

## Developing Interim Milestones & Criteria to Measure Progress

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## Administrative vs. Resource Outcomes Based Management

	Administrative Outcome Approach	Resource Outcomes Approach
<b>Goal</b>	Program Performance	Environmental Performance
<b>Measures</b>	Administrative Actions	Indicator End-points
<b>Results</b>	Improve Programs	Programs are Tools to Improve the Environment

Most environmental indicators have been developed to report regularly on the “state of the environment” rather than the success of a specific project.



## Heinz Center is a leader in developing and using environmental indicators

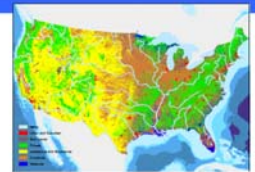
### Key Findings From The State of the Nation's Ecosystems 2008

#### Conditions and Trends – The Nation's Lands, Waters, and Living Resources

The State of the Nation's Ecosystems 2008 presents 108 indicators that describe the condition and use of U.S. ecosystems. The report focuses on key characteristics such as ecosystem area and composition, chemical and physical properties, condition of biological resources, and the goods and services that people derive from ecosystems.

The State of the Nation's Ecosystems 2008 is the product of extensive collaboration between government agencies, universities, businesses, and conservation organizations, supported by public and private funds. The core premise behind the report is that decision makers and the American public should receive periodic, high quality, non-partisan reports on the condition of the nation's lands, waters, and living resources.

This fact sheet provides a glimpse into the



Land Cover and Ocean Depth  
Data from Multi-Resolution Land Characterization Consortium (MRLC) and NOAA

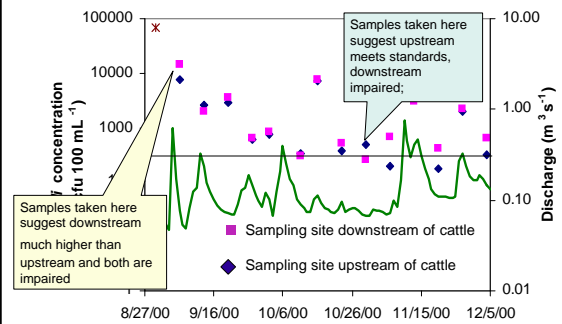
#### What's New – More Data, Improved Indicators

The 2008 State of the Nation's Ecosystems report builds on the strong foundation of its 2002

## Human Health Recreational Use Support (Swimmable)

	Fully Supporting	Not Supporting
Bacteria ( <i>E. coli</i> ): at least 5 equally spaced samples over thirty (30) days. (cfu = colony forming units)	Geometric mean $\leq 125$ cfu/100ml and no more than one sample $>576$ cfu/100ml.	Geometric mean exceeds 125 cfu/100mL.
Bacteria ( <i>E. coli</i> ): grab samples	No more than 10% of measurements $>576$ cfu/100ml and no more than one (1) sample $>2400$ cfu/100ml.	More than 10% of samples $>576$ cfu/100ml or more than one (1) sample $>2,400$ cfu/100ml.

## Day-to-day and year-to-year variability in *E. coli* and other parameters are often greater than reduction due to NPS program

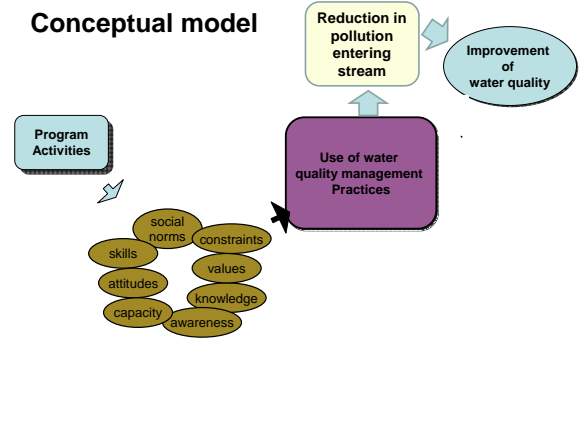


## Sneaker Index (Patuxent River)

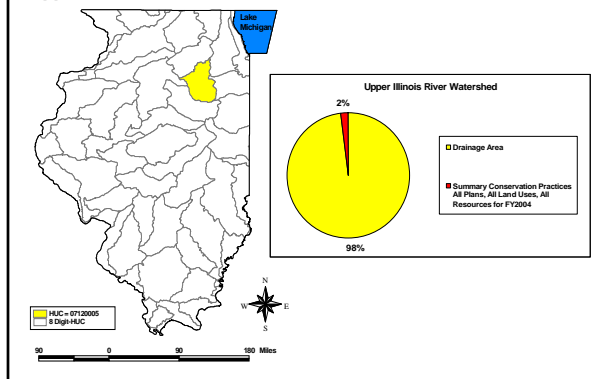
- Hundreds of people wade in each year until they can no longer see their feet
- Begun in 1988, the annual wade has attracted governors, congressmen, hundreds of people.



