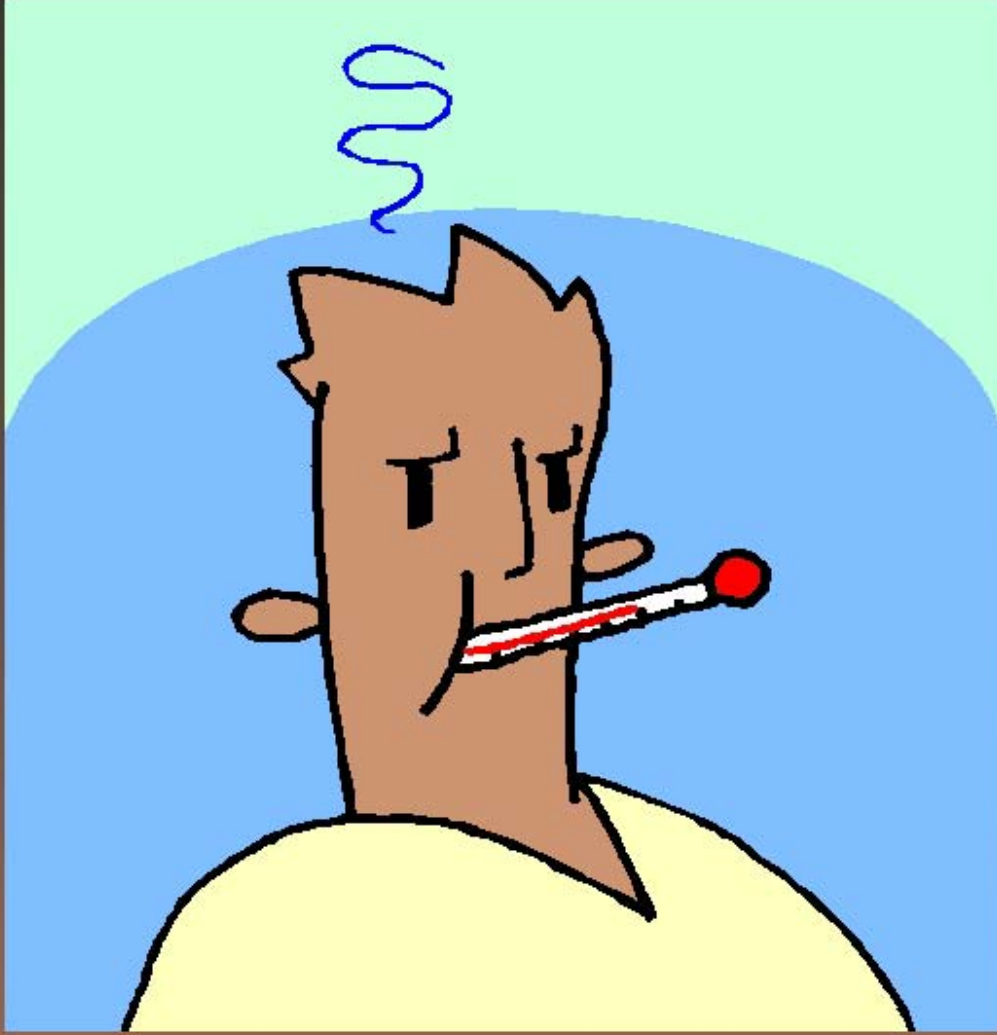




Introduction to SOLEC Indicators Process

Paul Bertram, Ph.D. presenting
U.S. EPA
Chicago, Illinois

Nancy Stadler-Salt
Environment Canada
Burlington, Ontario



SOLEC '98





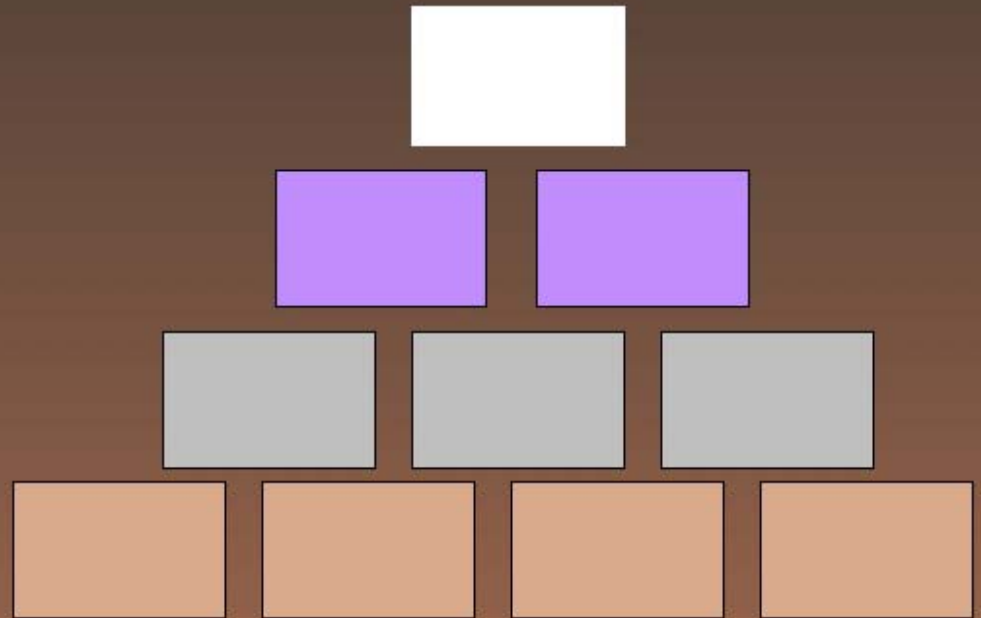
What is a SOLEC indicator list?

A compilation of indicators *necessary* and *sufficient* to characterize the state of the Great Lakes ecosystem



