan focuses conservation actions in portions of the watershed prioritized for protection and restoration by the Department of Ecology watershed characterization methodology.

Conservation recommendations can be accomplished through select low impact development techniques, open space programs, transfer of development rights, transportation system planning and operation, and direct citizen action. Without action, we would expect projected full buildout to lead to eventual loss of up to 60% of current species diversity.

Conservation overlay map. The terrestrial focal area is shaded green, with the marine/marine riparian/nearshore area in bluish gray. For each area we developed recommendations for maintaining adequate patches of habitat, retaining or re-establishing connectivity, minimizing the impacts from further residential development, restoring habitat-forming processes, and/or implementing traffic softening measures.

Within sub-watersheds outside of the conservation focal areas, we also made recommendations for retaining effective patches of habitat to support species less sensitive to human presence and development.

Contact

John Carleton
(360) 902-2622
carlejpc@dfw.wa.gov

Joanne Schuett-Hames
(360) 902-2695
schuejps@dfw.wa.gov