

**St. Joseph River Watershed 319 Watershed  
Management Planning Project  
Road-Stream Crossing Workshop Summary**

**November 5, 2003**

As part of the St. Joseph River Watershed 319 Watershed Management Planning Project, a half-day workshop addressing erosion from road-stream crossings and streambanks was held in Three Rivers, MI on November 5, 2003. Over forty attendees, including road commissioners, drain commissioners/surveyors, biologists, watershed planners and USDA NRCS staff, were present. Six presenters discussed their work with erosion control in Indiana and Michigan. A synopsis of this information is provided here, and a speaker and attendee contact list is attached.

The purpose of the workshop was to institutionalize a method for quantifying erosion from streambanks and road-stream crossings in the watershed. It followed several meetings with a 319 Road-Stream Crossing Subcommittee and the field testing of the draft form in the Rocky River and Hog Creek Watersheds. There is no current unified method for quantifying and tracking sediment loading from these sources to the St. Joseph River. Therefore, the goal is to establish a universal, easy-to-use quantification method.

**John McNamara, St. Joseph County, IN Drain Surveyor**

Mr. McNamara delivered a presentation on the role of the county drain surveyor and drainage board in erosion control projects in Indiana. The drainage surveyor sits as an *ex officio* member of the county board. Through his position as a drain surveyor for over thirty years, he has been involved with three Section 319 grants for Juday Creek, which flows through the northern part of the Notre Dame campus in South Bend, IN. A U.S. Geological Survey (USGS) study indicated that most of the sediment entering Juday Creek originated from streambanks. Therefore, erosion control projects were completed on the creek. His work on those projects has helped him identify the types of practices that work best. For example, seeded vegetative erosion control mats become established before waterfowl can graze them away, as opposed to mats in which plugs are planted. It has been approximately ten years since the first Section 319 grant was awarded, and he is interested in working with the USGS on a followup study to assess the success of the practices installed.

Public road-stream crossings are under the jurisdiction of the county engineer or highway engineer. Erosion from regulated drains is under the jurisdiction of the county surveyor. However, the surveyor's staff do not conduct field work to locate erosion problems. They respond to situations that are identified by residents. Erosion control projects and drain maintenance activities are funded by an assessment fee paid by watershed residents. Approximately \$1/acre for farmland and \$10/lot for subdivisions is charged as an annual assessment. The highway department can maintain drainage systems in right-of-ways only, through the gas tax. To provide maintenance service to subdivision systems not in right-of-ways and not in regulated drains, an urban drainage system fee was established in 1976 for rural lands that are converted to residential areas. An annual fee of \$20/lot is collected. If that fund grows to four times the sum of the annual fees, then the money must be spent or a hold on the collection of the fee must be instituted. This fee can be reinstated without legislative action or a public hearing.

**Presentation discussion/responses to questions:**

- How many staff does a county surveyor employ? The number of county surveyor staff can vary. St. Joseph County has four staff, including a secretary, while Lake County, in Northwest Indiana,

has twenty-three staff and a full time lawyer. The number of staff in St. Joseph County limits the amount of erosion control projects that can be overseen. However, the department typically uses the same contractors and is familiar with their capabilities. (Each erosion control project is bid out.)

- Who controls the lake levels? The IDNR controls lake levels.
- Not all streams in the county are regulated drains.
- A common enemy law in the state allows a property owner to do anything to his property to drain it, and his neighbor can do the same. In essence, he can fill his property and grade it so that stormwater drains onto his neighbor's property.
- Are farmers utilizing the USDA conservation buffer programs? Some farmers are using the conservation buffer programs, and the cost for installation is equal to the cost savings associated with decreased sediment loss and loss of land when drains are dredged. However, some farmers simply do not want to bother with this practice and literally plow their fields up to the water's edge.

### **Chuck Westfall, Indiana Department of Natural Resources, Department of Soil Conservation**

Chuck Westfall filled in for Randy Braun, the scheduled speaker. The unique aspect about the IDNR Department of Soil Conservation is that each office is housed locally with the NRCS and county Soil and Water Conservation District. Other IDNR departments are located in Indianapolis. Therefore a partnership exists among the county-level, state and federal agencies. Most soil conservation work was traditionally performed at a county level. However, now projects and work tasks are divided along watershed boundaries. The Lake and River Enhancement (LARE) program is used for watershed projects and funded through boat taxes. Projects begin with a diagnostic study. Recommendations for land treatment options are forwarded to the state board. Fines from illicit discharges have been used to purchase easements as another method of erosion control. Indiana has used exams developed to test engineers in Michigan for erosion engineering guidance. Indiana also uses erosion survey forms that call for vague rankings, such as satisfactory/unsatisfactory. A draft form with a quantitative element is being developed. Traditionally these forms have only been used at problem sites as a way to alert contractors of the need to improve their practices. Chuck would like to see them used at good sites to encourage contractors to continue favorable practices.

**Presentation discussion/responses to questions:** The Department of Soil Conservation occasionally reviews NRCS farm plans and finds it easy to exchange information between agencies as the offices are housed together.

### **Sarah VanDelfzijl, Rocky River Watershed Section 319 Grant Coordinator**

The Rocky River Watershed is the subject of a Clean Water Act Section 319 grant to develop a Watershed Management Plan. One of the requirements for Michigan Section 319 projects is to conduct a road-stream crossing inventory. Fifty-eight crossings were surveyed in the Rocky River Watershed using the MDEQ-required form. Ten sites were revisited using the model erosion quantification form. That form requires the surveyor to measure the length, height and severity of the site of erosion. Soil texture is also determined. She found that the subjective rank produced by the MDEQ form at each of the ten sites did not predict sediment loading. Further, the methodology only calls for observations from road crossings, as far as the field personnel can see upstream and downstream. Further surveys by kayak, for example, revealed a severely eroding stream bank site, contributing six tons of sediment annually, to the watershed. She indicated that her experience with the project form found it to be very easy to use. It provided valuable quantification information with little additional effort required.

