

A Sediment Transport Modeling Workshop for the Burns Ditch and Trail Creek Watersheds

Portage, Indiana
November 3, 2005

*Sponsored by: U.S. Army Corps of Engineers
Assisted by: Great Lakes Commission and the
Northwestern Indiana Regional Planning Commission*

Welcome, Introductions and Workshop Objectives

David Bucaro, USACE Chicago

Bucaro opened the workshop by welcoming the participants and outlining the schedule for the day. An agenda for the workshop is available in Appendix A.

A total of 36 participants attended the workshop, including representatives from American Consulting, Inc.; CDM; Great Lakes Commission (GLC); Indiana Department of Environmental Management (IDEM); Indiana Department of Natural Resources (IDNR); Indiana Dunes National Lakeshore; LaPorte County; LaPorte County Mulch Plus; Little Calumet River Basin Commission; Michigan City; Michigan State University (MSU); Northwest Indiana Regional Planning Commission (NIRPC); Porter County; Purdue University; Save the Dunes Council; Town of Chesterton; Town of Kouts; U.S. Army Corps of Engineers (USACE) Chicago District; and the U.S. Environmental Protection Agency (EPA). A participant list is available in Appendix B.

Background and Methodology

David Bucaro, USACE Chicago

Bucaro then presented background information on the Great Lakes Tributary Modeling Program, which is authorized by Section 516(e) of the Water Resources Development Act (WRDA) of 1996. In brief, Section 516(e) directs the USACE to develop sediment transport models for Great Lakes tributaries contributing sediment to Federal navigation projects or Areas of Concern (AOCs). These models are intended to be used as tools by state and local entities to evaluate options for soil conservation, non-point source pollution prevention, dredging and dredged material disposal needs, Remedial Action Plans (RAPs), and Lakewide Management Plans (LaMPs). Long-term benefits of the modeling projects include applying a watershed approach to sediment management, supporting and enhancing measures that will reduce loadings of sediments and pollutants to tributaries, reducing the costs of navigation maintenance, and reducing the need for sediment remediation. More information on the Great Lakes Tributary Modeling Program, including a recent status report to the U.S. Congress on the program's activities, is available at www.glc.org/tributary.

The Burns Ditch and Trail Creek watersheds currently transport sediment into a federal navigation channel, which qualifies them for model development under the Great Lakes Tributary Modeling Program. For these watersheds, the USACE has contracted with MSU and Purdue University to expand the capabilities of an existing web-based land use planning tool, including the addition of sediment loading assessment capabilities. The modeling efforts under the Section 516(e) authority are fully federally funded. However, the USACE is limited to using existing data to develop each model and cannot fund any follow-up work or demonstration projects under this program.

The following three primary objectives for the workshop were presented to the participants:

- 1) Identify sedimentation issues within the two watersheds.
- 2) Identify stakeholder needs that might be met with this tool.
- 3) Identify existing data sets that can be packaged into a usable tool.

NIRPC recently completed a four-year watershed planning effort for the Little Calumet/Galien River and Kankakee River basins under a Clean Water Act (CWA) Section 205j grant. The watershed plan that was developed as a product of this effort can be used as a template by smaller watersheds within northwest Indiana for other CWA Section 319 watershed planning projects. Appendices to the report were developed in conjunction with Lake Michigan Coastal Program staff and will be useful for other local communities. These appendices include:

- List of Projects and Areas of Concern
- Watershed Management Inventory
- Northwest Indiana 303(d) Listed Waterbodies
- Concern Matrix
- Northwest Indiana Sites Listed on the National Register of Historic Places
- Northwest Indiana Managed Lands
- Endangered and Threatened Species Found in Northwest Indiana
- Superfund Sites in Northwest Indiana
- Water Resources Protection & Conservation Tool Kit
- NIRPC Model Stormwater Management Ordinances and Guidance
- Funding Resources Document

The final report, entitled *Watershed Management Plan for Lake, Porter, and LaPorte Counties*, is available on the NIRPC website at www.nirpc.org and in paper or CD format upon request. As an outcome from this effort, NIRPC plans to create a full-time water advisory committee separate from their MS4 stormwater committee. NIRPC is also exploring opportunities for continued training for communities to learn to use Purdue's Long-Term Hydrologic Impact Assessments (L-THIA) planning tool.

