

## Little Plover River Model Project – Status Update, August 21, 2014

*The following is condensed and updated from a recent memo to DNR about project progress. The Topic headings are based on items in the original proposal. I have focused on what I think are the most interesting details, and included a few pictures. Ken Bradbury, 8/21/14*

### Progress to date:

#### 1. **Compilation and review of existing hydrogeologic data.**

We have met several times with the WPVGA and are currently working out a data sharing plan so that we can use water-level data being collected by the Growers. We have also made several field surveys to attempt to locate and track down records for existing wells and piezometers in the basin, and have found quite a few. We are making an effort to locate the historical information for these existing wells. We are also working with local industry and public officials to obtain monitoring data from currently-monitored wells.

We have worked to resolve uncertainties in the Little Plover River streamflow data. Currently there are three continuous stage recorders on the stream: one at the Kennedy Ave bridge and two (adjacent to each other) at the Eisenhower Ave bridge. One of the Eisenhower gages is operated by the USGS and has only been online since November, 2013. However, this gage has been well-calibrated by the USGS and so has a continuous flow record since November 2013. The other two recorders are operated by the Village of Plover but measure stage only and were never previously calibrated to flow. These continuous stage records go back several years. We have acquired the stage data from the Village and plotted it against both USGS spot flow measurements and additional spot flow measurements from UW-Stevens Point personnel to construct stage rating curves for the Kennedy and Eisenhower sites. So now we can reconstruct the flow at these two sites for the past several years. It is interesting to note that, once calibrated, the Village and USGS measurements at Eisenhower are almost identical. It is also interesting to note that, in spite of what seems to have been a snowy winter and generally wet, cool summer so far, the Little Plover flow at Eisenhower is currently below the public rights flow and is very near to the  $Q_{7,10}$  long-term low flow.

We have obtained coverages of current land use and cropping patterns and have asked the WPVGA to confirm the current crop patterns.

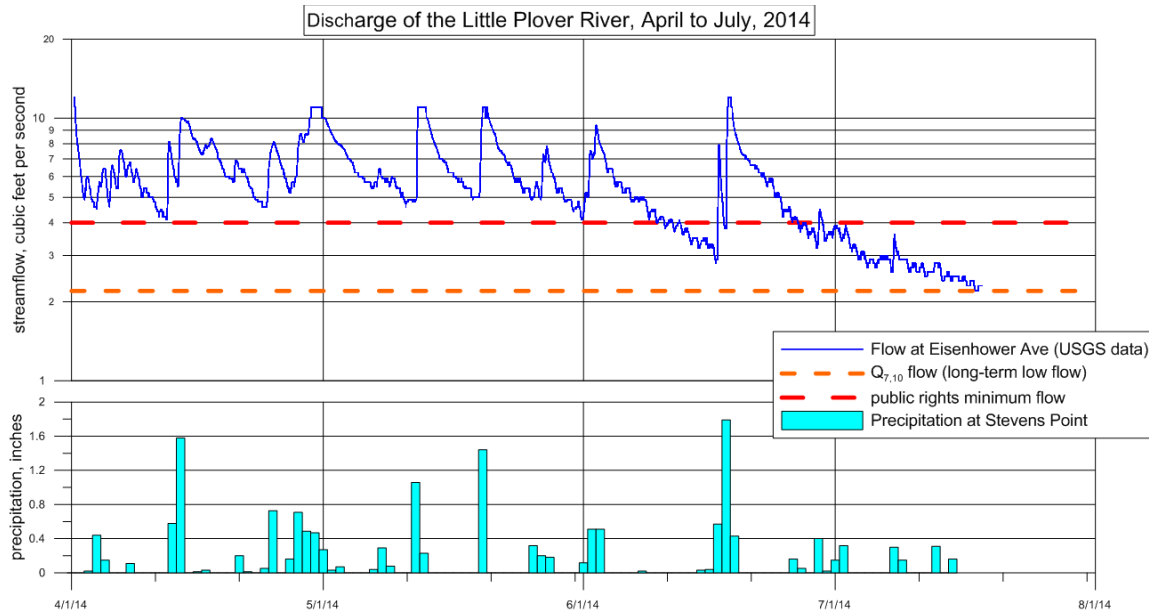


Figure 1. Little Plover hydrograph at Eisenhower Ave.

