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Determining Conservation Values and Potential Conservation Areas in Kitsap County, Washington

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Purpose

Natural habitats are slowly disappearing as the human population grows and pushes the boundaries of cities outward. Conservation areas can be determined through careful analysis of the lands attributes and population density. The purpose of this project is to examine the land cover, locations of wetlands and water, predicted wildlife distributions, current land use, and population density of Kitsap County, Washington and determine which areas have a high conservation value based on these attributes. One of the main draws of Kitsap County is its natural beauty; in order to preserve the allure and environmental value of these vital habitats, we must find a way to determine which areas should be the top priority for conservation. Large scale analyses such as this can be used to target potential conservation areas which can then be examined at a smaller scale (i.e. through field work and ground truthing) to determine which areas truly are the best choices for conservation.

Objectives

There were three major goals for this project. The first and foremost was to design a method for combining the land cover, water, and wildlife attributes for Kitsap County in order to create a decision cube for areas with the highest conservation values. The second goal was to further analyze the best areas for potential conservation efforts by compare final conservation values to population density. The third goal was to compare areas with high conservation values to the land use designation of parcels in Kitsap County. It was hypothesized that areas the areas of low conservation value would be found in areas with a high population density and areas of high conservation value would be found in areas with a low population density. In addition, it was hypothesized that many of the parcels that coincide with higher conservation values will be land that is used for natural resources or as open space.

Future Studies

Future studies should look in depth at wildlife presence in relationship to human population. These studies should also look at the types of species present (for example, edge, keystone, invasive, etc.). In addition, extensive field work should be done before decisions are made designating conservation areas.

Methods

This analysis was performed using ArcGIS v. 9.3.1 Geographic Information Systems (GIS) software. All data was projected using NAD 1983 State Plane Washington North FIPS 4601 and the raster cell size used for analysis was 30 feet. National Land Cover Data (USGS 2006), water quality (Kitsap County GIS), and predicted wildlife distribution (WDFW 1997) data were converted to rasters and each dataset reclassified into three categories with values ranging from

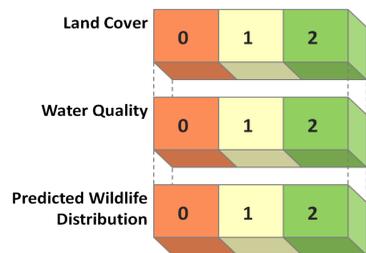


Figure 1. Model of the raster overlay used as a decision cube to determine conservation values.

0 to 2. A value of 0 represents areas with low value or undesirable attributes represents average or medium attributes, and 2 represents the highest value and most desirable attributes. These were then overlayed in raster calculator to create a decision cube (model shown in Figure 1) for Kitsap County. Figures

2, 3, and 4 show the initial rasters and their reclassified values. The final decision cube (Figure 5) has seven possible conservation values ranging from 0 (very low) to 6 (very high). The decision cube was modeled after methods created by Savitsky and Lacher (1998). Population density was determined using total population by block groups (U.S. Census Bureau 2000) and interpolated using inverse density weighting (IDW), shown in Figure 6. Parcel data was obtained from the Kitsap County GIS Department and reclassified into thirteen general categories based on land use type (see Figure 7 for categories). For analysis of population in relationship to conservation value, areas with a medium to very high conservation value were selected out and areas of low and high population were selected out and intersected. A similar technique was used to select parcels that intersect with land that has a high conservation value. Summary statistics were used on these parcels to determine percentages for land use and the average acreage of the different parcel land use types.

