

INTRODUCTION AND SUMMARY

Michigan Tech Research Institute (MTRI) is in the midst of a multi-year, cooperative agreement with the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS), formerly known as the Soil Conservation Service. NRCS manages and implements several programs to conserve and protect natural resources, including soil, water, and air. Through these programs, commonly called "Farm Bill Programs," NRCS delivers both technical assistance and funding to farmers to encourage and support ecologically sensitive farming practices. Although some of these programs have existed in their present form since 1985 (and longer under the Soil Conservation Service), the USDA has not conducted a formal evaluation of their effectiveness in meeting ecological goals and objectives (such as clean water and less soil erosion). To rectify this situation, USDA contracted with the MTRI to examine the ecological effects of NRCS programs in Michigan, including both retroactive and ongoing, future-oriented evaluation.

In managing its conservation programs, NRCS faces the challenges of optimally coordinating its efforts across programs and achieving the desired ecological benefits. Therefore, in addition to our study of the ecological effects of NRCS programs, NRCS also requested that the MTRI assist in developing improved program management and communication tools. Thus, our activities in this program fall within four broad areas:

1. Evaluating the effects of NRCS conservation programs in Michigan, including retroactive and ongoing statewide assessment of NRCS programs in Michigan, and participating in NRCS's own case study that is assessing its activities specific to the Tiffin River watershed.
2. Developing a Technical Assistance Tracking Tool (TATS) to integrate the multitude of NRCS data sources and databases within a single structure and interface.
3. Creating an Internet Mapping Service (IMS) to enhance the ability of Michigan NRCS staff to view program data spatially.
4. Developing improved tools for providing information from the evaluation and assessment activities back to NRCS management so that this information can be used to better manage programs.

EVALUATION ACTIVITIES

Under this task, MTRI has developed a comprehensive evaluation framework that considers the effects of NRCS programs on environmental quality, as well as the effect of other, confounding influences, such as urban sprawl and climate. In addition, this framework includes five major components of environmental quality, relating to soil condition, land habitat, stream health, air quality and climate, and societal utility. Based on this overall framework, we are developing an Environmental Quality Index (EQI) that serves as an indicator of NRCS's success in improving environmental quality.

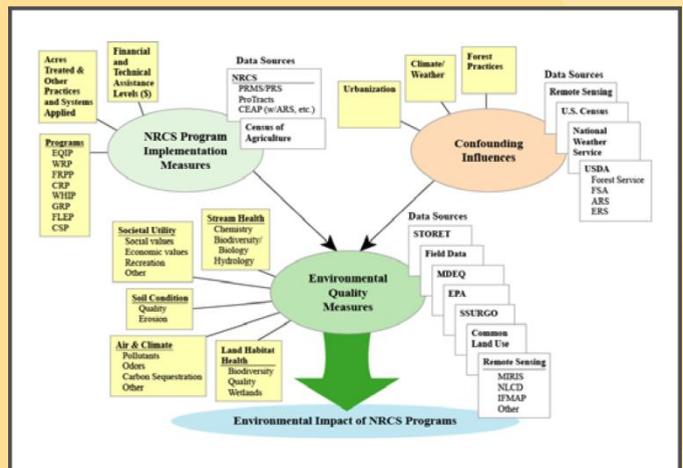


Figure 1. Framework for Evaluating NRCS Programs

In this task, the MTRI team is also supporting NRCS's efforts to conduct a detailed case study of how well its practices are affecting environmental health in the Tiffin River watershed. Part of the national Conservation Evaluation and Assessment Program (CEAP), this effort includes a major focus on stream quality and use of a non-point source pollution model, Annualized Agriculture Non-Point Source (AnnAGNPS) Model. Our main task in this support role is to develop a detailed land classification coverage as input to the model. In so doing, we are conducting a comparison of vector-based and traditional, pixel-based classification approaches. Our preliminary results indicate the former approach is better suited to field-based agriculture. In addition, we are also conducting water quality sampling within the watershed.

TATS, IMS, AND MANAGEMENT FEEDBACK TOOLS

MTRI is also undertaking a significant effort to enhance the geospatial and other databases that NRCS uses to plan, implement, manage, and track its programs. Within this effort, we are working with both the Michigan NRCS office and the NRCS's Information Technology Center in Fort Collins, CO. Overall, this effort involves database design, C# programming, IMS development, and data visualization. Ultimately our goal is to integrate evaluation activities and database tools with an IMS interface, as shown in Figure 3.