Introduction to the Digital Watershed and Long-Term Hydrologic Impact Analysis (L-THIA) Tool

Yi Shi, MSU, and Bernie Engel, Purdue

As mentioned previously, the USACE has contracted with MSU and Purdue to expand the capabilities of an existing web-based land use planning system to create an enhanced, user-friendly web-based watershed analysis tool specific to the Burns Ditch and Trail Creek watersheds. This new tool essentially integrates the capabilities of MSU's Digital Watershed tool and Purdue's L-THIA tool, allowing users to access either of these models to browse local datasets to learn about a specific location of interest, generate local maps depicting specific data, and predict outcomes of various land use/management scenarios. Within this enhanced web interface, users will be able to zoom from an 8-digit to a 14-digit watershed scale within the Burns Ditch and Trail Creek watersheds to view more detailed information and finer resolution.

In recent years, MSU has collaborated with Purdue to create a hierarchical digital watershed dataset from online modeling systems. This has included building a comprehensive dataset from the EPA Basins system as well as a Geographic Information System (GIS) interface. MSU has also collaborated with the USACE Detroit District to generate new datasets, including sediment and soil erosion data for specific watersheds throughout the Great Lakes basin. Users of the enhanced tool will be able to access MSU's Digital Watershed database, which contains all regulated facilities, river networks, digital elevation models (DEMs), state soil and other data layers, and is searchable by address, city, zip code, or by using a locator map.

L-THIA is a tool that was developed by researchers at Purdue University to predict and analyze changes in runoff, recharge, and nonpoint source pollution (including sediment) in urban settings resulting from past or proposed land use changes. L-THIA results are intended to provide insight into the relative hydrologic impacts of different land use scenarios. The results can be used to generate community awareness of potential long-term problems and support physical planning aimed at minimizing disturbance of critical areas.

Also included in the enhanced watershed tool for the Burns Ditch and Trail Creek watersheds are the SedSpec (Sediment and Erosion Control Planning, Design and Specification Information and Guidance) and E-SCORE tools. SedSpec is the complement to L-THIA and is used to assess peak rates of runoff and associated erosion issues on a particular site. SedSpec can aid in the preliminary design of erosion control structures and is best suited for smaller watersheds. The E-SCORE tool was also developed by researchers at Purdue in collaboration with the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) in Indiana in support of their Environmental Quality Incentives Program (EQIP). E-SCORE uses web-based GIS technology to identify areas where a Best Management Practice (BMP) might be placed and to assess potential resource concerns specific to that location (e.g., air quality, soil conditions, water quality, types of erosion). This tool currently includes over 100 different BMPs for analysis. When using any of these tools, however, it is important to remember that these are not intended to replace field observations, but can aid in identifying potential areas of concern or areas in need of further field exploration.

Following a brief introduction to the tool, Shi provided a demonstration of the tool's functions specific to the Burns Ditch and Trail Creek watersheds, including an assessment of channel erosion and erosion from urban and agricultural areas leading to sediment flow downstream. Shi indicated that the following datasets are still needed to complete the tool for these watersheds:

- Weather Information
- Soil Data
- Digital Elevation Models (DEMs)
- Land Use/Land Cover
- Management Practice Data

Next steps for the modeling team will include integrating the Digital Watershed, E-SCORE, and MUSLE models into the web-based tool to enable the user to assess the placement of BMPs in specific locations within the watersheds. The team will then develop training materials for the web-based tool and conduct a hands-on demonstration and training workshop.

More details on these models can be obtained by contacting Bernie Engel, Ph.D. at Purdue University at 765-494-1162 or engelb@purdue.edu.