## Conceptual model



## Upper Illinois River Watershed



## Indicators measure progress towards our goals.

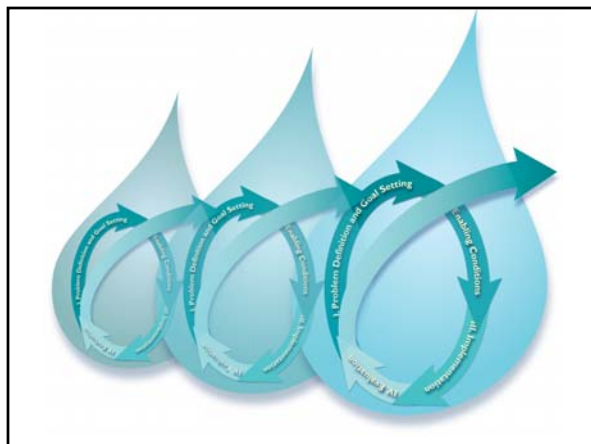
For watershed management projects, our goals are based in the Clean Water Act.

- Restore and maintain chemical, physical, and biological integrity
- Fishable and swimmable streams



## Value of Milestones

- Allows you to track actions various partners will take to achieve goals
- Relates project goals to how things are being accomplished
- Status of objectives/outputs easy to determine



## Milestones

- Indicator and temporally based
- Stakeholders can relate to the time frame and measure.
- Specific to work plan activities and priorities.
- Milestones with water quality goals form the bases of the projects monitoring effort

## Types of Milestones

- Tracking milestones (process –track BMPs, # of permits, etc against workplan expectations)
- Interim milestones (process/outcome – training completed prior to BMP installation)
- Critical milestones (outcome/impact – without this achievement the project will succeed must make changes)

Are there indicators to measure all these outcomes?

Outcome	Measurable?
1. Water is swimmable	
2. <i>E.coli</i> is reduced to meet WQ std	
3. Cows are no longer in stream	
4. Farmers install fencing and alternate watering systems	
5. Farmers believe cows should be out of stream	
6. Farmers know how to exclude cattle (and cost-share)	

## Types of Indicators

- Administrative
- Social



- Environmental



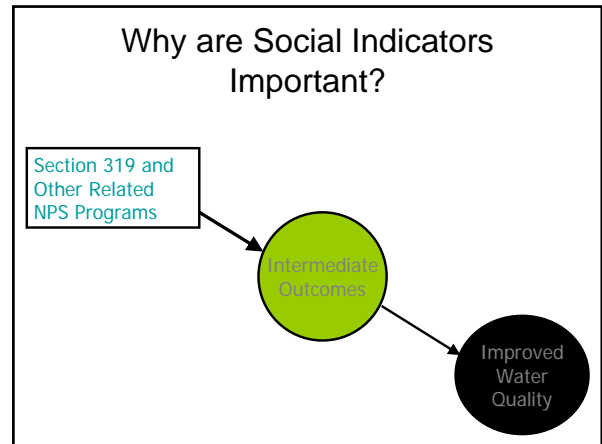
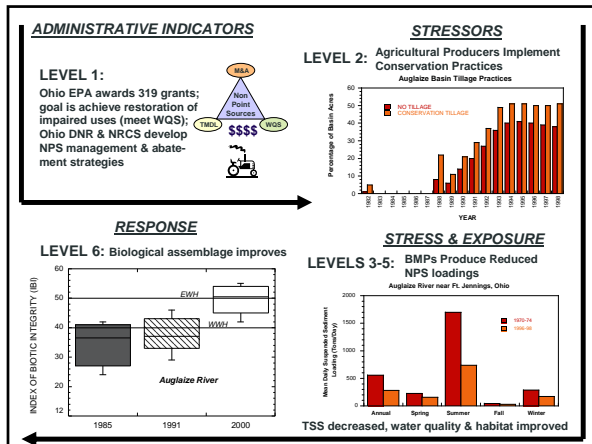
## Environmental indicators include

- **Condition** Indicators
  - Water quality, habitat quality, aquatic communities
- **Stressor** Indicators
  - Less manure in the stream from cattle
  - Reduction in nutrient loading
  - Increase in forested riparian buffers
- **Management** Indicators (*maybe – some overlap with social indicators*)

## Critical milestone

- Lower Big Rib Priority Watershed project established a critical milestone to trigger management focus:
 

“after 5 years of implementation, the calculated sediment reduction based on cost share agreements, is less than 60% of the total cropland sediment reduction goal. Additional cropland fields will be classified as critical and eligible for assistance.”



