

ASIWPCA: How Clean Are Our Waters?

A state-driven solution to a national question

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Presentation

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How did we get here?

Chair, Subcommittee on Water Resources & Environment (1999):

- Is information in NWQI reliable and representative?
- Is available data sufficient for states to make key decisions on management?

GAO concluded (2000):

NWQI is not reliable due to “wide variation in”:

- State selection of monitoring sites
- State monitoring methods (what's there?)
- State assessment methods (what does it mean?)
- State stressor identification

Therefore

Data is not comparable across state lines

States do not have info to do their jobs

ASIWPCA's position

- Ed Koch asked the right question:
"How am I doing?"



ASIWPCA's position

BUT, Ed Muskie said it best:



"Federal legislation in the field of water pollution control has been keyed primarily to an important principle of public policy: the States shall lead the national effort to prevent, control, and abate water pollution. As a corollary, the Federal role has been limited to support of, and assistance to, the States."

ASIWPCA's conclusion

- NARS does not give States information needed to make decisions
- NARS is not appropriate as implemented
- Ask a different question to get a better answer: How do we improve state capacity for monitoring & assessment that also yields a valid national picture of water quality?
- Mandates to have states conduct probabilistic surveys are unnecessarily limiting

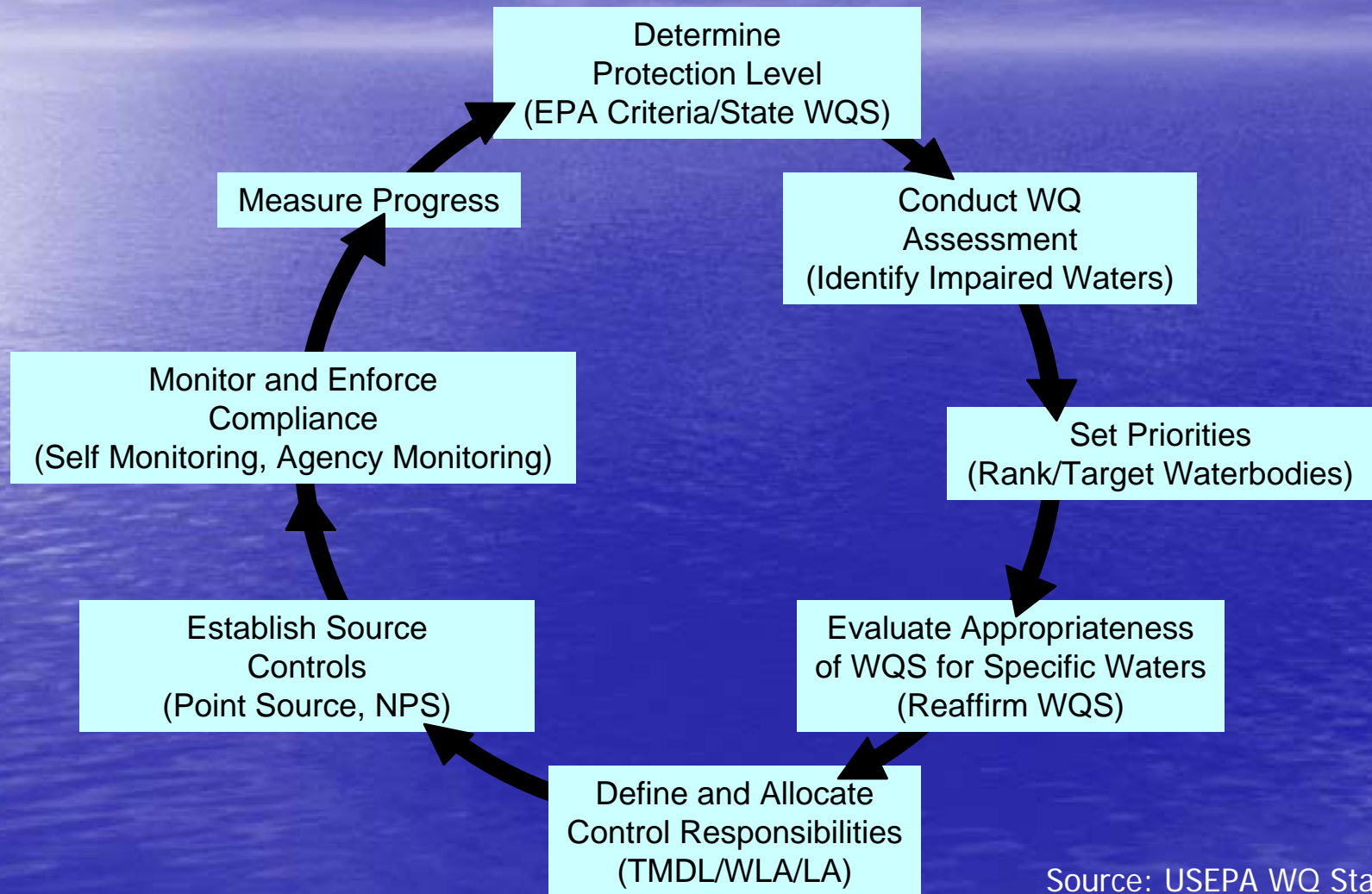
What are the Principles of the States' solution?

