WA Department of Ecology Grant #1200281
Task 3 Bi-State Surface Water/Groundwater Monitoring
Final Report

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In Cooperation with:
Overview

An important aspect of the water budget is the basin’s evapotranspiration. Evapotranspiration (ET) is the loss of water through the process of evaporation and transpiration. In order to quantify the potentially significant loss of water through evapotranspiration monitoring stations within differing crop types throughout the Walla Walla Basin focusing on the model area boundary designated in the task 1 of the WMI Phase II Project.

Prior to the beginning of this project, three Campbell Scientific ET Monitoring Stations (ET106 stations) were installed in 2005 to begin collecting evapotranspiration data in order to calibrate and validate evaporative and crop water uses for the Integrated Water Flow Model (IWFM) that was expanded under Task 1 – Integrated Water Flow Model of the WA Department of Ecology Grant #1200281. The sites were also set up to support a collaborative pesticides reduction project being done by the WWBWC, ODEQ and Blue Mountain Horticultural Society. The ET stations, once online were to supply orchards and vineyard managers with spatially relevant weather conditions information that can be used to better use and limit the amount and timing of pesticides, herbicides and fungicides being used. They were installed utilizing funding from the Oregon Watershed Enhancement Board, Oregon Department of Environmental Quality and Washington Department of Ecology.
For the IWFM modeling purpose of these ET stations, these stations are complemented spatially by Weather Stations currently operated and maintained by Washington State University through their AgWeatherNet program\(^1\) (figure 1). The three WWBWC operated ET stations are the 1) the WS03 LeFore Station is located within an apple orchard setting, 2) the WS04 Umapine Station is located within the middle of a wheat/alfalfa field, 3) and the WS02 Forks Station is located in a grass hay field (Figure 1). The ET data recorded from the stations is being incorporated into the expanded surface/groundwater model that was completed in July 2015.

**Objectives:**

1. Collect and compile local ET data to populate the surface and groundwater model with spatially relevant evapotranspiration data for the Little Walla Walla and Walla Walla River modeling area
2. Calibrate existing sensors at each of the ET station sites.
3. Publish collected data online for public distribution.

**Methods:**

The existing Campbell Scientific (CSI) ET 106 Stations were upgraded following the guidelines set forth by Campbell Scientific\(^2\). The suite of out dated sensors (no longer supported) were upgraded to new CSI supported sensors.

Each station was programmed to collect and average data hourly. The station collected data can be found at: [http://www.wwbwc.org/monitoring/weather-stations.html](http://www.wwbwc.org/monitoring/weather-stations.html)

Data collected from the existing AWN Stations was downloaded and the ET will be manually calculated before it’s integrated into the surface/groundwater model ET dataset. Each monitoring station will undergo a total recalibration in February 2010 satisfying the two year calibration schedule.

**Summary:**

Data collected from this task is a key component of the surface and groundwater model for the Little Walla Walla and Walla Walla River. With the recent upgrades to station sensors and radio network, accurate data collection and storage in real time is now possible. Having remote access to the stations also decreases downtime due to malfunctions and it also decreases the cost of travelling and downloading each station in the field. Additional information regarding the usage of the collected ET data can be found in the Model Expansion/Development Report. The model expansion report can be found at: [http://www.wwbwc.org/monitoring/monitoring-reports.html](http://www.wwbwc.org/monitoring/monitoring-reports.html)

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\(^1\) [http://weather.wsu.edu/](http://weather.wsu.edu/)

Not only has this task fulfilled a need of the model, it's also providing critical atmospheric data to local orchardists. Local orchardists are relying heavily on specific atmospheric criteria for pesticide applications to their orchards. The new nonorganic chemicals used in the treatment of orchards impact the surrounding environment less than previous organic pesticides. Moving forward it will be crucial that the data be readily available for download and distribution to the local farmers and orchardists.
Appendix A

ET/Weather Station Data Graphs.

(All of the weather station data can be downloaded at http://www.wwbwc.org/monitoring/weather-stations.html)
