
A wildlife habitat network: designation and implementation

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Abstract

A network of wildlife habitats was identified to link important protected natural areas throughout King County, Washington. This diverse County extends from the City of Seattle and Puget Sound to the crest of the Cascade Mountains. The County is urbanizing rapidly, and includes both urban and rural designated zones. The best remaining locations for the wildlife network were identified using the County's geographic information system (ARC-INFO), and a series of decision matrices to analyze spatial information. Map data layers analyzed included streams, wetlands, existing land uses, parcel size, and ownership size. Areas that ranked poorly on the final habitat value map would be more likely to support a lower diversity, and a greater proportion of urban and exotic species than native species. This methodology resulted in a network that is primarily located in rural areas since connections have been lost in more urbanized landscapes. The process highlights the need to act sooner rather than later to manage for wildlife diversity in urbanizing areas.

The wildlife habitat network is designated in the Comprehensive Plan, and is implemented through a regulatory program. Wildlife Program staff must review all development permit applications for parcels that are crossed by the designated network. There have been some problems with proper routing, permitted exemptions, and landowner understanding of the requirements. Enforcement may become a problem in the future. It is still too early to test the effectiveness of the network in achieving conservation goals since many designated areas are still undeveloped.

INTRODUCTION

One of the greatest impacts of urbanization on wildlife is habitat fragmentation. Local jurisdictions can protect blocks of habitat through parks' programs and acquisition strategies. Sensitive areas ordinances that protect streams and wetlands also protect small bits of habitat throughout the urban area. However, as the landscape matrix shifts from natural vegetative cover to urban land uses, these areas become remnant habitats that are disconnected and isolated from each other.

Urbanization is occurring at a tremendous rate in King County, Washington. The network is an attempt to create a system of nodes and linkages that will protect some habitat and wildlife values in the urbanizing landscape. Through local stream and wetland protection regulations and open space acquisition programs, a tremendous amount of public money and effort has been expended to protect small- to medium-sized blocks of wildlife habitat. If we allow those areas to become isolated, we will lose many of the wildlife values that we are

trying to preserve. Finding ways to connect those blocks of habitat could help to maintain their wildlife values.

In an environment of rapid urbanization, development proposals are foreclosing options for wildlife protection almost daily. Unless linkages are identified prior to development, opportunities for wildlife habitat protection will be lost.

NETWORK DESIGNATION

King County is located in western Washington. Seattle is the largest city in the County. The County is over 2100 square miles in size with a population over 1.5 million. The County may be divided roughly into thirds with the western third composed of the City of Seattle and its immediate suburbs. The middle third includes the lower density suburban areas and the designated rural zone. The eastern third is the forest production district where the major landowners are the U.S. Forest Service and Weyerhaeuser Corporation. The County ranges from

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the marine waters of Puget Sound to the alpine habitats at the crest of the Cascades. There are a number of major river valleys separated by rolling plateaus formed by the glaciers of the last ice age. The landscape is traversed by a system of streams that support salmon. This system connects the plateaus to the river valleys; and is filled in by second growth forests, farmlands, and residential development.

Network designation focused on areas where habitats currently exist with the intent of maintaining those connections as development occurs. We used the ArcInfo GIS software to determine potential areas for the network. The first step was to identify the highest quality habitat areas, or those areas most likely to support the greatest diversity of native wildlife species. Places that were top candidates for network routing were places with high quality streams and wetlands, low or no existing development, and places where the lots were a little larger. The methodology is described in detail in Stenberg et al. (1997).

The streams, wetlands, and land use or land cover portions of the model simply identified those places with the most diverse existing habitats. These are the areas where the greatest diversity of native species would be expected. The lot size portion of the model assigned higher habitat values to areas of larger lots. Larger lots will have a greater potential for creative development schemes and they support a greater diversity of native wildlife.

Streams, wetlands, and public ownerships were overlaid onto the final habitat value map and potential routes that would connect the public lands while staying in the streams and wetlands as much as possible were identified. Field investigation of the potential route was the final step, and some segments were eliminated at this point as encroaching developments had reduced their wildlife value.

