

Scuppernong Springs and Paradise Springs

Spring gaging station - Installation report

The spring gaging stations at Paradise Springs and Scuppernong Springs were installed during the weeks of January 1st and January 7th, 2013. Frozen ground significantly reduced impacts to vegetation and the bank area. At each location the gaging house, antenna mast, orifice line, and staff gage were all successfully installed.

A map of the location of each spring monitoring station is included in Figures 1 and 2 (pages 2 and 3). A series of photos taken by the USGS after installation activities are included on pages 4 to 6.

Following installation, the USGS will continue to perform periodic manual flow measurements near the gaging stations (see reference to “Measuring Section” in Figure 1). The exact location of the Measuring Section may change depending on measurement results, vegetation, and the location of debris. By performing manual flow measurements and recording water levels, a rating curve will be developed and calibrated for flow in each creek. The USGS will then use these rating curves to estimate flow in the creek at any point in time based on the water level measured in the creek.

Water levels in the creek are continuously measured by back pressure on the orifice line. The back pressure is a function of the pressure exerted on bubbles of nitrogen gas which slowly bleed out the end of the orifice line. The higher the water level, the higher the pressure exerted on the bubbles of nitrogen gas, and therefore the higher the pressure reading by the pressure transducer. Measurements by the pressure transducer are then recorded on the datalogger and relayed to the USGS database via the antenna. The tank of nitrogen gas, pressure transducer, datalogger, and telemetry equipment is securely located inside the gage house.

Once a rating curve is established for each gaging station, the USGS will not need to visit the sites as regularly and will conduct routine visits about every 6-8 weeks to make control measurements and perform routine maintenance.

The WGNHS and USGS also plan to install informational panels at each gaging location, which describe the methods and purpose of the spring gaging activities. The content of these panels will be developed in coordination with KMSF Staff.

Water levels (measured) and flow rates (calculated by rating curve) for each creek can be accessed online at the following USGS URL addresses:

Scuppernong Springs:

http://waterdata.usgs.gov/wi/nwis/uv/?site_no=05426350&PARAMeter_cd=00065,00060

Paradise Springs:

http://waterdata.usgs.gov/wi/nwis/uv/?site_no=05426380&PARAMeter_cd=00065,00060

Currently, only water levels are available from these websites. Once rating curves are developed for each gaging station, real-time flow rates will be available at the same websites.

