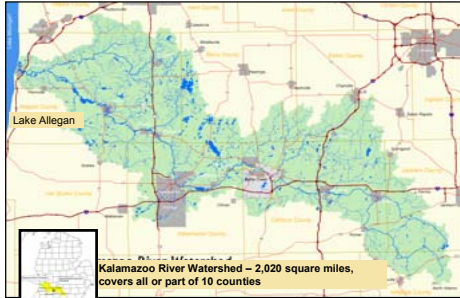


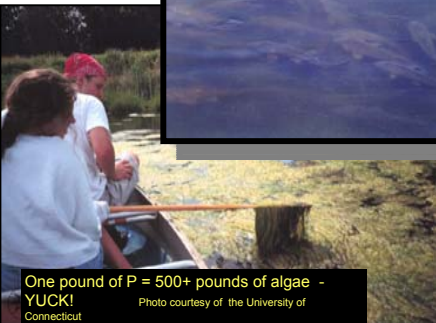
Successes and lessons learned from Extension-supported TMDL phosphorus (P) reduction program within a large rural watershed

The Kalamazoo River Watershed in southwest Michigan is threatened by nutrient enrichment.



Lake Allegan is a 1,587-acre impoundment near Lake Michigan, affected by excess phosphorus provided by a variety of point and non-point sources. Lake Allegan conditions:

- hypereutrophic
- collection point for sediment and nutrients
- algal blooms
- low oxygen levels, poor clarity
- a fish population dominated by carp.



One pound of P = 500+ pounds of algae - YUCK!
Photo courtesy of the University of Connecticut

MSU Extension at KBS has had a critical lead role

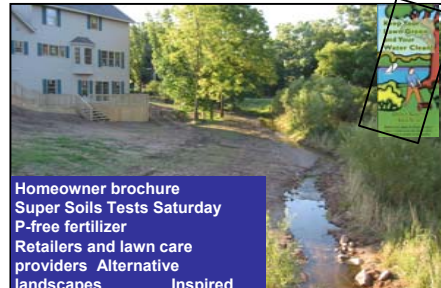
- Overall leadership, facilitation and coordination.
- Research on sources, pathways and fate of phosphorus (P) in the watershed system.
- Integration of watershed-wide research, education and extension.
- Development of volunteer monitoring network.
- Develop and maintain reporting and tracking system – GIS-based and on the web.
- Foster and support stewardship, cultivate local leadership and ensure sustainability.

Approved local plan

Stakeholder designed and implemented
Voluntary reductions of P

Land-use based P reduction strategies

- Agriculture
- Transportation
- Land use design
- Construction sites
- Storm water management
- NPDES point source dischargers
- On-site sewage disposal systems
- Turf management and alternative landscapes, our most successful strategy



Homeowner brochure
Super Soils Tests Saturday
P-free fertilizer
Retailers and lawn care providers
Alternative landscapes
Inspired statewide initiative

Success – what the data, and the community, say

Point sources have met target reductions of 23% since 2002



Non-point source reductions of 27% (50% target) in 2005



Lessons learned

Need a staffed “umbrella” organization for such a large watershed

- some 300 existing organizations and communities
- volunteers running a comprehensive program
- information clearinghouse—action alerts—one voice for the watershed

Voluntary program—difficult to motivate stakeholders

- initiate and continue P reduction activities
- tracking and reporting

Need better science—as a basis for setting the TMDL and other actions

- more detailed data on water chemistry and aquatic biology
- without such data, it's difficult to predict how the resource will respond

Use of transparency tubes by volunteers to estimate P is problematic

- training of volunteers to ensure consistency is challenging
- tubes are limited in clear waters

the different forms of P (dissolved and particulate) affect transparency

Stakeholders must care about the resource before they will change their behavior.

KANOE THE KAZOO is a series of guided float trips on the waters of the watershed

- introduce the public to the values of the watershed
- attempt to overcome complacency and misunderstanding
- targets key decision makers and general citizens
- 2,000 participants in four years
- assessment indicates significant change in attitudes and some change in behavior