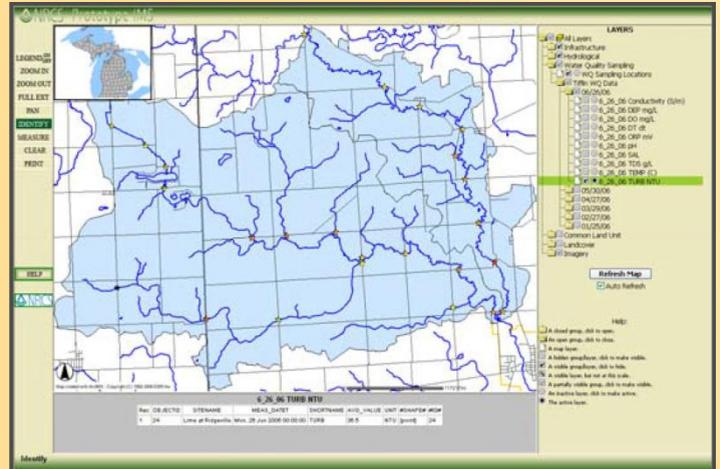
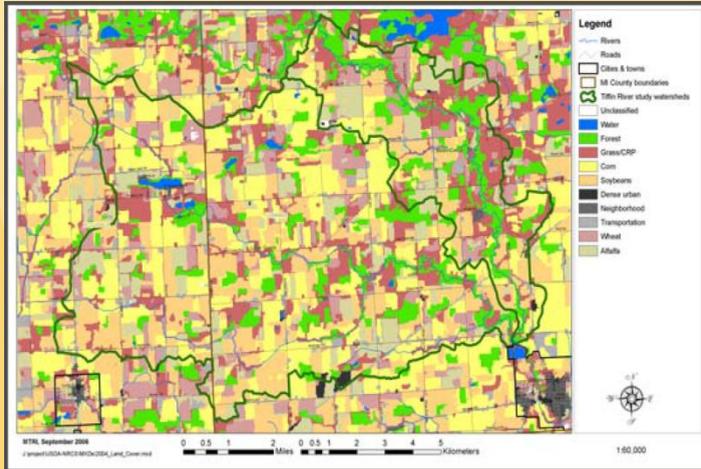


Figure 2: (a) Tiffin River agricultural land cover derived from multi-season Landsat satellite imagery

Figure 2: (b) Water quality and other geospatial data being Integrated into an Internet Mapping Service (IMS)

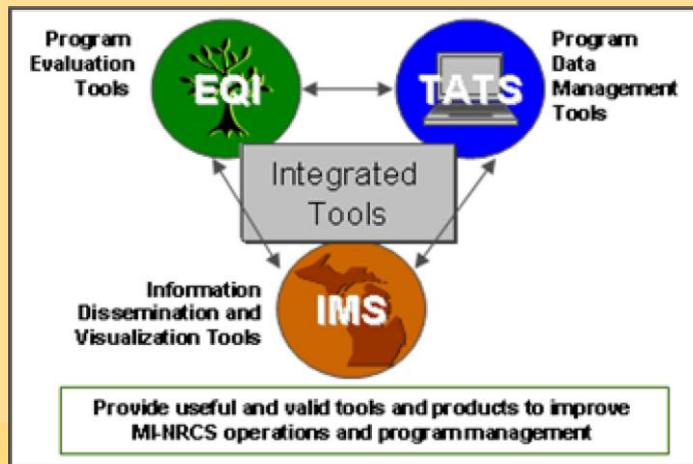


Figure 3: Goal for Integrated NRCS Management Information

Michigan Tech Research Institute

3600 Green Ct., Ste. 100 • Ann Arbor, MI 48105 • USA • 734.913.6840 (p) • 734.913.6880 (f) • www.mtri.org

Dr. Nancy French
Senior Research Scientist
(734) 913-6844
nancy.french@mtu.edu

Dr. Robert Shuchman
Institute Co-Director
(734) 913-6860
shuchman@mtu.edu