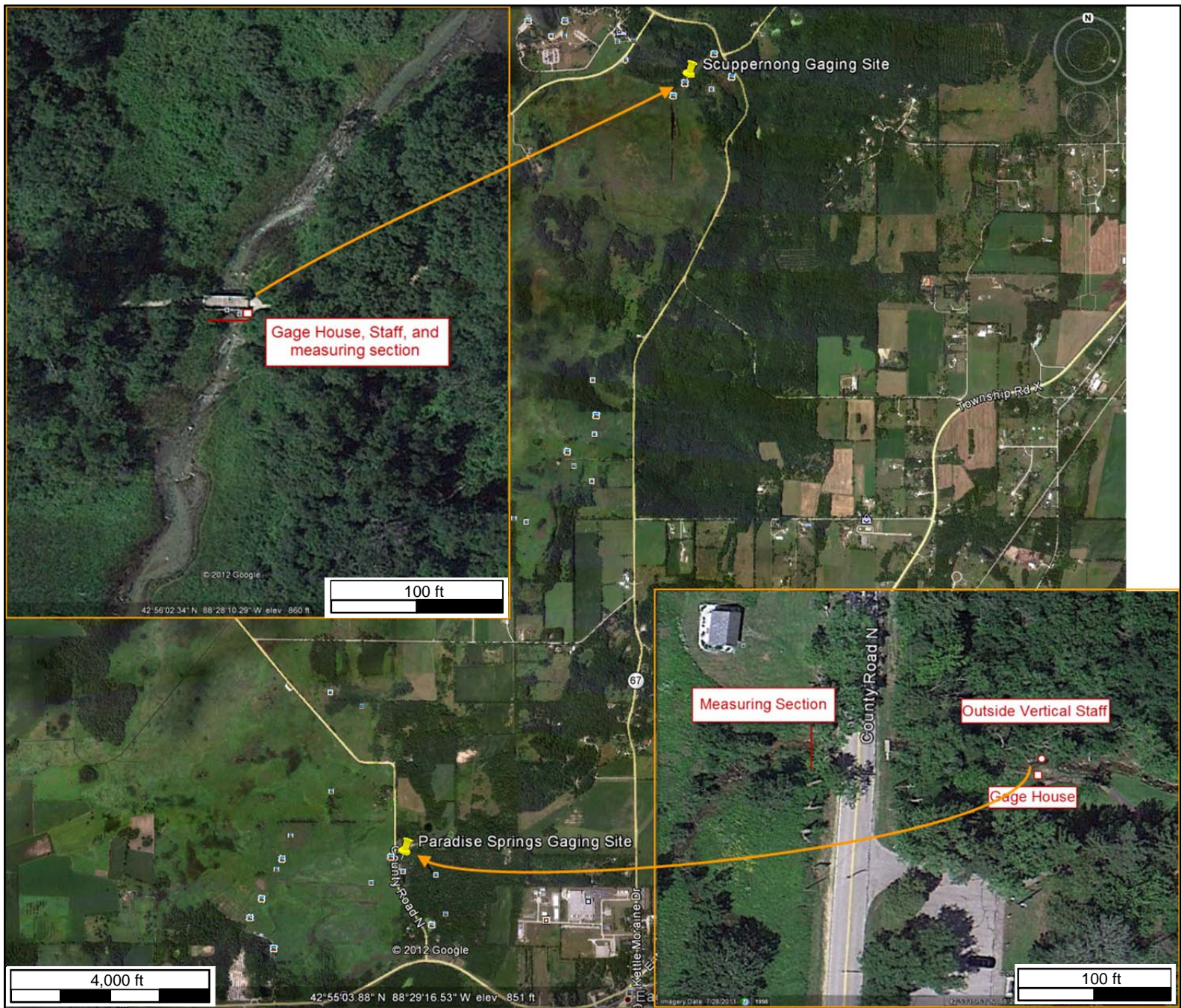


Figure 1: Overall site map with inset maps for each site location.

