

# Sebewaing River Intercounty Drain An Odyssey in Watershed Management

By Claire Schwartz, P.E., of Fishbeck, Thompson, Carr & Huber

A ten-year adventure of epic proportions, the Sebewaing River Intercounty Drain project was a modern odyssey with almost as many plot twists as Homer's classic poem. Set in Huron and Tuscola Counties at the turn of the 21st Century, the voyage to completion of this multi-faceted flood control and water quality improvement project employed an extra measure of applied science and tenacious project administration to navigate a complex mixture of issues.

## *A History of Flooding*

The Sebewaing River, a relatively short waterway located in the Village of Sebewaing, serves as an outlet for two very large intercounty drainage systems known as the State and Columbia Drains. The vast network of drains that are tributary to the Sebewaing River was excavated during the 1920s and 1930s to make the land productive for agriculture. The combined drainage districts are over 66,000 acres and comprise some of Michigan's best cropland, most notably for sugar beets.

Previous attempts to clean out the lower portion of the State Drain met with controversy and litigation owing to historic flooding. The Village of Sebewaing experienced devastating floods in the first half of the 19th Century caused by ice formation and breakup in the open channels. Attempts by the U.S. Army Corps of Engineers to install an ice boom on the State Drain in the 1940s had failed.

Local residents became fearful and skeptical of attempts to re-engineer the drain, as the channel had naturalized over the years, having formed sediment bars and a meandering low-flow channel with mature trees covering the banks and river corridor. Meanwhile, on the other side of the drainage district, there were massive failures along the 12- to 15-foot-high channel banks of the treeless Columbia Drain. Residents faced their own version of Homer's Scylla and Charybdis (the proverbial "caught between a rock and a hard place.")

## *Restoration Finds Favor*

Though a watershed study was completed in 1995, no action was taken. Then, on the heels of another ice-jam induced flood event, the Village of Sebewaing petitioned for relief in 1997. The Sebewaing River Intercounty Drainage Board



Aerial View of Columbia Drain Sediment Basin

(ICDB) used the study to create a final plan consisting of five major work elements:

- Two regional offline sediment basins for State and Columbia Drains
- Dredging the Sebewaing River
- Restoration of the lower end of the State Drain
- Stabilization of the lower end of the Columbia Drain
- Restoration of the "Old North Channel" as an emergency floodway, including construction of a riprap weir and a 70-foot steel pony truss bridge.

These elements were constructed in 2004 and 2005 for \$2.2 million. Over \$0.6 million in grant funds were secured from FEMA and MDEQ, reducing the cost to the drainage districts by over 28 percent. Project goals focused on water quality concerns and serious flooding issues.



Constructing the State Drain Sediment Basin

The regional sediment basins required significant numbers of easements and agreements with local agricultural producers. To prevent a failure similar to the USCOE ice boom in the 1940s, it was imperative that emergency overflow provisions and maximum sediment retention during flood flows be

incorporated into the design. The basins were designed so that the capacity of the main drains during base flows would not be disrupted.

The U.S. Army Corps of Engineers and the Sebewaing Harbor Commission routinely dredged the



Dredging the Sebewaing River

the navigable portion of the Sebewaing River (known as the outer channel.) However, the inner channel had not been dredged in 50 years. Sediment testing was required to determine disposal

options and the project faced another challenge: finding a disposal site for about 40,000 cubic yards of sediment. The U.S. Army Corps of Engineers' confinement area was essentially full. The ICDB searched for a site and eventually negotiated the use of a 10-acre tract of land as a temporary disposal area.

Restoration of the lower end of the State Drain was a delicate matter. ICDB team-members worked early in the project to discuss the "natural" approach to construction on the drain with



BMP: Channel Cleanout (one-sided construction with selective clearing, retaining meanders) – State Drain



BMP: Rock Ford Crossing – State Drain

landowners and residents. These early efforts were rewarded with citizen support. Low-flow meanders and trees were to remain and meanders were protected with tree revetments. This

integrated with the dynamics of ice formation and jamming to minimize ice block thickness and overall size at breakup; floating ice is trapped upstream of the downtown Sebewaing area. CMI grant funding



BMP: Rip Rap Slope Protection – State Drain

was secured for in-channel BMPs on the State Drain.