Organizing Principle I

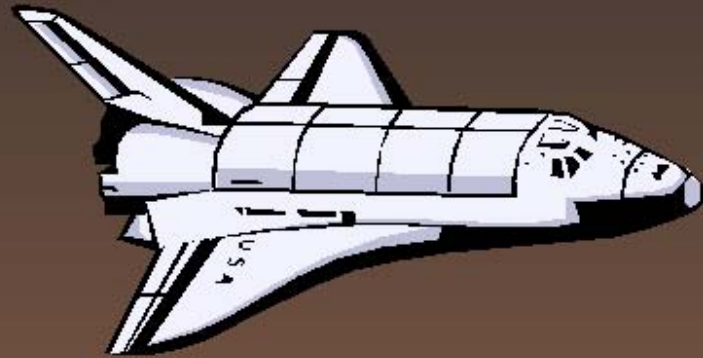
Build upon the
work of others





Organizing Principle 2

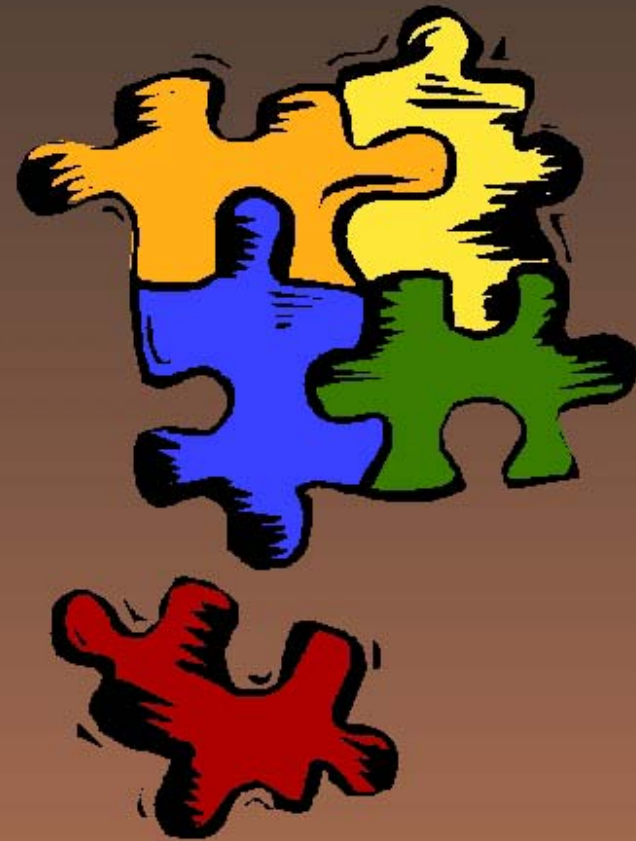
Focus on
broad
spatial
scales





Organizing Principle 3

Select a framework for subdividing the Great Lakes basin ecosystem





Framework

Physical, Chemical, Biological

Aquatic communities, Terrestrial
communities, Abiotic Habitat



Framework

Desired Outcomes

- Fishability
- Swimability
- Drinkability
- Healthy Human Populations
- etc.



