Lake Erie Nutrient Targets: An Imperative for Adaptive Management

Image from 8-23-15

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1978 GLWQA

Multiple models provided guidance:

Vollenweider, DiToro et al., Chapra, Bierman et al.

Supported by info/technology available at that time

The Lake Erie phosphorus load shall not exceed:

11,000 tonnes/year

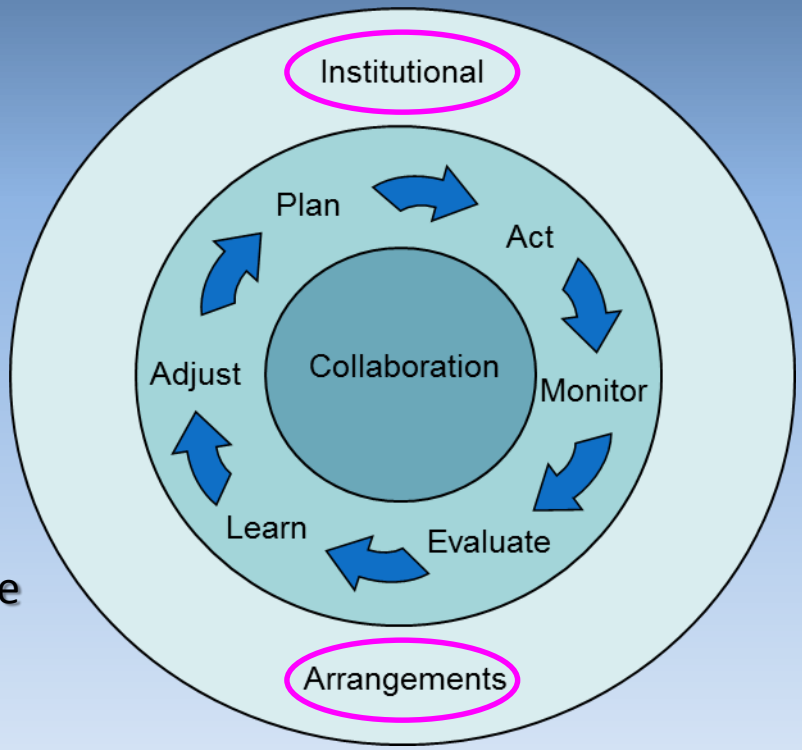
which probably translates to about 15 ug/L

early 2000s…


ALGAL BLOOM
ADVISORY
A harmful algal bloom has been detected at this location.
Users are encouraged to avoid ingesting water and avoid surface scum.
Image from
8-23-15

The Case for Adaptive Management

- Well established concept – extensive literature*
- Decision-making under uncertainty
- Reduce uncertainty via ecosystem-scale experiment - not usually feasible
- Recognize management actions as experiment
- **Learn – Testable hypotheses supported by appropriate research and monitoring**
- Update management actions with new knowledge



➢ **Active learning process – not trial and error**

Holling, C.S., and Chambers, A.D. 1973. Resource science: the nurture of an infant. Bioscience **23: 13-20.*

Active vs Passive Adaptive Management

Passive

Choose "best" management
Monitor
Evaluate

Active

Deliberate, structured experimentation
Choose management to push system
Develop testable hypotheses, alternative models
Structure monitoring, research to test hypotheses, differentiate models

- Best to be closer to the active side

POLICY FORUM

CLIMATE CHANGE

Stationarity Is Dead: Whither Water Management?

Climate change undermines a basic assumption that historically has facilitated management of water supplies, demands, and risks.

P. C. D. Milly,[1]* Julio Betancourt,[2] Malin Falkenmark,[3] Robert M. Hirsch,[4] Zbigniew W. Kundzewicz,[5] Dennis P. Lettenmaier,[6] Ronald J. Stouffer[7]

Science 2008

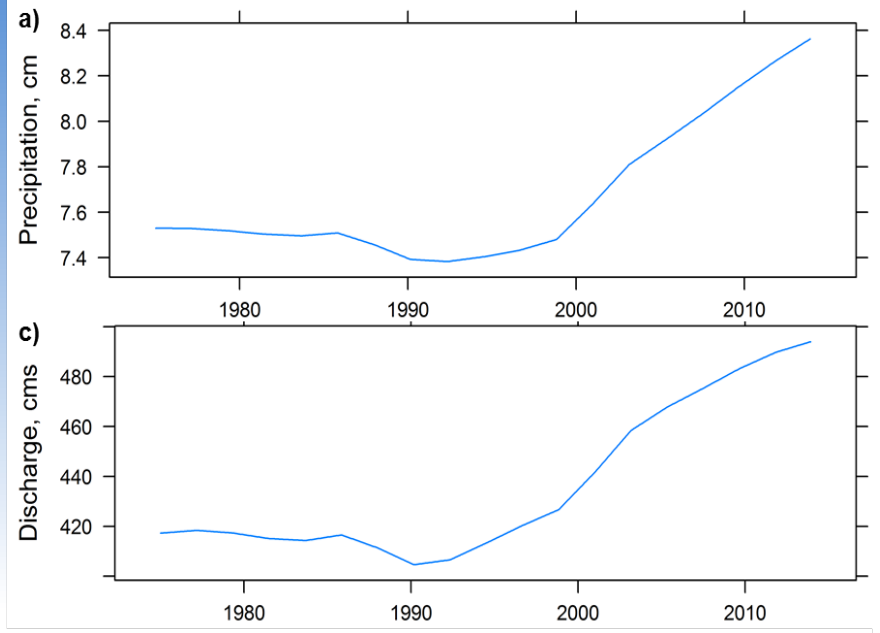
Environmental Science & Technology

Article

pubs.acs.org/est

Long-Term and Seasonal Trend Decomposition of Maumee River Nutrient Inputs to Western Lake Erie

Craig A. Stow,*[,†] YoonKyung Cha,[‡] Laura T. Johnson,[§] Remegio Confesor,[§] and R. Peter Richards[§]



Long-term precipitation increasing

Long-term Maumee River discharge increasing

Implementing Adaptive Management

To effectively implement, requires

- Defined problem ✓
- Authorization to address problem GLWQA
- Institutional framework to support collaboration LAMP
- Defined objectives
- Work plan and reporting cycle
- Performance measures
- Stakeholder involvement

Under Development

Draft Report - (24 November 2015)
RECOMMENDATIONS FOR MONITORING, MODELING, RESEARCH AND REPORTING TO SUPPORT ADAPTIVE MANAGEMENT

- Resources
- Political will

In Conclusion

- Targets moving forward – still work to be done
- System changing on relevant time scales
- Adaptive Management → *Buzzword*
  - Needs To Be An Imperative
- Otherwise – it's back to the 1980s…

- Going forward, our willingness and ability to monitor, evaluate, and update the targets will be more important than the original targets

Thank You