- Integrate standards, monitoring, and assessment - EPA HQ & Regions
- Improve state capacity
- Develop State-EPA NARS true partnership – design, methods & assessment
- Maximize NARS benefits to meet state water information needs
- Information must be “actionable” by states to improve water quality - as per CWA

Integrate Standards, Monitoring and Assessment

- What is the goal? → STANDARDS
- What's the condition? → MONITORING
- Does it meet goal? → ASSESSMENT

Water Quality Based Approach (CWA Section 302)



THEN, TAKE ACTION

- Examples:
 - Upgrade waterbody designated use
 - Upgrade antidegradation tier
 - List waterbody as impaired
 - Prioritize waterbody for restoration
 - Develop TMDL
 - Write NPDES discharge permit

What is the States' solution?

- Determine sampling & assessment methods that allow comparability to existing state data & accommodate regional differences
- Collaborate with states to integrate NARS with state monitoring designs
- More fully integrate comparable monitoring & assessment methods into state Comprehensive Monitoring & Assessment Strategies

Advantages to State Solution

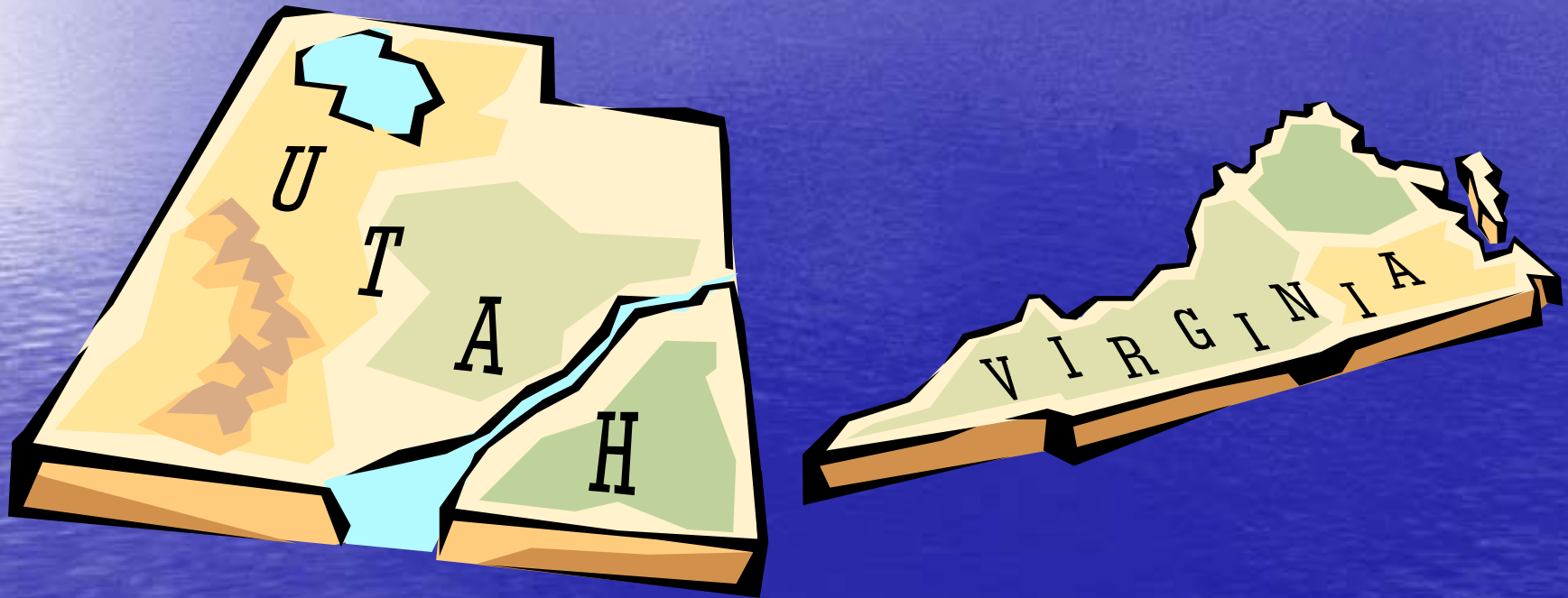
- Builds State monitoring & assessment capacity
- Incorporates existing State's knowledge of water quality
- Provides greater assessment power
- Reduces potential for conflicting or questionable results
- Data serves national assessment and is "actionable" by states