## 2. Collection of additional field data

During the first part of August we obtained soil borings/sampling to bedrock using Geoprobe equipment and installing temporary piezometers. Cores of aquifer material have been returned to Madison where they are currently being studied by the project staff. The temporary piezometer nests will provide vertical gradient information to be used in model calibration. Mr. Marv Hopp from Roberts Irrigation was extremely helpful in assisting with choosing sites and obtaining owners' permissions, as was Dan Mahoney from the Village of Plover.

Beginning in mid-August the WGNHS geophysical staff began collecting geophysical data at sites near the drilling locations with the objectives of determining depth to bedrock, locating possible silt and clay layers, and better understanding the depositional environment of the aquifer. A financial contribution from the WPVGA has allowed the purchase of a passive seismic instrument that allows rapid determination of bedrock depth at other locations. The WPVGA has expressed interest in understanding the sediment thickness in the Little Plover (the idea being that recent sedimentation has raised the river's base level) and we are exploring ways to rapidly assess the sediment thickness using geophysical techniques.

We have made several field visits to the upper part of the Little Plover to understand the configuration and history of the ditch network there. Several local growers and land owners have helped greatly in this work by obtaining permission for us to visit private lands and pointing out significant local features. During these visits we have collected spot elevations of the water surface using high-resolution GPS equipment; these measurements are needed to finalize the stream routing inputs to our model.

We also plan to conduct a synoptic measurement of water levels in wells and piezometers across the basin in late August or early September.

## 3. Development of areal recharge distribution (soil water balance modeling)

This work is in progress by the Survey's GIS staff. It uses historical climate records combined with soil and land use data to develop estimates of recharge and evapotranspiration across the project area. We have asked the WPVGA for their own estimates of evapotranspiration rates so that we can be sure there are no major disagreements about this important parameter.

#### **4. Hydrostratigraphic interpretation**

This is still in progress and will await the completion of the Geoprobe coring and geophysical surveys described above. We anticipate completion by mid-September.

#### **5. Compilation of current and historical water-use data**

Essentially done, with the assistance of Bob Smail from DNR and Cheryl Buchwald from USGS.

#### **6. Completion of conceptual model**

Essentially complete. We have selected boundary conditions, and implemented streamflow routing. We have not yet finalized the number of model layers, as this depends on the stratigraphic work above.

#### **7. Construction of numerical model**

In progress. We have a functional version of the steady-state model, but it is not finalized yet. The model is being done in Groundwater Vistas and is easily updated.

#### **8. Development of calibration targets and criteria**

Also in progress. We are building a database in ARCMAP to facilitate target handling and weighting.

#### **9. Report Preparation, model documentation, and outreach**

Outreach activities have already taken up considerable time, as members of our team have met with the WPVGA groundwater task force (3 times), the Portage County groundwater committee (2 times) and participated in several other outreach events (Wisconsin Planning Convention, Wisconsin Academy Waters of Wisconsin meeting, etc.). We have also had two group field trips to the area during which we met with local landowners and well drillers. These events have been very useful in gaining local information and also in building trust with these user groups. On August 12-14 our team participated in Farm Technology Days, which was held at Plover and expected to attract over 80,000 people. We developed a booth and outreach materials for this event.

Some photos:



Figure 2. Our booth at Farm technology Days



Figure 3. Geoprobe drilling near the river.



Figure 4. Typical Geoprobe core being examined.



Figure 5. Shooting an elevation along the upper river.



Figure 6. Installing a datalogger in an old UWSP well near the river.