

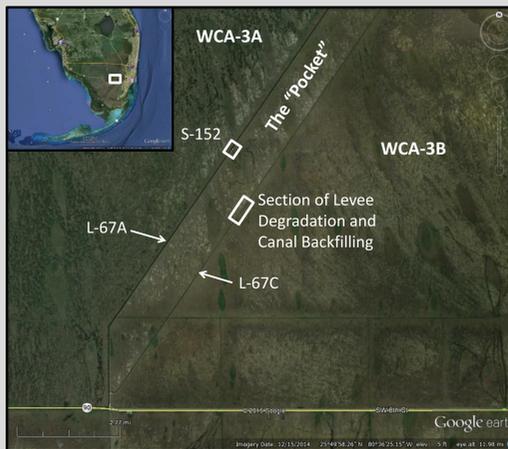
Hydrologic Monitoring at S-152 for the Decompartmentalization Physical Model (DPM) Flow-Release Test

The natural hydrology for much of the Everglades has been altered and surface-water flow patterns have been obstructed by a system of levees and canals. This levee and canal system was constructed to protect nearby urban and agricultural areas from flooding and to store water for municipal and agricultural use. The DECOMP element of the Comprehensive Everglades Restoration Plan (CERP) is intended to reestablish natural flow patterns through the Everglades by decompartmentalization, which is the removal of flow obstructions such as roads, levees, and canals.

The DECOMP Physical Model (DPM) flow-release test was designed to determine the effects of decompartmentalization on the landscape and ecology within Water Conservation Area 3 (WCA 3), a section of the Everglades located north of the Everglades National Park. WCA 3, which is divided into WCA 3-A and WCA 3-B by Levee-67A (L-67A) and Levee-67C (L-67C), was reconnected by installing water control structure S-152 in the L-67A levee, degrading the L-67C levee, and filling in a section of the L-67C canal.

The U.S. Geological Survey (USGS) monitored continuous water levels on either side of S-152 and measured flows through the structure. Techniques and methods used for data collection and computation of continuous discharge record for the first and second flow test periods, occurring in 2013 and 2014, respectively, are presented. Preliminary results demonstrate the ability to develop accurate ratings for the computation of discharge at this location.

Location of study area.



Close-up view of study area.



Monitoring design and sensor installations.



Up-gradient or west water level monitoring station.



Down-gradient or east water level monitoring station.



Example of Sontek SW acoustic Doppler current profiler (ADCP) and mounting bracket used for installation inside the downstream ends of pipes 2 and 6, as counted from the north end of S-152.

Flow measurements to create discharge ratings.

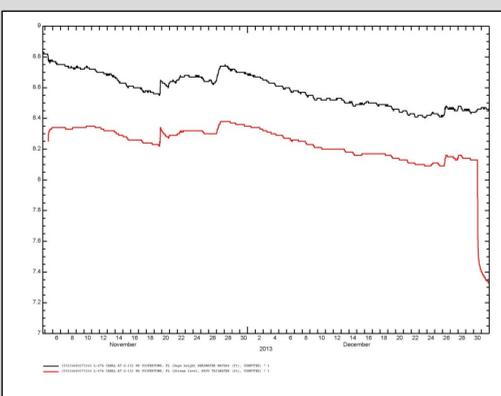


Measuring discharge at the down-gradient face of the pipes.

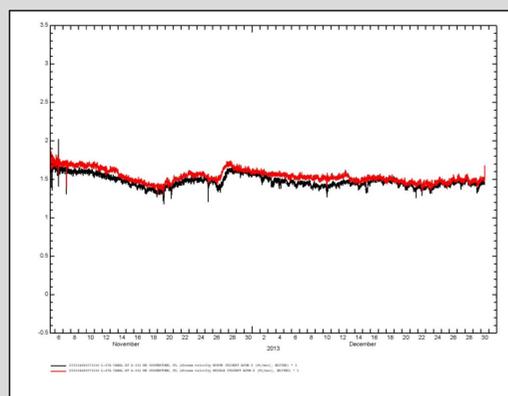


Measuring discharge up-gradient of the pipes.