- ### Social Indicators
- Consistent questions used before and after a project (and possibly mid project)
  - Consistent questions used across projects in one region
  - Surveys (when appropriate methodology) used rigorously and correctly

### Awareness indicators

Name of Indicator	Method	When Reported
Awareness of consequences of pollutants to water quality	Survey	Beginning and end of project
Awareness of types of pollutants impairing waterways	Survey	Beginning and end of project
Awareness of sources of pollutants impairing waterways	Survey	Beginning and end of project
Awareness of appropriate practices to improve water quality	Survey	Beginning and end of project

### Attitude indicators

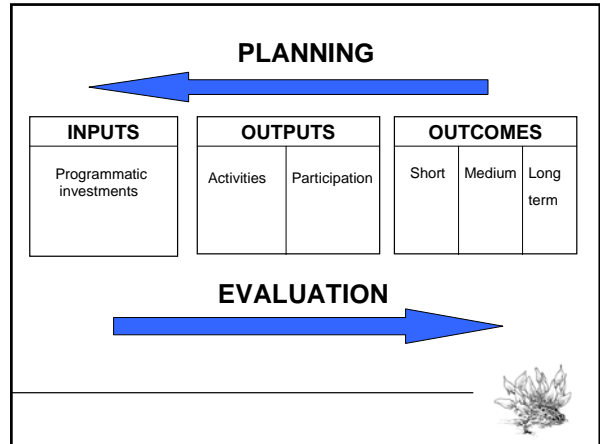
Name of Indicator	Method	When Reported
General water-quality related attitudes	Survey	Beginning and end of project
Willingness to take action to improve water quality	Survey	Beginning and end of project

### Capacity indicators

Name of Indicator	Method	When Reported
Resources leveraged by grant recipient in the watershed as a result of project funding (including cash and in-kind resources)	Records	End of project
Funding available to support NPS practices in critical areas	Records	End of project
Technical support available for NPS practices in critical areas	Records	End of project

### Behavior indicators

Name of Indicator	Method	When Reported
Percentage of critical area receiving treatment	Records	Beginning and end of project
Percentage of target audience implementing practices in critical areas	Survey / Records	Beginning and end of project
Ordinances in place that will reduce nonpoint source stressors	Interview	End of project

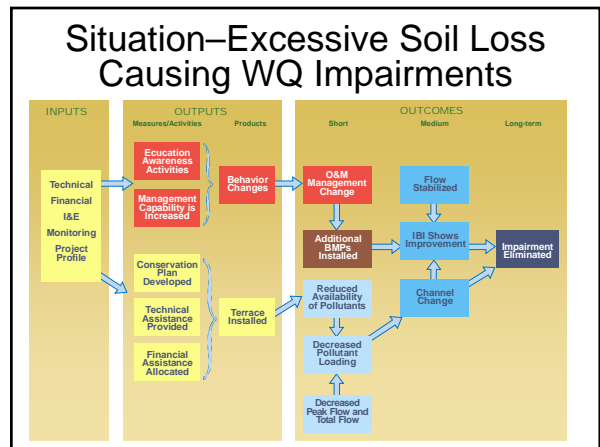
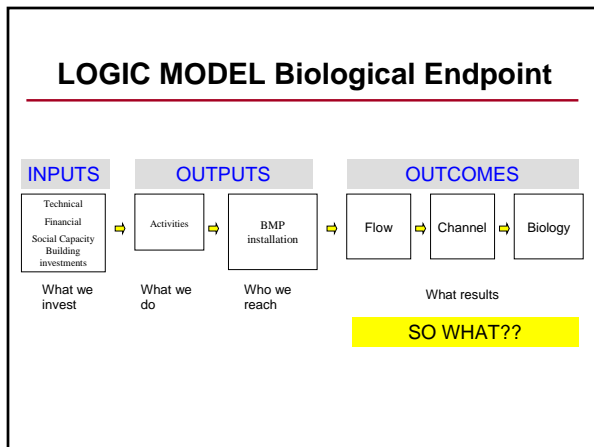


