

Wetland Mapping for the Thurston Region

WHY MAP WETLANDS?

Wetlands are a part of life in Thurston County. These "wet – lands" are remnants of the last glaciations that left the county with a large number of depressions which have now become what used to be called swamps, marshes, and bogs. The importance of wetlands to our landscape can not be overstated.

While most often noted for their fish and wildlife habitat, in Thurston County wetlands are a key component of our surface and groundwater system. Almost all Thurston County resident drink groundwater and wetlands provide filtration for surface waters. Wetlands are also a part of riparian habitat necessary to maintain the aquatic health of our streams, lakes, and marine shorelines. Salt marshes are also known as some of the world's most productive ecosystems, and essential for the life stages of several species of salmon. Some Puget Sound salmon species are now listed as a Threatened on the Federal Endangered Species list.

Unfortunately, wetlands have often been looked upon as waste land. They have been diked, drained, filled, or converted for agricultural use. Thurston County has lost its share of wetlands, but this trend began to diminish in the 1980's. Now numerous communities are seeking to maintain a "no net loss of wetland functions and values" in their comprehensive plans and development regulations. This change in community priorities was in part due to being better able to map wetlands.

EXISTING MAP SOURCES

Mapping wetlands in Thurston County began in the 1980s with the Thurston County zoning regulations prohibiting the filling of wetlands. However, at that time there were no maps or guidebooks to help with field delineations. In the early 1980's the U.S. Fish and Wildlife Service provided preliminary National Wetland Inventory (NWI) maps, but these missed so many wetlands that the entire Puget Sound was redone in the late-1980s. The only other generally reliable data source was the local soil survey, which provided delineations of hydric or wet soils. In 1990 the Soil Survey for Thurston County, Washington was prepared by the U.S. Department of Agriculture after years of work to update the original 1956 edition.

Both the NWI and soil survey maps are of limited value for permit review because of the large mapping scale of 1 inch = 2,000 feet. This is the same scale and size as a 7.5 Minute USGS quad map. The NWI mapping is considered to be very conservative, with the photos used for interpretation taken in the dryer times of the year (usually August). By comparison, use of the soil survey map alone may overstate the extent of wetlands. Hydric soils are often the most fertile and have been dredged, diked, or drained over the years. According to the now adopted

U.S. Army Corps methodology, areas cannot be classified as "wetlands" without the presence of hydric soils, water, and wetland vegetation.

While these maps were an acceptable scale for general planning purposes, in 1987 the regions' planners indicated the need for better mapping to support stormwater, groundwater and watershed planning efforts. In many other counties in Puget Sound, the NWI and soil survey maps are used as the best available information.

REGIONAL WETLAND MAPPING

Thurston Regional Planning Council (TRPC) began to explore the possibilities of mapping wetlands for the entire region. In 1989, TRPC undertook a pilot project to test if it was possible to map wetlands using false-color infrared aerial photographs. Accuracies in the cities needed to be greater than the rural areas, so various scales of photography were tested.

Example of a Wetland Section Map (Low Resolution - 100 dpi)



The technique was found to be a success and TRPC obtained several grants to map northern Thurston County, which included the Urban Growth Area for Lacey, Olympia, and Tumwater. A second grant was later obtained to map the remainder of the Deschutes River watershed downstream of Deschutes Falls. This totaled about 375 square miles.

After several years of use, local planners noticed that in some locations the wetland maps overstated the size or existence of a wetland. A small grant was obtained to have a local wetland consultant explore this problem, and find ways to improve the mapping accuracy. He compared the completed wetland maps to actual on-site delineations and found that the lack of a topography layer and mapping forested wetland mapped on non-hydric soils were the two key

problems. In 1997 the regional wetland maps were "scrubbed" to correct a short list of mapping inaccuracies.

NEW APPROACH TO WETLAND MAPPING

In 1999, the Thurston County GeoData Center (TGC) completed two-foot contour mapping for the entire county. That year TRPC contracted with Thurston County to prepare new wetland maps using a new technique. This approach used a computer to combine the topography, NWI, and soil survey data over the top of an aerial photograph base. Staff then mapped wetland boundaries on these work maps which were twice the size of previous phases. Photo signatures registration and quality control were maintained by contracting with a local wetland consultant for field reconnaissance.

The results of the new technique meet expectations. Improvements were seen in determining the type of wetland, more accurate boundaries, better mapping of stream corridors, and delineation of smaller wetlands, and lower cost per square mile even with the private consultant.

In 2001 the use of color aerial photographs replaced the black and white images as the base for the work maps. The use of color aerial photographs made delineations easier on relatively flat ground (such as around Tenino, Yelm, and Rainier). It also allowed for wetland maps to be created for rural parts of the county (such as the Skookumchuck River Valley) where false-color infrared aerial photographs were not available. The regional wetland mapping program was complete in 2002 and has created maps for 615 square miles of Thurston County, which includes all the cities and towns.

FINANCIAL CONSIDERATIONS

The cost of mapping wetlands in Thurston County has significantly decreased over time. In 1991, a pilot project used to test the mapping protocol cost \$2,300 per square mile. In the first and second phases the cost was reduced to about \$1,000 per square mile. In 1999 TRPC staff began to map the wetlands through the use of more detailed topography, digital aerial photos, better use of GIS data layers and a limited number of field inspections. This technique was actually found to be more accurate than the original technique, and brought the cost of mapping one square mile down to \$450. Total unadjusted cost was about \$482,000, or well over \$1/2 million in current dollars.

CONCLUSION

The regional wetland mapping program is an example where the communities of the region came together to address an important data need. The product is significantly better than just using the combined NWI and soils maps. The regional wetland mapping coverage has been used in groundwater, stormwater and watershed planning efforts. It provides a needed tool to flag properties which may contain wetlands, and where setbacks or buffers may be required. Even without the regulations, the maps are a valuable educational tool.

Reliable wetland maps for the Thurston Region did not come cheap. It required almost \$500,000

from state grants, multiple jurisdictions, and Thurston County. Quality control issues were addressed after a few years of use, and the project might still be underway without significant improvements in technology which reduced the cost per square mile by over 50 percent. Individual wetland maps for the 615 square miles of the Thurston Region are now available from the following two web sites.

[Thurston County Water Resources Home Page](#)
[Thurston Geo-Data Center](#)

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