The Columbia Drain had actually begun to heal itself from the conditions noted during the initial study. As work proceeded, the grade control and channel pullback called for in the design worked wonders on the battered channel. CMI grant funding was secured for in-channel BMPs on the Columbia Drain that went above and beyond traditional maintenance work and were accepted by the MDEQ for the improvement of water quality.



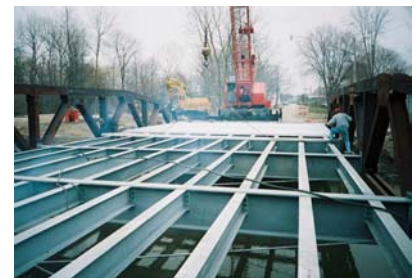
BMP: Rock Check Dam – Columbia Drain



Widening the Old North Channel

The Old North Channel, downstream of the Village of Sebewaing, was the original outlet of the Sebewaing River into Saginaw Bay. The

channel is dry at times when Great Lakes water levels are at their lowest. Seasonal lows normally occur in winter when the risk of ice-jam flooding is greatest, making the channel site ideal for use as an emergency floodway to relieve backwater caused by ice jams near the mouth of the river. To achieve this use, a stone riprap weir was constructed at the confluence of the Old North Channel with the Sebewaing River; construction of a pony truss bridge at the entrance to nearby Sebewaing County Park and channel improvements along the Old



Union Street Bridge Under Construction

North Channel were also necessary. A FEMA Flood Hazard Mitigation grant was awarded for construction of the Union Street Bridge on the North Channel.



Union Street Bridge - Sporting a Rustic Weathering-Steel Finish (bottom right)

Restoration required native vegetation and an invasive species control plan.

### ***The Sebewaing River Project Team***

Mr. Michael Gregg, Michigan Department of Agriculture served as Chair for the Sebewaing River Intercounty Drainage Board; Members included Ms. Sarah Pistro, Tuscola County Drain Commissioner and Mr. J. Dean Smith, Huron County Deputy Drain Commissioner, who succeeded Mr. Vern Rounds in that position.

Fishbeck, Thompson, Carr & Huber, Inc. (FTC&H) and Wilcox Professional Services, LLC (Wilcox) served as project engineers and retained the ice engineering expertise of Michigan Technological University (MTU) professor, Dr. Henry Santeford.

The Hubbard Law Firm provided legal counsel for the negotiation of over 50 new easements and land use agreements. Bendzinski & Company served as financial advisor and Dickinson Wright PLLC served as bond counsel with an overall project cost of \$3,377,577.

Nicol & Sons, Inc. of Cass City was awarded the construction contract. St. Regis Culvert provided the truss bridge superstructure and decking.

The Sebewaing River Intercounty Drainage Board worked closely with the Huron and Tuscola Conservation Districts who were awarded four additional 319 and CMI grants for the Sebewaing River Watershed.

### ***The Epic Concludes***

The project successfully weathered its first two winters of ice formation and break-up. Because of the complex dynamics and power of this system, the project will be monitored each year to prove the long-term success of this monumental undertaking. Monitoring and modeling have begun and, in this sense, the journey of discovery continues.

1. It is estimated that, based on MDEQ pollutant reduction calculations, the Best Management Practices implemented on this project will prevent 25,000 tons of sediment, 25,000 pounds of phosphorus, and 51,000 pounds of nitrogen from entering Saginaw Bay annually.

2. Over 1,500 tons (1,100 cubic yards) of sediment were removed from the State and Columbia Drain sediment basins in their first year of operation.

3. The U.S. Army Corps of Engineers is working on a sediment transport model for the Sebewaing River and branches to be completed by 2007.

4. The Huron and Tuscola Conservation Districts and Drain Commissioners partnered with 26 USA High School students and their instructor to conduct a streamside bio-assessment survey of the Kemp Drain in May 2005. The results of the survey showed very good diversity and overall health of the stream. The story was published in the Tuscola Conservation District's Annual Report.

5. Walleye and salmon were observed in reaches of the State Drain immediately after construction. Local residents indicated that more fish were observed in 2005 than have been seen in many years.

6. The Huron County Deputy Drain Commissioner has toured the project with various groups including the MDEQ SESC Unit, Huron County Boards of Commissioners and Road Commissioners, and local township officials.

7. The ICDB worked closely with The Sebewaing Newsweekly and the Huron County Press to keep the public abreast of the progress and intent of the project.



Dean Smith, Sarah Pistro, Mike Gregg, and Dan Fredricks at the "ribbon cutting."