A copy of this presentation can be found on the project website at <http://www.stjoeriver.net/wmp/road-stream.htm>.

**Presentation discussion/responses to questions:**

- Can the form be used to predict erosion from construction projects? It is not meant to quantify erosion from land surfaces, and erosion control practices should be in place during construction activities, so there is theoretically no erosion.

**Joe Margol, Berrien County, MI Road Commission**

Joe Margol is a member of this project's Road-Stream Crossing Subcommittee and was a member of the Steering Committee for the Galien River Watershed project. He was given the task of surveying all of the road-stream crossings in that watershed in Berrien County, MI, of which there are approximately 100. It seemed like an arduous task. However, it has led to the identification of areas of sediment loading and the opportunity to correct some of those problems. Many problematic crossings, constructed by former road commissioners, were identified. They were probably constructed according to the standards of that time, but did not currently meet surface water protection goals. Through the work with both projects, he is aiming to prevent erosion from road crossings in Berrien County.

**Chris Freiburger, Michigan Department of Natural Resources, Habitat Management Division**

Chris Freiburger presented the "MESBOA" approach for sizing culverts at road-stream crossings. He has conducted extensive research in Minnesota on this topic, and continues his work with the MDNR. He related culvert sizing to highway design, where the highway confinement ratio is equal to the right-of-way/prism width. Similarly, the stream entrenchment ratio is equal to the floodprone area/bankfull width. Typically, culverts are undersized, increasing exit velocities and creating backwater areas on the upstream side of the culvert. These velocities typically impede fish passage. Traditional culvert design was based on research on ocean going salmonids in the Pacific Northwest, which are much stronger swimmers than native Michigan resident fish. Native Michigan fish, like walleye, can swim at a speed range of 0-3 feet/second. Typical culverts channel water through at velocities of five feet/second, and Chris has measured some exceeding eleven.

Proper culvert design will result in a more expensive culvert. However, the life cycle costs will be lower, as the culvert will not need to be replaced as frequently and will not cause erosion. The MESBOA approach means:

- Match the culvert width to the bankfull condition width;
- Extend the culvert length through the side slope toe;
- Set the culvert at the same slope as the stream bed;
- Bury the culvert in native stream bed materials;
- Offset multiple culverts, and;
- Align the culvert direction with the stream flow.

Bankfull condition width should be measured at riffles, so that the culvert will also act as a riffle. The measurement should be made at a point in the creek not affected by the current culvert. Bankfull conditions define channel geometry and occur approximately every 1.5 years, during snow melt or spring rain on snow cover conditions. Fish tend to migrate upstream to spawn during bankfull conditions, making it critical to size culverts to allow fish passage during these high-flow conditions. Chris went through the procedures for sizing long culverts, those which would direct water under state and county roads, which are 75-110 feet in width. He also showed examples of improperly designed culverts and properly installed

culverts. An example using step pool sequences to allow fish passage in perched conditions was shown, and floodplain culverts were discussed.

A copy of this presentation will be available in the near future on the project website at <http://www.stjoeriver.net/wmp/road-stream.htm>.

**Presentation discussion/responses to questions:**

- How can areas needing this culvert placement method be prioritized? The specific biological features of the stream in question would need to be considered. However, fish passage is not the only reason for properly sizing culverts. The method is valuable for maintaining stream stability and maximizing the life of the culvert.
- To what height should multiple culverts be offset? Offset culverts are typically seven inches higher than the lowest culvert. They are placed so that they are dry during low flow conditions and cannot get clogged with sediments and woody debris. They convey water only during high flow conditions.

**Mark Kieser, Kieser & Associates**

Mark Kieser discussed the benefits of quantifying sediment loading from streambanks and road-stream crossings. He reviewed the forms currently used to characterize these areas. The new model form was field tested in the Rocky River and Hog Creek Watersheds and found to be easy to integrate into existing field work. The observation of the additional parameters does not take much extra time, approximately 1-2 minutes per site. A packet containing the form with instructions and a sheet with three copies of the form was distributed to the attendees and is available on the project website at <http://www.stjoeriver.net/wmp/road-stream.htm>. The parameters to measure and the method of calculating sediment loading were discussed. Mark provided some BMP costs and cost savings by reducing erosion in four example projects in the Kalamazoo River Watershed.

**Next Steps:** Mark identified the following steps would be undertaken by the Road-Stream Subcommittee:

- The Subcommittee will meet an additional time in 2003 to review comments;
- Comments on the form and methodology would be considered, and appropriate edits would be made, and;
- Methods to share this information across the watershed will be considered.

He invited feedback at his email address ([mkieser@kieser-associates.com](mailto:mkieser@kieser-associates.com)) and on the project website discussion board at <http://www.stjoeriver.net/cgi/dcforum/dcboard.cgi> and offered invitations for attendees to participate in remaining project efforts.

**Comments:** The Indiana Forestry Board conducted a tree inventory. The task seemed quite overwhelming when it was initiated. However, it was found to provide valuable data and was not too difficult to conduct once it was begun. A similar survey for erosion sites should be just as valuable. Perhaps an observation of whether the streambank toe is eroding should be added. An eroding toe indicates a severe erosion problem.