

Herrera Environmental Consultants, Inc.

Executive Summary

To Kimberly Swan, Clackamas River Water Providers
From Jennifer Schmidt, Herrera Environmental Consultants
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Subject GIS Geodatabase Development and Risk Analyses Executive Summary

In 2010, the Clackamas River Water Providers (CRWP) developed a Drinking Water Protection Plan that outlined a series of strategies and programs to address potential threats to source water quality in the Clackamas River watershed over the next ten years. As a part of this plan, the CRWP hired Herrera Environmental Consultants (Herrera) to complete a phased two-year project with the following objectives: 1) identify and gather Geographic Information Systems (GIS) datasets related to drinking water quality into a spatial Drinking Water Protection geodatabase tool; and 2) complete a series of GIS risk analyses that focus on six potential pathways for pollutant export identified as being high risk to source water quality in the Clackamas River watershed.

In Phase 1 (FY2010), Herrera first coordinated two project kick-off meetings with CRWP partner agencies and stakeholders to solicit input and facilitate project buy-in. Information collected during these meetings was used to identify and gather more than 100 GIS datasets related to drinking water quality in the Clackamas River watershed through close coordination with local, state, and federal agencies. Herrera compiled this data into a GIS Drinking Water Protection geodatabase; it was decided during the project kick-off meetings that the final geodatabase would be hosted by the City of Lake Oswego at the end of Phase 2.

The Risk Analysis work done in the second year of this project (FY2011) was funded by the U.S. Environmental Protection Agency through the Oregon Safe Drinking Water Program administered by the Oregon Business Development Department. In Phase 2, Herrera completed a series of GIS risk analyses to assess potential threats to source water quality from the following high-risk activity categories identified in the CRWP Drinking Water Protection Plan:

- Septic Systems
- Agricultural Activities
- Forestry Activities
- Vulnerable Soils
- Urban Development
- Point Source Pollutants

The goal of these GIS analyses was to map risk factors known to have a strong negative correlation with drinking water quality in the Clackamas River watershed. To accomplish this, Herrera first prepared an analysis approach outline for each risk analysis category that was sent

out to CRWP partner agencies and stakeholders for review and input. Then a GIS predictive risk matrix analysis approach was used to identify risk “hot spots” in the Clackamas River watershed through the following methodology:

1. Identify the spatial datasets that best represent risk for each factor being analyzed.
2. Apply scientific expertise to rank each dataset into low-to-high numerical categories.
3. Overlay and add the numeric ranking values assigned to each dataset together to obtain an overall assessment of risk.

Mapped risk “hot spots” for each category provide a spatial context for both the geography and intensity of risk by activity that can be used by the CRWP to help prioritize mitigation efforts. The results generated from each risk analysis include: 1) a memorandum summarizing the analysis objectives, data sources used and limitations, analysis methodology, and resulting trends and recommendations; 2) a series of maps showing risk “hot spots” for each risk category in the watershed; and 3) GIS risk analysis results data uploaded into the Drinking Water Protection geodatabase. As part of Phase 2, Herrera also developed a list of required datasets and a recommended approach for developing a GIS-based watershed emergency response system for the Clackamas River watershed.

In May 2012, Herrera gave a presentation to the CRWP on interpreting the GIS risk analysis results and outlining recommendations for next steps. The main conclusion presented at this meeting is that the results generated from each risk analysis are intended to assess the geographic distribution of risk within the watershed for each risk activity category; they are not intended to assess relative risk to source water quality between categories of risk. To better assess which activities are the primary contributors to source water quality issues in the Clackamas River watershed, Herrera recommends that the CRWP use the GIS data generated in Phase 2 to complete a pollutant load modeling effort to quantify the relative contribution of pollutants to drinking water quality from different sources. Once the results of a pollutant load model help the CRWP identify the activities with the largest relative contribution, the GIS risk “hot spot” results generated in the Phase 2 risk analysis will allow the CRWP to begin implementing some of the source-specific mitigation and prevention efforts outlined in the Drinking Water Protection Plan.