Framework

Geographic Zones

- Offshore
- Nearshore
- Coastal Wetlands
- Nearshore Terrestrial



Framework

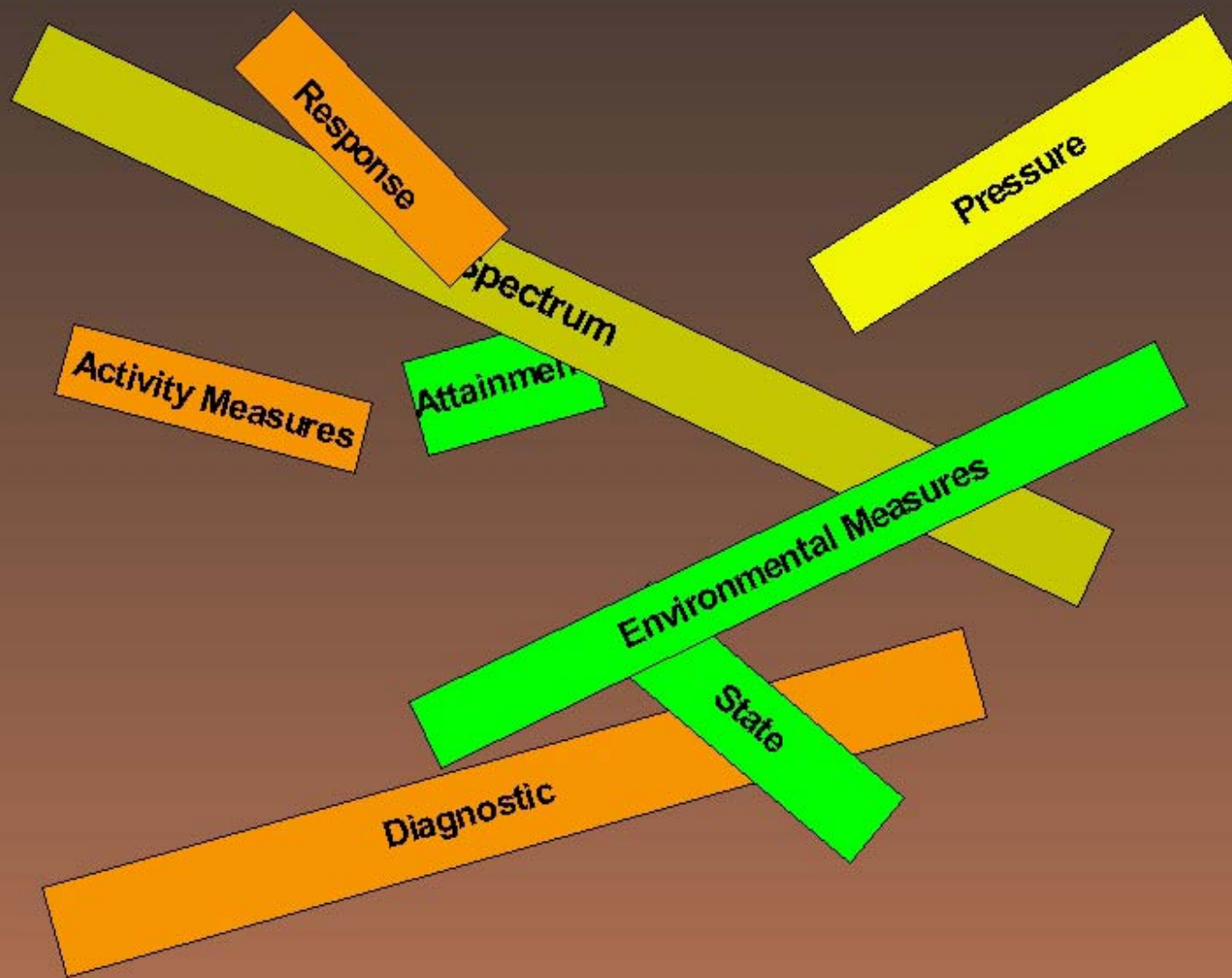
Non-Geographic Issues

- Human Health
- Land Use
- Stewardship
- Unbounded



Organizing Principle 4:

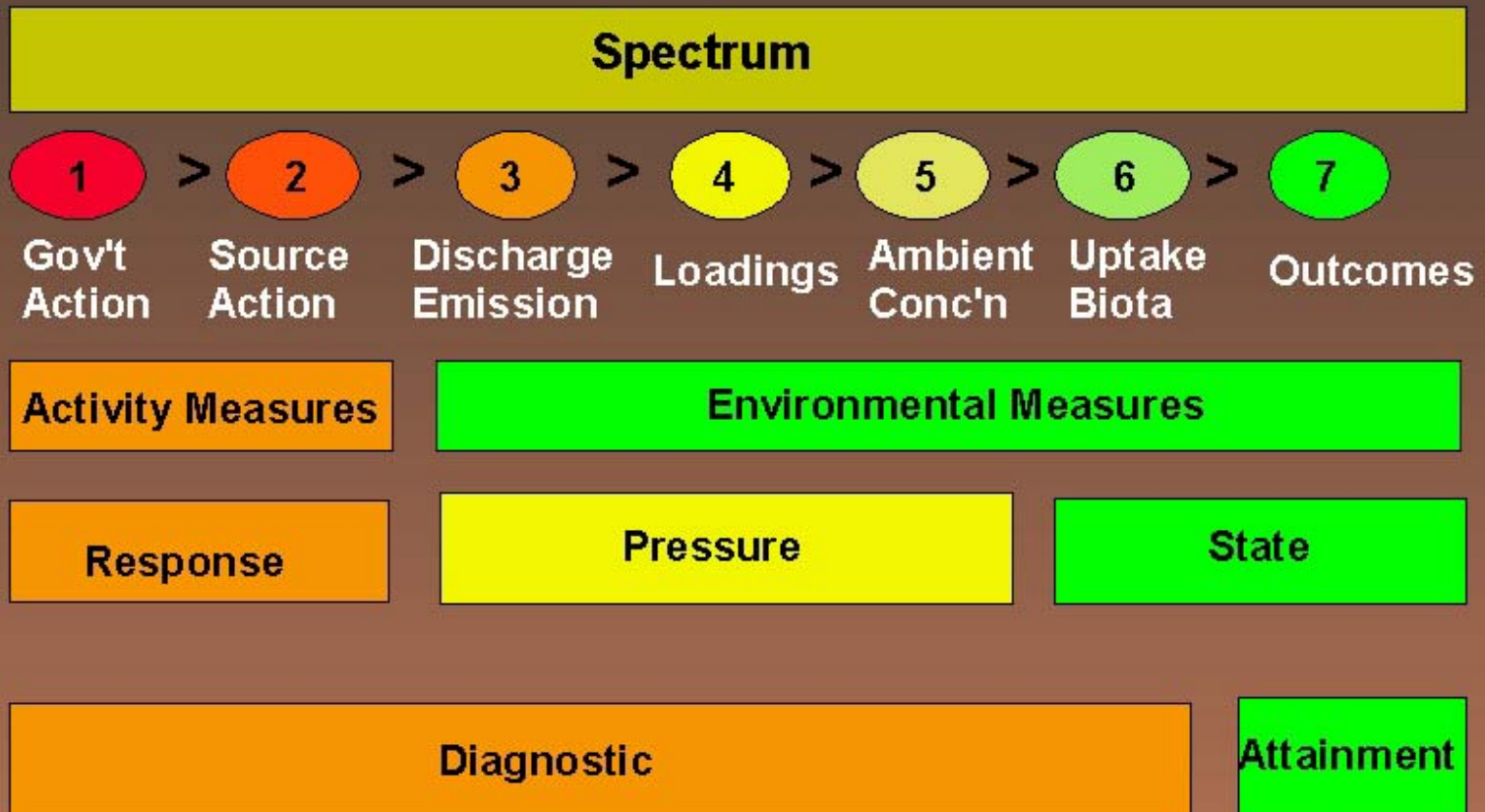
Select a
system
for types
of
indicators





Organizing Principle 4:

Comparison of Indicator Framework





Ecological Integrity and Benefits

Ecological Health

Human Health & Welfare

Stressors

Physical

Biological

Chemical

Sources

Filling

Dams

Dredging

Navigation

Exotics

Stocking

Erosion

Emission

Point Source

Sediments

Economics

Behavior

Institutions

Laws

Programs

**Factors
Limiting
Stressors**



Organizing Principle 5:

Identify Criteria
for indicator
selection

- Necessary, Sufficient, Feasible
- Supplemental Screening criteria





The Process - Past

1997

Aug Sep Oct Nov Dec Jan

Form Indicators Group
Core Groups
Expert Panels



The Process - Past

1997

Oct **Nov** **Dec** **Jan** **Feb** **Mar**

Mine indicators from existing documents



Mining Indicators from documents

Group	Title	Sponsor/ Authors	Date	Priori	Lenght Pages	Applicability	OW	NS	CW	NT	HH	SS	EV	Notes
GLFC	Aquatic Resource Goals and Fish Community Objectives for Lake Erie (DRAFT)	Committee	1993?											
GLFC	Fish-Community Objectives for Lake Huron	DesJardine et al.	1995	1	37	x	x							
GLFC	Fish-Community Objectives for Lake Michigan	Eschenroder et al.	1995	1	56	x	x							
GLFC	Fish Community Objectives for Lake Superior	Eschmann	1990	1	23	x								