NARS Monitoring Protocols

National Protocols:



- 'One-size-fits-all' method only works well part of the time
 - Impossible to tell when or scale results according to effectiveness of the method
- Incompatible with existing state data
- 'Snapshot' single sampling events may not be representative of true condition if sampling occurred under anomalous or inappropriate conditions (flows)
 - More refined sampling criteria are needed

Utah is not Virginia



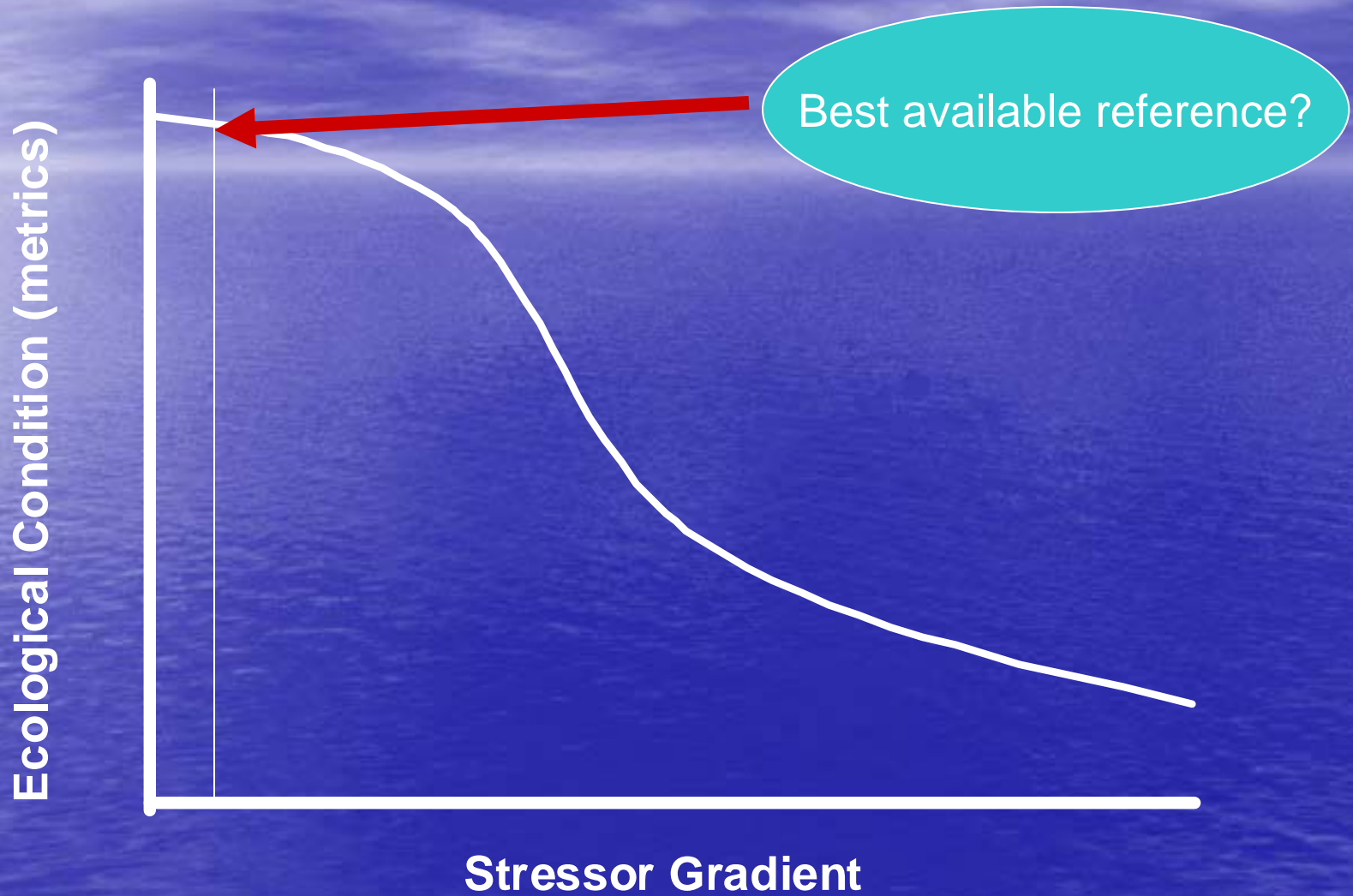
Desktop reconnaissance

2007-2008 Illinois/Rock River Basin Sites inventory

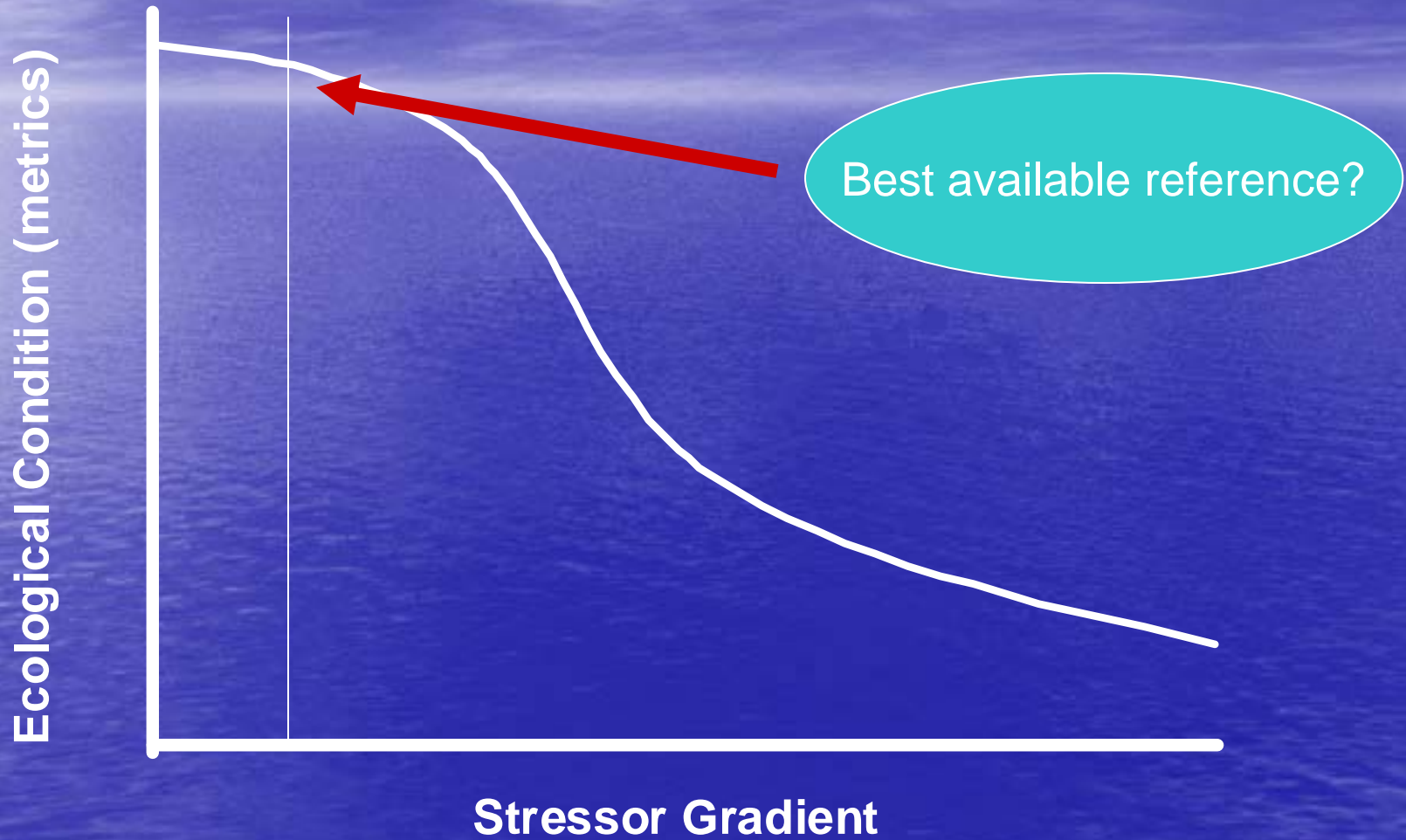
River Size Panel	Wadeable	Boatable
0-150 (n=114)	Rejected=113 99% 	Completed = 1 Inaccessible=0
150-500 (n=73)	Rejected=20 27%	Completed= 26  Inaccessible=27
500-1000 (n=62)	Rejected= 6 10%	Completed= 30 Inaccessible= 26
>1000 (n=34)	Rejected= 1 3%	Completed= 25 Inaccessible= 8