NETWORK IMPLEMENTATION

The final network map was adopted as part of the King County Comprehensive Plan. A new section of the zoning code was drafted to implement the network and formally adopted by the County Council during a regular update of the code. All of the parcels that are crossed by or are adjacent to parcels that are crossed by the network, are flagged in the County's parcel database. This flag is located in the system with all other special limitations that might be attached to a parcel such as known streams, wetlands, steep slopes, and special drainage or clearing conditions. The flags in the parcel database are used by the permit staff to properly route permit applications for review. The flags are also used by potential buyers to evaluate the relative

merits of properties they are considering purchasing.

The regulations require that all applications for building permits and permits for subdivision of land on flagged parcels go through a wildlife network review. That review involves locating the mapped network on the parcel and reconciling it with the actual location of the sensitive areas. If there are additional sensitive areas discovered during development review they may be included in the network. The code also allows the landowner to route the network anywhere on the property as long as it enters and exits the property where the map shows and it makes a continuous network across the property. This allows some flexibility for the landowner to take advantage of additional sensitive areas and to make adjustments for the development design.

Once the route has been agreed upon by County staff and the landowner, then it is shown on the application site plan. Subdivisions must show the network as a separate tract that is designated as the network, and is managed like other sensitive areas. Permits for individual single-family homes must show the network as a notice on title recorded with the County.

Permits cannot be issued until the wildlife review has been completed. This places the wildlife review on the same level as the health department review, or the structural engineering review. The key point is that there is a process for implementing the network. While this may not be the most efficient method, we do have a process and the network is being implemented.

CHALLENGES

The network does not connect all of the parts of the County that it might be desirable to connect. The simple model focused on places where high quality habitats existed. As a result, places that had already experienced some level of urbanization and fragmentation were not included. Most of the network is located in the rural area simply because that is where the habitats were left. It is important to identify and designate critical areas earlier rather than later since even a year or two of rapid development can result in significant losses.

Proper review of permits is predicated upon proper routing of permit applications to wildlife review staff. This routing does not always occur and a small number of permits have been issued without the proper review or conditions to implement the network. This is human error, and can be reduced by increasing the frequency of training on proper procedures for permit intake specialists.

The network is not something that can be seen on the ground like a stream or wetland, and as a result,

the network requirements sometimes come as a surprise to landowners. Notice in the newspapers of a comprehensive plan adoption or regulatory update has been determined to be adequate legal notice of changes. The County does not send personal notices to every landowner in the County every time there is a policy or regulatory update. Landowners should be notified if they inquire about conditions on a specific parcel or when they first apply for any kind of permit. Occasionally this does not happen, and the most severe problems arise when landowners are informed very late in the application process. Again, this is human error and more frequent training of frontline staff will help reduce these problems.

Monitoring and enforcement are problems for the near future. King County does not have sufficient staff to monitor all of the properties with network designation. Like most jurisdictions, code enforcement officers barely keep up with the violations that are reported to them. Code enforcement does not have the staff to monitor properties to find violations above and beyond those that are reported to them.

Regulatory programs are a more complex process than acquisition programs, and so there are more places in the process where things can go wrong. When writing codes, there are many exemptions and loopholes to be aware of. For example, if an applicant goes about the process in a different order than normal, will he/she be able to avoid the intent of the law? Despite these challenges, the King County Wildlife Habitat Network continues to enjoy a high level of public support and compliance.

CONCLUSIONS

The wildlife habitat network was identified based on a fairly simple model of habitat value. The model used information that was readily available in the County's GIS databases. Since the type of information used is generally available to community planners, the method should be relatively easy to implement in other jurisdictions. The network that was designated met the objectives of connecting valuable sensitive areas and protected public open spaces, and forming a continuous network across the County to the extent possible. Since many of the landscapes crossed by the network are still undeveloped, it is still too early to determine if the network will meet the additional objectives of preventing loss of wildlife values in sensitive areas, and of protecting species diversity in protected public open space/habitat reserves.

Some researchers have criticized the trend toward the use of wildlife networks or corridors (Simberloff & Cox 1987; Simberloff et al. 1992). There is concern that corridors might enhance the spread of ecological disturbances such as disease or invasive, exotic

species, or that they will become mortality sinks. Certainly more study of the King County system will need to be conducted in the future.

REFERENCES

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