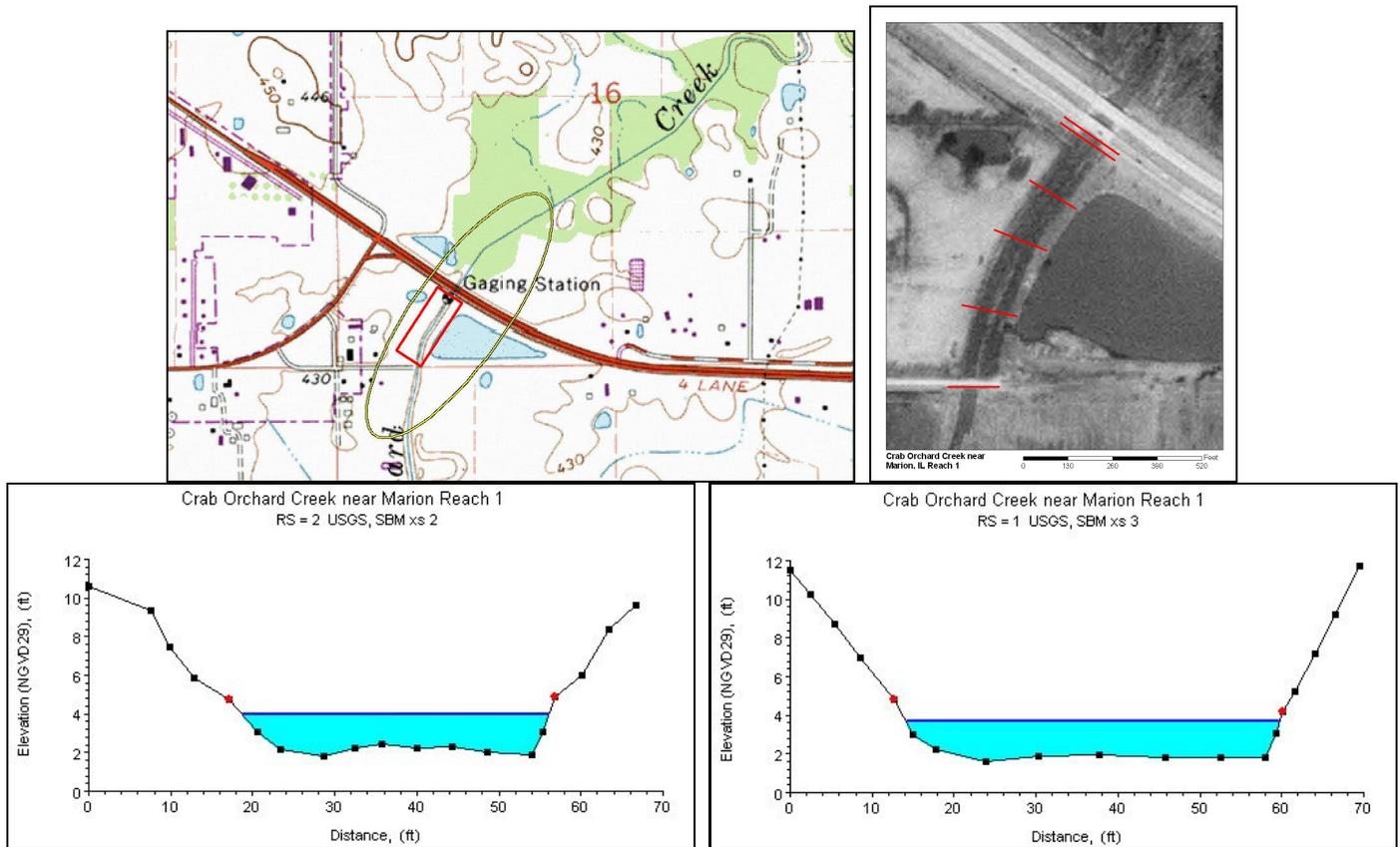


Crab Orchard Creek near Marion, IL Reach 1



Study Reach.--The channel reach under consideration is a natural channel regulated in urban settings. The study reach, approximately 620 ft long, is a channelized portion of the stream located from the downstream side of the State Route 13 bridge to just above a drainage ditch leading out of the lake (approximately 800 ft downstream), as shown in the quadrangle map on the top left. Three surveyed channel cross sections (surveyed by the Illinois Department of Natural Resources in June 2005) are available for describing the channel geometries (see plots above). The alignment of the study reach, approximate variations in channel width and bank conditions, and locations of the three cross sections are shown in the aerial photo on the top right.

Gage Location.--Lat $37^{\circ}43'52''$, long $88^{\circ}53'21''$, in SW1/4 SW1/4 sec.16, T.9S., R.3E., on right bank at downstream side of bridge on State Route 13, 1.8 mi downstream from Buckley Creek, 2 mi east of the town square in Marion, Williamson County, and at river mi 32.9. The USGS streamgage-station number is 05597500.

Drainage Area.--31.7 sq mi.

Gage Datum Elevations of Reference Points.--Datum of gage is 415.82 ft. A wire-weight gage (WWG) is located on the downstream side of State Route 13 bridge. A reference point for n-value study, RP-N1 is two file marks located on the 3rd upright I-beam from the right edge of water on the upstream side of 900N Road bridge, elevation=430.874 ft. All elevations are in NGVD 1929 convention.

Stage, Discharge Measurements, and Computed n-Values.--Water-surface elevations at the USGS streamflow gage and the access road bridge were measured at the time of the discharge measurement. Water-surface slope was determined by dividing the difference in elevations and the distance between them. Discharge was measured using the conventional

current meter method. Flow through a box culvert 500 ft east of the gage on Route 13 starts when stage in main channel reaches about 9.3 ft. The point of zero flow of the lake spillway is 7.8 ft gage datum. Events with stage higher than 7.8 ft were not used in the n-value study because of this concern. The computed n-values are listed in the following table. Whenever possible, the computed n-values are associated with a photo taken at the time of the measurement. The photos are arranged from low stage to high stage in order to illustrate contributing factors of n-value at a particular stage.

Date of Observation	Discharge (ft ³ /s)	Average Cross Section Area (ft ²)	Hydraulic Radius (ft)	Mean Velocity (ft/s)	Slope	Coefficient of Roughness <i>n</i>
1/27/1999	23.3	37.7	1.18		0.000198	0.038



05597500 Crab Orchard Creek near Marion, IL Reach 1
Looking Downstream from gage

12/03/03



05597500 Crab Orchard Creek near Marion, IL Reach 1
Looking Upstream from the old bridge downstream

Description of Channel.--This channel is a dredged and straightened, located in an urban setting. The bed is composed of clay-sand-fine gravel mixtures. The channel is subject to heavy vegetation as well as scour and fill, and can be cluttered with logjams, debris jams, and beaver dams. The channel shape can be described as rectangular and the channel alignment is straight. Both banks are low, full of brush, and will overflow at about 11 ft. The bank face is covered with exposed tree roots and clay-sand mixtures. The left bank is a levee, which separates the creek from a borrow-pit lake. The right flood plain is grassy pasture.

Floods.--Dec. 17, 2001, Discharge 9,430 ft³/s, gage height 13.63 ft; May 11, 1996, 9,270 ft³/s (gage height, 13.60 ft), determined by indirect measurement (contracted opening with culvert overflow).

Estimated n-Values using Cowan's Approach.--0.036 - 0.041