NARS Assessments

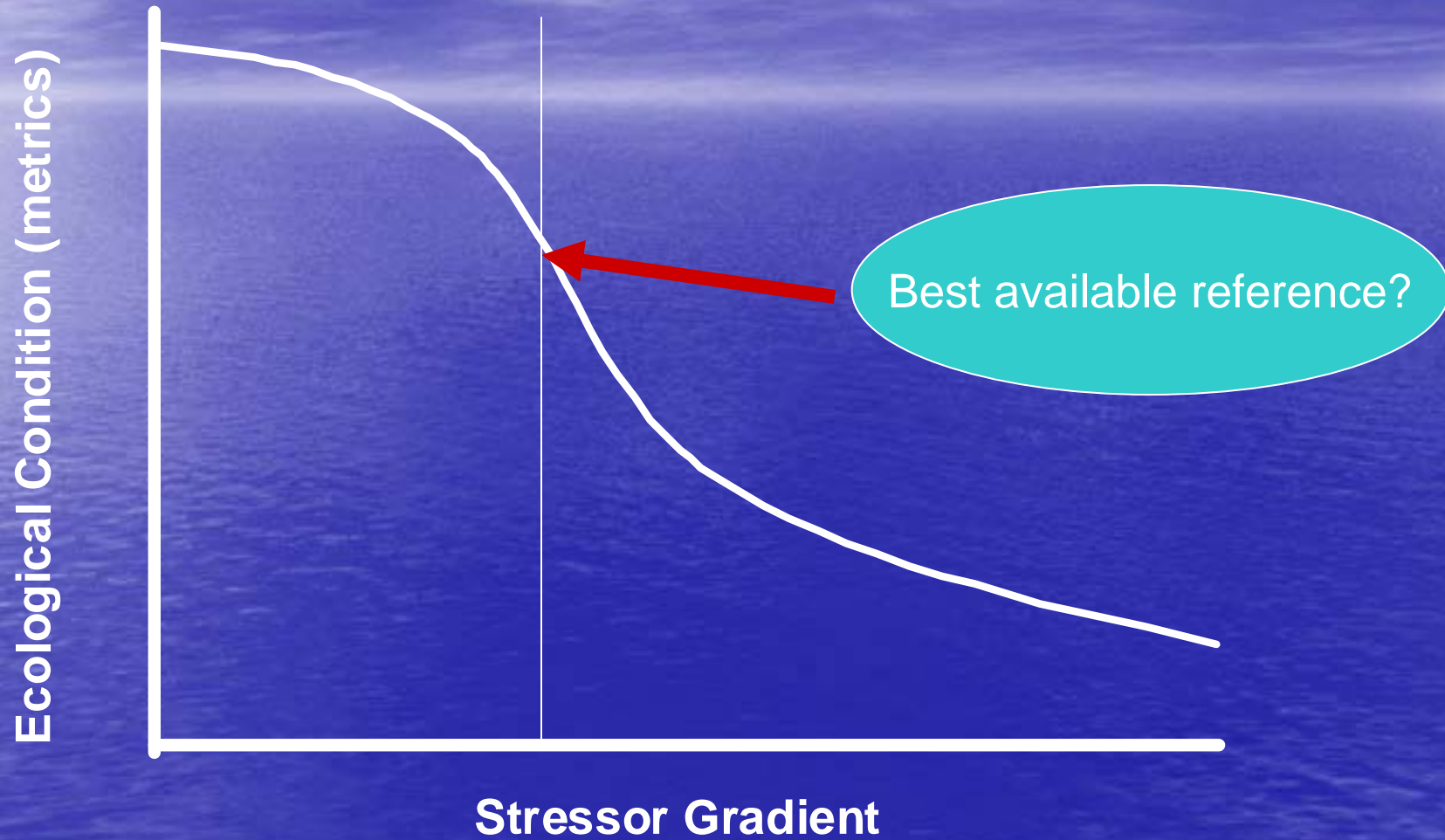
PRISTINE CONDITIONS