Discussion: Present Sediment Issues and Problems in the Trail Creek and Burns Ditch Watersheds

Kevin Breitzke, Porter County

Following the initial presentations, Engel then opened up the discussion and asked the participants to identify any erosion and sedimentation-related issues within the watersheds. Potential concerns and related comments specific to the Trail Creek and Burns Ditch watersheds were listed as follows:

- Bank sloughing on western branch of Burns Ditch
 - Finger piers extend into Burns waterway
 - Significant debris and trees during flooding
 - Steep banks from the point where it splits and comes in from Lake County
- Sediment plume near mouth of Burns Ditch from upstream sedimentation
 - Inputs from eastern branch of Burns Ditch and Salt Creek
- Navigation problems due to trees and sediments in Burns Ditch
 - Boats kick up sediment (5 mph speed limit)
- Spoil bank management of east branch of Burns Ditch
- Curious about impacts of water chemistry on sedimentation
- Little contribution of sediment from agricultural lands (maybe a few places)
 - Some topography in Trail Creek watershed, forests and pasturelands
- Flashy runoff from development areas during rain events (early 1990s study)
 - Changes in land use, residential development, impervious surfaces
- Erosion control at local construction sites not being enforced

- Need random site visits by EPA enforcement
- Need ordinances at county level on erosion control to ensure implementation with fines and penalties
- Drainage ditch maintenance west of County Line Road (near I-94), not regulated east of County Line Road
- Seeding, buffer strips aren't being completed due to budgeting issues (county, city)
- Northwest Indiana heavily drained with agricultural tiles
 - 3 Types: private tile drains (active or abandoned), mutual drains from early 1900s (recovered by more than one party), regulated drains (100+ miles)
 - Close to 100% of farm fields are tiled in Kankakee River basin
 - No maps of tile drains (not required in Indiana)
- Reversal of Trail Creek from the mouth during northerly winds
 - Exacerbates dredging issues within navigational channel and at mouth
- Upstream of Lake George (huge sediment trap)
 - Sedimentation problems at Beaver Dam Ditch (from Crown Point and Turkey Creek)
 - Past proposal to IDNR to dredge materials from Lake George – too expensive
 - 3 main tributaries to Lake George, urbanizing of watersheds with lots of land conversion, few setbacks
 - Ask municipalities about problems

Discussion: Identifying Potential Data Sources

Bernie Engel, Purdue

Since the USACE is limited by the authorizing legislation for the Great Lakes Tributary Modeling Program to using existing data to develop each model, participants were asked to help identify potential data sources that might be of use to the modeling team during the remainder of the Burns Ditch/Trail Creek watershed model development phase of the project. The following data sources were listed:

- Early 1990s study of deposition of sediment in Trail Creek
 - Looked at velocity and streambank erosion in federal navigation channel
 - Funding from U.S. Geological Survey or USACE (?)
- Data from Total Maximum Daily Load (TMDL) reports
- 319 study of Lake George watershed underway
- Watershed plan for Turkey Creek (?)
- Several watershed plans that identify critical areas (contact Linda Schmidt, IDEM*)
- Catalog of watershed plans at NIRPC (contact NIRPC*)
- Coastal Program IGS Report (contact Joe Exl, IDNR*)
 - IDEM data on total suspended solids
 - Compilation of other data throughout Little Calumet/Galien River watershed
 - Sampling locations
 - Data available in digital format (contact Linda Schmidt, IDEM*)
- IDEM Infrared digital imagery (but not for land use – would need funding to get this)
- City of Portage DEM efforts would help with Burns Ditch (contact Craig Hendricks, Portage City Engineer*)
 - Municipalities have historically had resources to do 2-foot contours
- Indiana Biodiversity Initiative: (contact Mike Molnar, IDNR*)
 - Completed gap analysis and updated datasets in Northwest Indiana
 - Some updated land use/land cover data
- Future IDNR Lake Michigan Coastal Program funding for program enhancements (next 2-3 years)
 - Potential funding for updating land use/land cover datasets
 - Similar efforts planned for Lake, LaPorte, & Porter Counties in the northern part of Kankakee River basin (contact Chicago Openlands Project*)

* See Appendices B or C for contact information.