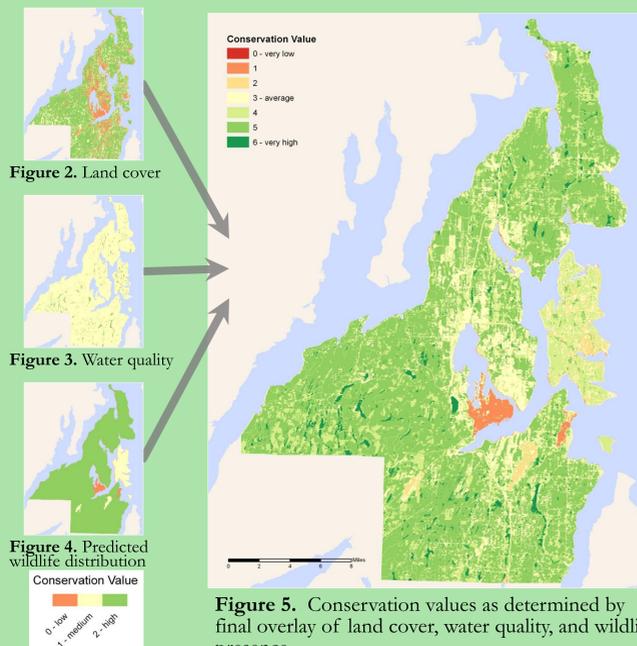


Figure 5. Conservation values as determined by final overlay of land cover, water quality, and wildlife presence.

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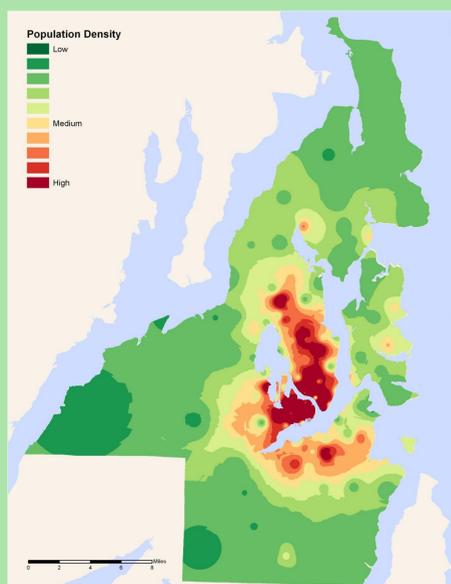


Figure 6. Population density of Kitsap County, WA. Population data from the U.S. Census 2000.

Results

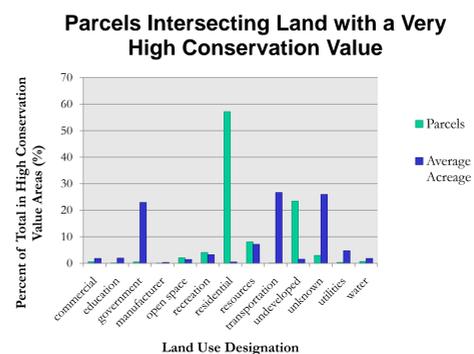


Figure 7. Comparison of the designated land use of parcels and the average size in acres of those parcels that intersect land with a high conservation value.

The parcel analysis portion of this project showed parcels intersecting land with a very high conservation value are mostly residential and undeveloped as opposed to the hypothesis that most of the land would be resources or open space, which is shown in Figure 7. However, further analysis showed that while a majority of those parcels are residential and undeveloped, the average acreage for those parcels is relatively small. This shows that while the population density in those areas is low, there are still many people living outside of city limits in more natural settings (as opposed to living within city limits). In addition, this analysis showed that while a majority of the land in Kitsap County with a medium to high conservation value is found in areas of low population density, there are some areas of medium to high conservation value found in areas of high population density, which is shown in Figure 8. These areas are most likely residential properties or public parks.

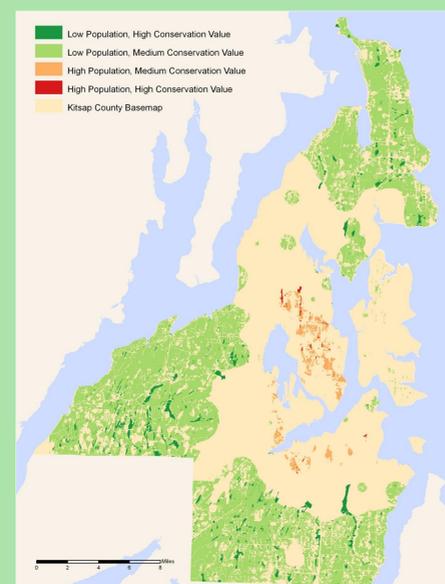


Figure 8. Comparison of land with high and low population densities to land with high and medium conservation values.

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