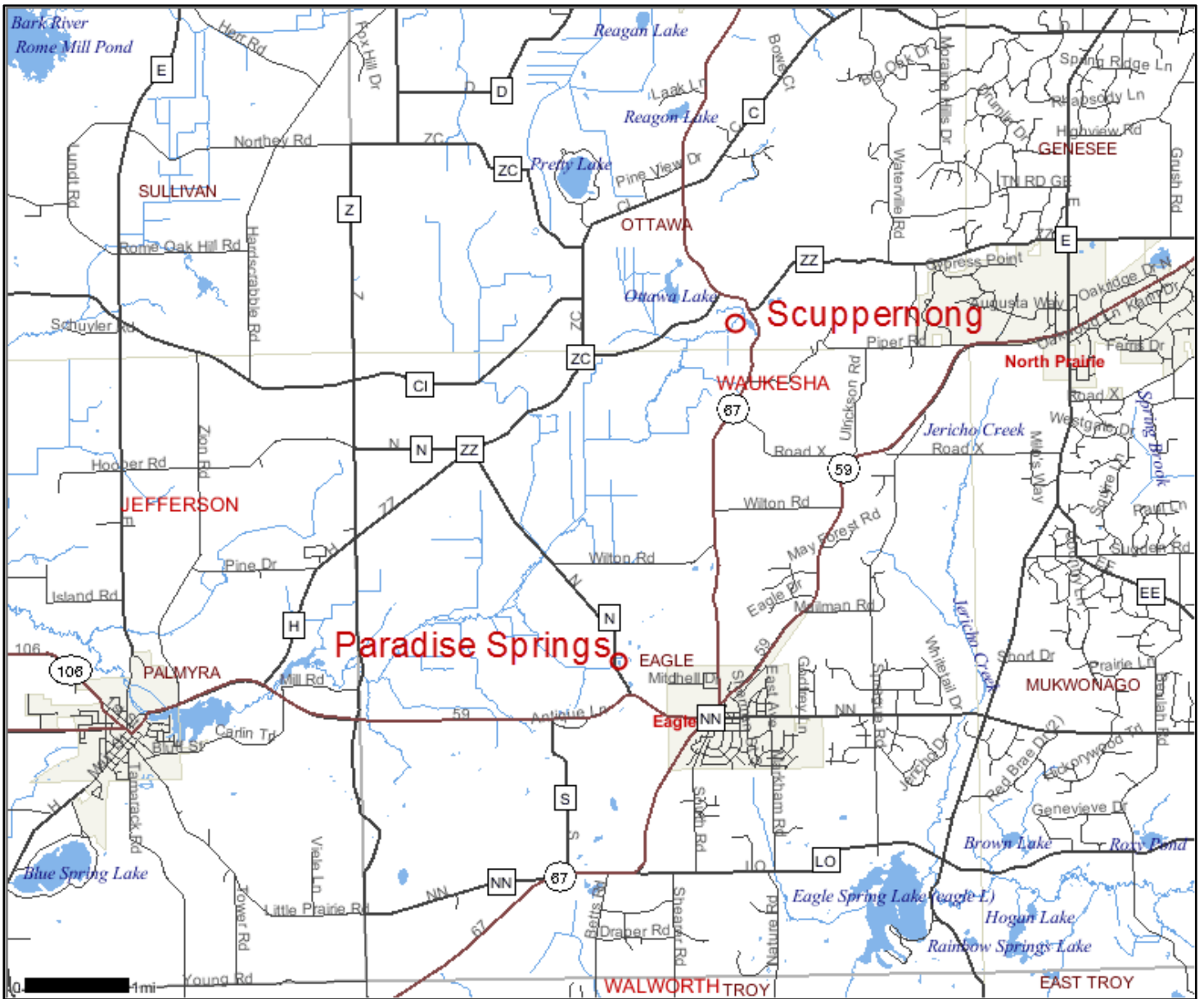


Figure 2: General site map showing roads and surface water features. Small red circles denote the location of the proposed spring flow monitoring stations.

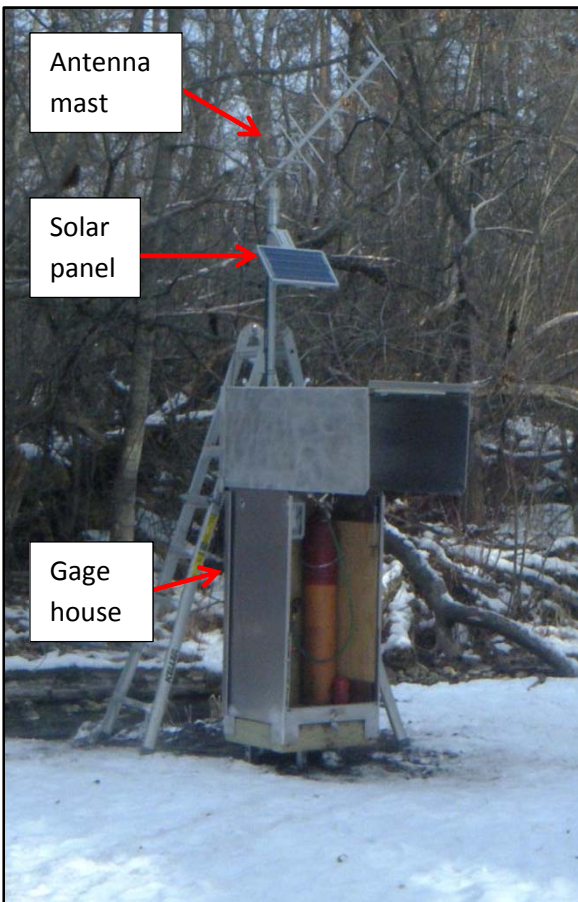
Paradise Springs gaging station:



Gaging Station installed Jan 2013 along creek bank



Nitrogen tank, pressure transducer, datalogger, and telemetry equipment inside the gaging station

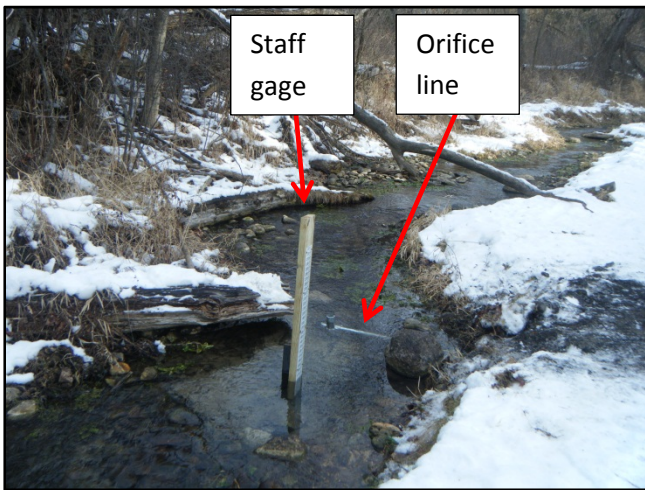


Close up of gaging station (looking northeast).