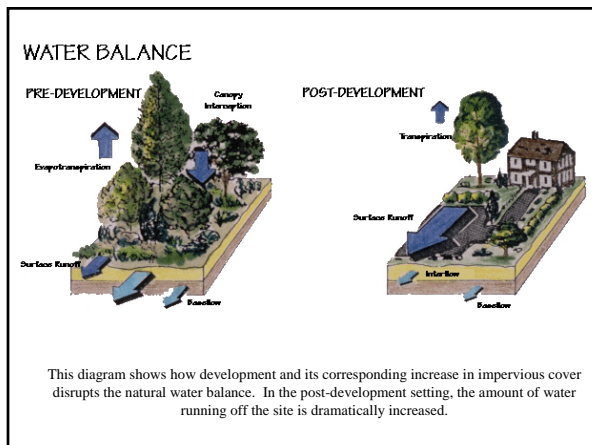
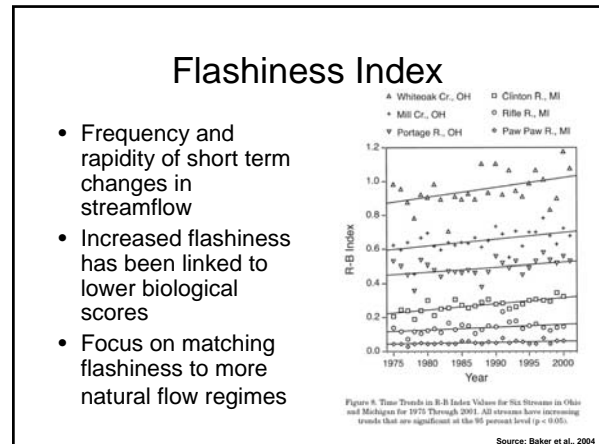
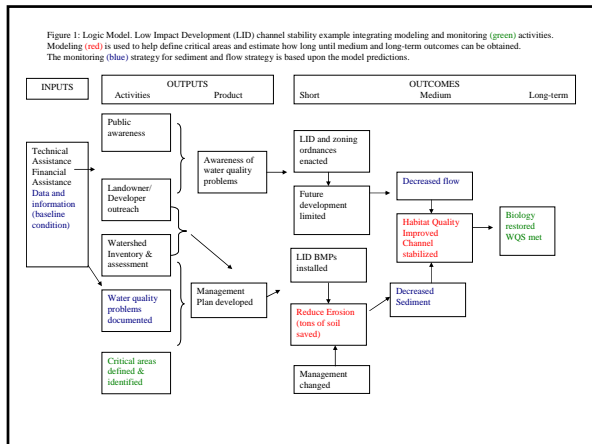
### Lake Sarah Watershed Management Plan Turbidity Objective

Objective	Activity	Action	Responsibility	Time Frame	Cost Estimate
Reduce turbidity in lake by 15 % by June 2010	Install riparian buffers	Involve local land-owners	Partner group	July 2001 – July 2008	XXXX

### Evaluation Measurements

Type/Time frame	Indicator
Administrative "Beans" (early)	\$ spent BMPs installed
Environmental (end)	Loading reductions IBI changes
Social (early-end)	# participants KSA changes





### Indicators & targets: short/long term

**Worksheet 12-2**  
**Developing Criteria to Measure Progress in Meeting Water Quality Goals**

[Note: Complete one worksheet for each management objective identified.]

Management Objective: Reduce nutrient inputs into Cane Creek by 20 percent

Indicators to Measure Progress	Target Value or Goal	Interim Targets		
		Short-term	Medium-term	Long-term
P load	44 t/yr	52 t/yr	49 t/yr	44 t/yr
# of nuisance algae blooms	0	2	1	0
transparency	5.5 m	4.1 m	4.9 m	5.5 m
frequency of taste and odor problems in water supply	0	1	1	0
hypolimnetic DO	5.0 mg/L	2.5 mg/L	4.0 mg/L	5.0 mg/L

### Milestones/Adaptive Management

Project water quality goals are not modified based on lack of progress –

Implementation, monitoring, O&M activities are modified to achieve water quality goals –

Milestones help tell you when

### Finally...Make Adjustments

- Monitor water quality and BMPs
- Compare results to goals
- Are you making progress?
- Are you meeting your goals?
- If you aren't meeting implementation milestones
- If you aren't making progress toward reducing pollutant loads...

Then...do it all over again!