- Aerial photography datasets: 1997, 1998, 2003, 2005, no historical photography
 - 1999-2000 Porter County (contact Kevin Brietzke, Porter County*)
 - 1970, 1980, 1990, 2000 – non-corrected aerials flown every census year, not digitized
 - Marina project in Portage, could have elevation/topography data
 - Farm Service Agency aerials
- USACE dredging profiles and data
- Lake County – county assessment data, working on getting it into GIS databases (need funding)
- Information from original ditching project for Burns Ditch (contact Kevin Breitzke, Porter County*)
 - Testing of materials and sediments
- Ongoing environmental monitoring and data collection (contact Linda Schmidt, IDEM*)
 - Coastal zone data, worked with Indiana Geological Survey
- Impact Study, *E. Coli* impacts and sediment turbidity (contact Dr. Richard Whitman, USGS*)
 - Extensive monitoring: weekly/daily sampling at several dozen points in Trail Creek watershed
 - Water quality monitoring on Burns Waterway
- Most recent land use data has been compared with 2003 orthophotos, ambiguities ground-checked in 2005 (digital layer)
- Qualitative data for stream habitat from IDNR and IDEM

Summary and Next Steps

David Bucaro, USACE Chicago

Before adjourning for the day, Bucaro provided the group with a brief summary of the next steps for the remainder of the Trail Creek/Burns Ditch project. Over the next year, the modeling team (MSU, Purdue, and EPA staff) will be working on finalizing the development of the L-THIA/Digital Watershed web-based tools. Upon completion of the tools (about one year from now), a training workshop will be held to teach interested users how to use the tools. Bucaro encouraged workshop participants to contact him in the interim with any comments on the capabilities of the tools or to submit potential datasets for the development of the tools.

The Great Lakes Commission will compile a short summary of the workshop for distribution to the workshop participants and project partners. A webpage for the Trail Creek and Burns Ditch project will also be developed to disseminate information and announcements specific to this project. Workshop participants were encouraged to view the Great Lakes Tributary Modeling Program website (www.glc.org/tributary) to learn more about the program and other completed watershed projects.

Any follow-up comments and/or additional data sources may be submitted to David Bucaro at the USACE Chicago District at David.F.Bucaro@usace.army.mil or by calling (312) 846-5583.

Submitted By:

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* See Appendices B or C for contact information.

Appendix A

A Sediment Transport Modeling Workshop for the Burns Ditch and Trail Creek Watersheds

November 3rd, 2005 @ 10:30 CST

Sponsored by: U.S. Army Corps of Engineers
Assisted by: Great Lakes Commission and the
Northwestern Indiana Regional Planning Commission

Location: Northwestern Indiana Regional Planning Commission
6100 Southport Road
Portage, Indiana 46368

10:30 a.m.	Welcome, Introductions and Workshop Objectives	David Bucaro
10:45 a.m.	Background and Methodology: Implementing Section 516(e), WRDA	David Bucaro
11:00 a.m.	Little Calumet / Galien River Watershed Plan	Reggie Korthals
11:15 a.m.	Introduction to the Digital Watershed / L-Thia tool	Jon Bartholic / Bernie Engel
12:00 p.m.	Lunch	(A buffet style lunch will be served)
1:00 p.m.	Discussion: Present Sediment Issues and Problems in the Trail Creek and Burns Ditch Watersheds	Jon Bartholic / Bernie Engel
1:45 p.m.	Discussion: Identifying Potential Data Sources	Jon Bartholic / Bernie Engel
2:30 p.m.	Summary and Next Steps	
3:00 p.m.	Adjourn	

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Appendix B

Sediment Transport Modeling Workshop for the Burns Ditch and Trail Creek Watersheds

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November 3, 2005

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Appendix C

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(DEM data)

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