



Tipping Points and Indicators

Watershed Education and Planning Tool

Location: Great Lakes Region

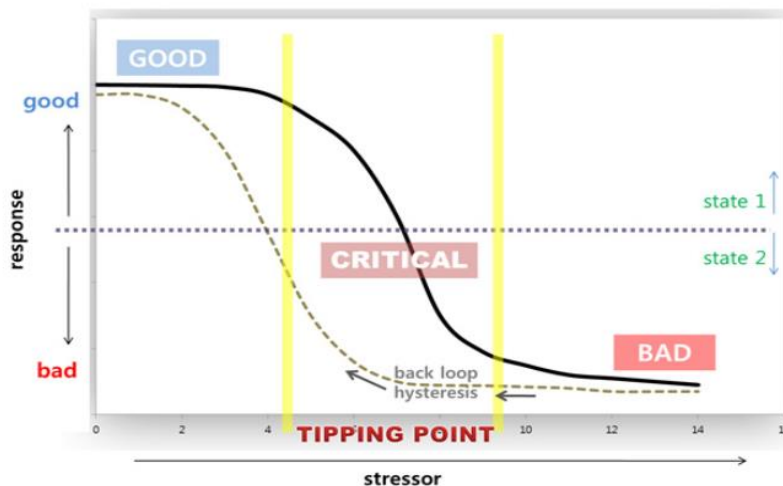
Partners: Illinois-Indiana Sea Grant, University of Illinois, Purdue University

Context: Human uses of land surrounding a river-stream network—in other words, a river-shed—have strong consequences for the aquatic natural resources the river-shed supports. Human land use impacts on aquatic systems are especially pronounced in the states surrounding the Great Lakes due to extensive agriculture and urban development. In order to protect the aquatic resources in this region, it is crucial to understand the current state and potential future of human-induced stress within their corresponding river-sheds.



Project Description: The Tipping Points and Indicators Project is the work of a multi-state team affiliated with the Great Lakes Sea Grant network. The project takes its name from the idea that the response of an aquatic system to stressors such as pollutants can be quite sudden when a critical threshold or “tipping point” is crossed (see graph). Good stewardship therefore requires good knowledge of current conditions and a clear understanding of what future changes might cause that tipping point to be crossed.

Placeways provided interactive mapping and analysis tools for a key phase of the action-planning process



The team is creating a robust web-based decision support tool for use by land use decision makers and local stakeholder groups such as watershed associations. When complete, the project will be implemented state-wide in each of the 8 states bordering the Great Lakes (Illinois, Indiana, Michigan, Minnesota, New

York, Ohio, Pennsylvania, and Wisconsin). Groups will participate in a facilitated process to complete a series of web-based wizards that address a variety of topics including prime farmland preservation, water resources, and biodiversity. Numerous tools and resources will be available for reference and follow-up, and the end result will be a community action plan.

Placeways provided interactive mapping and analysis tools for a key phase of the action-planning process. This is a spatial what-if exercise in which participants draw or “paint” potential future land uses on a live, dynamically-generated map of their area, chosen from any watershed in any of the states touching the Great Lakes. Using existing land cover and the proposed future land uses as inputs, the tool automatically models the potential impacts the new land uses would have on levels of nitrogen, phosphorus, suspended solids, and other pollutants. Results are displayed in animated gauges that visually convey the effects.



Technology and Partners: Placeways contributed GIS data processing, modeling, and interactive mapping tools that are part of the larger site being created by Illinois-Indiana Sea Grant. The mapping component is built on ArcGIS Server and its JavaScript API, and the web components use HTML and the JavaScript AMD pattern. Although the tool is typically used for one watershed at a time, it supports all 15,053 HUC12-level watersheds in the 8 states it supports. There are approximately 1.2 billion vector grid squares (each 30 meters square) in the data, which is stored on between 8 and 10 separate services on ArcGIS Server 10.1. Each grid square is attributed with its land use, soil type, and watershed, and each watershed is attributed with the area of each possible land use/soil type combination.

KEY LINKS

- Tipping Points and Indicators
tippingpointplanner.org
- Illinois-Indiana Sea Grant
www.iisgcp.org
- Placeways LLC
placeways.com

Availability: As of July 2014, the tool is in beta release.