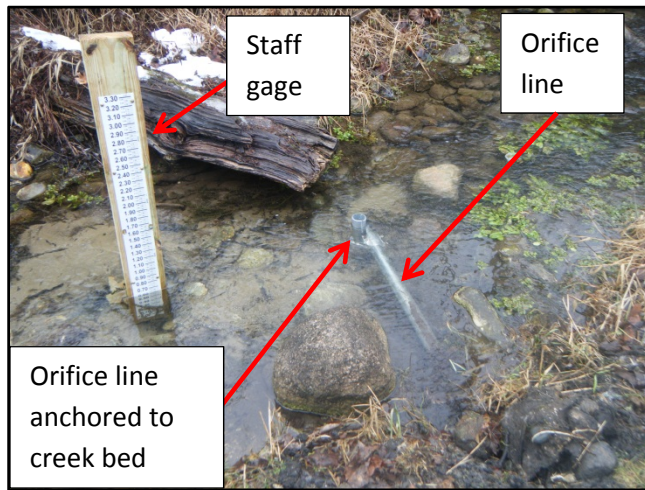


Staff gage and orifice line in creek (looking downstream to the east). Gage house is out of view to the left.

Paradise Springs gaging station (cont.):

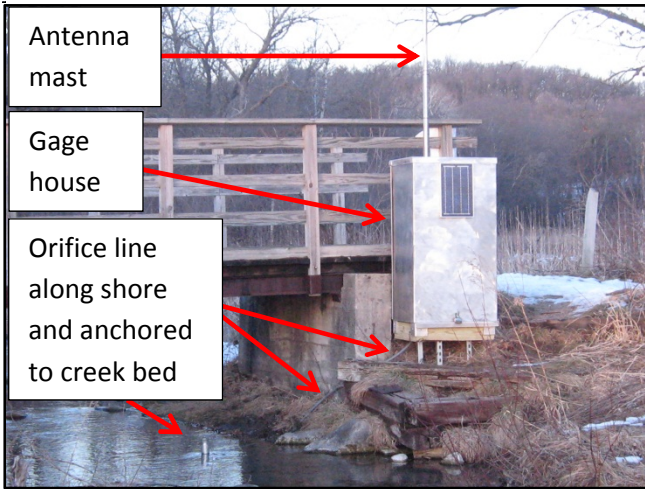


Staff gage and orifice line in creek (looking upstream). Gage house is out of view to the right.



Staff gage and orifice line in the creek (looking north with back to the gage house).

Scuppernong Springs gaging station:



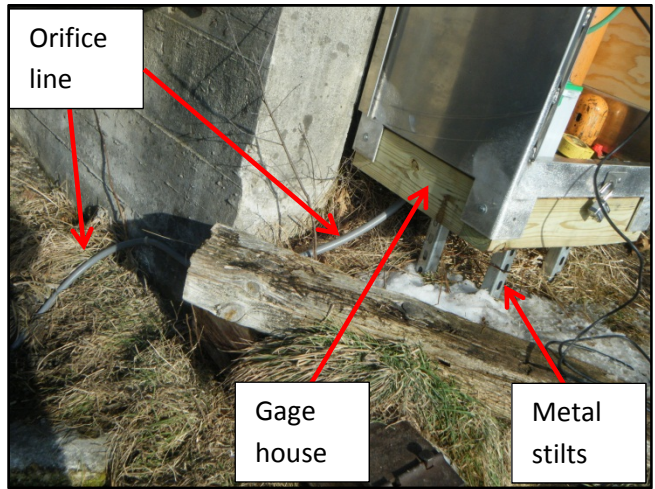
Gaging station looking upstream (looking north-northeast).



Side view of gage house and antenna mast (looking east) Front door of gage house is open.



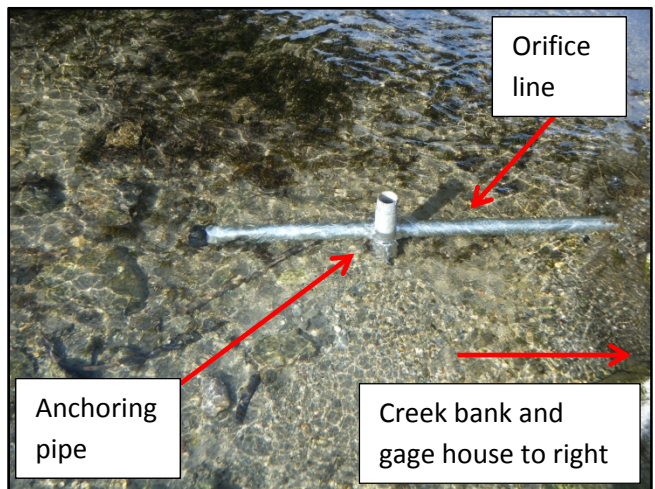
Rear of gage house (looking southwest).



Front of gage house with orifice line running down bank to creek. Gage house installed on metal stilts.



Close-up of antenna mast.



Orifice line anchored to the creek bed.