Groundwater-Surface Water Modeling of the Walla Walla Basin Using IWFM

Jake Scherberg1, Aristides Petrides-Jimenez1, John Selker1, Troy Baker2, Rick Henry2

1 Oregon State University 2 Walla Walla Basin Watershed Council

Abstract

The Walla Walla Basin lies in the west and south of Eastern Washington and Oregon. A large portion of the region is dominated by agriculture with rivers draining into the Snake River and adjacent aquifers occurring within Quaternary aquifers and active to Pleistocene, smaller alluvial aquifers. Farming water demand for irrigation has increased as climate change and population growth has resulted in decreased surface water supplies and increased development in groundwater. Specific aquifers have emerged regarding regional water supplies as critical to water management concerns. Modelling of surface water and groundwater systems is a highly complex problem and unique to each region. This study integrates the physical and chemical variables in a single model to simulate surface water and groundwater interactions under different scenarios. The model uses a distributed parameter approach to estimate water and solute transport in the landscape. This study provides a general framework and a model framework for future work in the region. The framework can be applied to similar regions with surface water and groundwater issues.

Modeling Objectives

- Simulate the groundwater and surface flow systems
- Evaluate the impacts of climate change on the region
- Improve the overall understanding of the groundwater system
- Develop a model that can be used for future research and management

Methods

- Use of the Integrated Water Flow Model (IWFM)
- Hydrological and biogeochemical processes are simulated
- Incorporation of climate change scenarios

Results

- The model accurately simulates the groundwater and surface water interactions
- The model can be used to assess the impacts of climate change on the region
- The model can be used for future research and management

Acknowledgements

- The authors would like to thank the following organizations for their support:
- Oregon State University
- Walla Walla Basin Watershed Council

References