LaMP	Indicators of Progress Toward Lake Ontario Ecosystem Objectives	EOWG	1993	1	6	x	x			x	x	x		Matrix table
LaMP	Lake Ontario: An Ecosystem in Transition	LOPCHIC	1993	1	65	x	x							
LaMP	Ecosystem Principles and Objectives, Indicators and Targets for Lake Superior	LSWG	1995	1	177	x	x			x	x	x	x	
LaMP	Lake Michigan Indicators: Degradation of Wildlife and Fish	LaMP	1996	1	11	x	x			x				Matrix format
LaMP	Matrix for Aquatics/Habitat Indicators for Lake Michigan	LaMP	1996	1	6	x	x			x				Matrix format
Other	Compendium of Ecosystem Health Goals, Objectives and Indicators	? Canada	1996	1~60		x	x			x	x	x	x	Compilation Tables
SOLEC'94	Health	Manno, et al.	1995	1	89						x			
SOLEC'94	State of the Great Lakes Basin, 1985	SOLEC	1995	1	100		x							1 page paper
SOLEC'94	Water Quality in the Great Lakes	SOLEC	1995	1	70		x							
SOLEC'94	Toxic Contaminants	DeVault et al.	1995	1	45	x	x							
SOLEC'94	A Changing Great Lakes Economy: Economic and Environmental Linkages	Ashdridge, Thorp	1995	1	50								x	
SOLEC'94	Climate Change: Trends and System Response	Neilson et al.	1995	1	29	x								
SOLEC'94	Wetlands: Trends and System Response	Dodge,	1995	1	29	x								
SOLEC'94	Aquatic Habitat and Wetlands of the Great Lakes	Gaksky	1995	1	71	x	x			x				