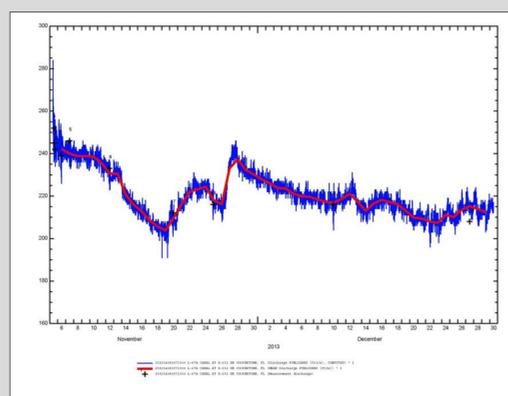
Fifteen-minute time-series data.



Fifteen-minute time-series plot of provisional up-gradient and down-gradient water level data at S-152 for the first flow release period of November 4 to December 31, 2013.



Fifteen-minute time-series plot of provisional index-velocity data from ADVMs installed in pipes 2 and 6 for the first flow release period of November 4 to December 31, 2013.

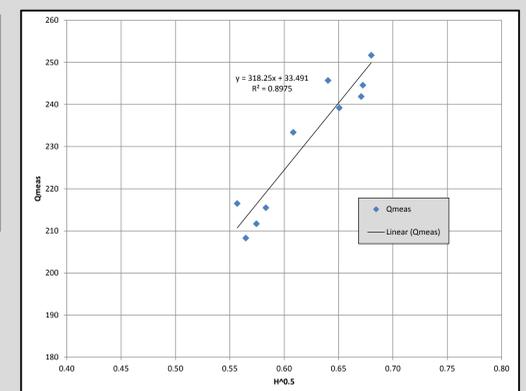


Provisional time-series plot of fifteen-minute and daily mean discharge and discharge measurements through S-152 for the first flow release period of November 4 to December 31, 2013.

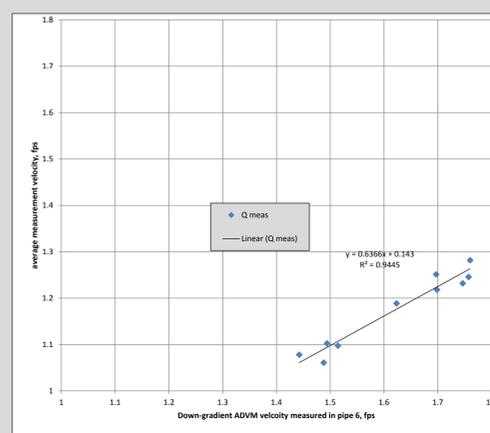
The discharge record is computed from the regression equation developed between the mean measurement discharge vs ADVM velocity measured in pipe 6.

Rating development to compute fifteen-minute time-series discharge record.

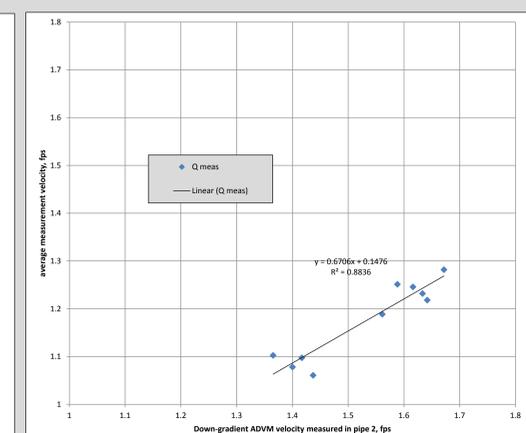
To compute discharge record, a rating is developed between easily measured sensor data and discharge measurements. At this station, three relationships were tested to determine the most accurate method for computing discharge: discharge vs head, mean measurement velocity vs ADVM velocity measured in pipe 2, and mean measurement velocity vs ADVM velocity measured in pipe 6. The mean measurement velocity vs ADVM velocity measured in pipe 6 provided the best relationship.



Relationship between measured discharge and the square root of the head between the up-gradient and down-gradient water level stations.



Relationship between average measurement velocity and down-gradient component of ADVM velocity measured in pipe 6.



Relationship between average measurement velocity and down-gradient component of ADVM velocity measured in pipe 2.

For more information please contact:
 Mark Dickman
mdickman@usgs.gov
 U.S. Geological Survey
 Caribbean-Florida Water Science Center
 Davie Office