Initial List of 37 documents

Expanded to 67 documents

Other references not yet recorded in the list



The Process - Past

1998

Dec **Jan Feb Mar Apr** May Jun

Create electronic database

Metadata fields

Description fields



SOLEC Indicators Indicator ID:

Indicator Name:

Indicator Measure:

Program Source:

Indicator Type: **SOLEC Indicator?:**

Select applicable Lake Basin(s):

- Lake Erie
- Lake Ontario
- Lake Huron
- Lake Superior
- Lake Michigan

Select applicable SOLEC Category:

- Nearshore Water
- Nearshore Terrestrial
- Offshore Water
- Coastal Wetland
- Human Health
- Stewardship/Sustain.
- Economic Viability
- Other

Data Availability: **Data Quality:**

Data Source and Comments:

Record: of 839 of 867



SOLEC Indicator Description		B128
Indicator Name:	Nearshore threatened species	
Indicator Measure:	Number and proportion of nearshore species ranked as GI	
Ecosystem Objective:	Healthy populations of all flora and fauna, including the rarest of species. Relates to IJC Desired Outcome 6:	?
Indicator Purpose:	The rarest elements of the natural diversity are indicators of the health of and stresses on the	?
Endpoint or Outcome:	Maintenance of number of species and maintenance or increase in endangered, threatened, and vulnerable	?
Indicator Features:	Numbers of individuals in each population, measure of area occupied and percentage of flowering (plants);	?
Indicator Illustration:	Bar graph of numbers of species by state/province, shaded to illustrate number of sites for each species	?
Indicator Limitations:	It would be costly to annually monitor all populations of all species. A subset could be sampled annually, to	?
Indicator Interpretation:	If the right subset of species are chosen, sampling endangered/threatened/vulnerable species should be	?
Additional Comments:	Experts from the states/provinces should collectively decide which species would be the best indicators.	?
Return to Indicator Form		



The Process - Past

1998

Jan **Feb** **Mar** **Apr** **May** **Jun**

Screen indicators according to N-S-F criteria

Combine, modify or develop new indicators

Write descriptions for each proposed indicator



The Process - Past

1998

Apr **May Jun Jul Aug Sept**

Assemble Indicators List -Version 1

Review by Agencies, Interested Stakeholders

Assemble Indicators List -Version 2



The Process - Now

1998

Aug Sep **Oct** Nov Dec Jan

Review of SOLEC Indicator List

SOLEC Discussions, Comments, Suggestions

Database Available

1999



The Process - Future

1998

1999

Sep **Oct** **Nov** **Dec** Jan Feb

Revise List by Core Groups

Simplify the Indicator Descriptions

Assemble Indicators List -Version 3



The Process - Future

1998 1999

Dec Jan Feb Mar Apr May

Review of SOLEC Indicator List

SOLEC Participants, Agencies,
LaMPs, RAPs, Public, Other
Stakeholders

Approval by the Parties

SOLEC 98 Indicators List - Final



The Process - Future

1999 - 2000 and Beyond

Continue evaluation, development, research

Integrate SOLEC indicators into monitoring programs



SOLEC '98

Today

Core Groups to present indicators, rationale, special processes, challenges

SOLEC Participants to critically review the SOLEC List



SOLEC 98

Key Questions

Is everything on the list necessary?

What should be added to the list?

How can specific indicators be improved?



SOLEC 98

Key Questions

Will the indicators answer **your** management questions?

How can **you** use the indicators to make better management decisions?