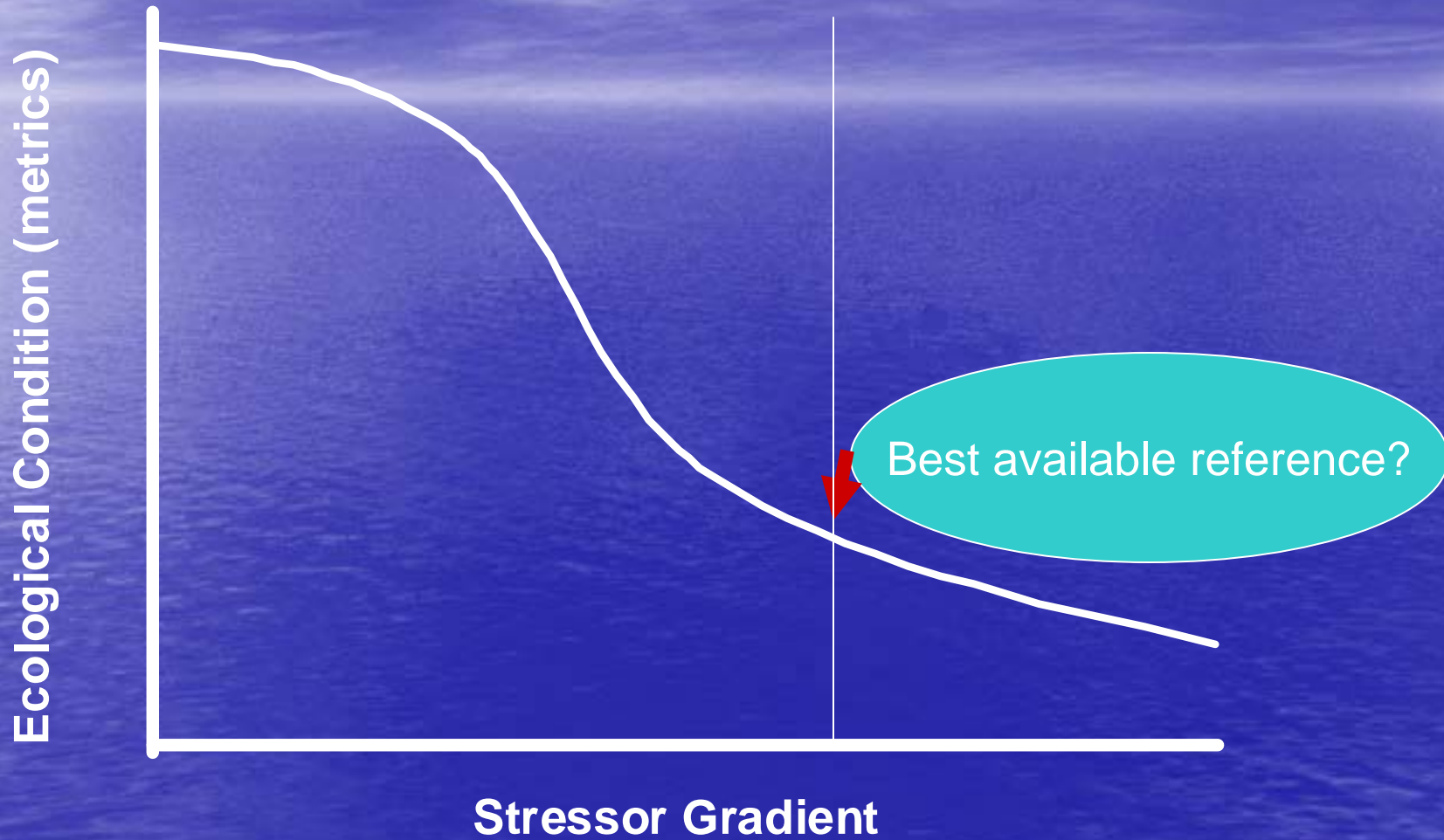
LOW IMPACT – FULL BMPS



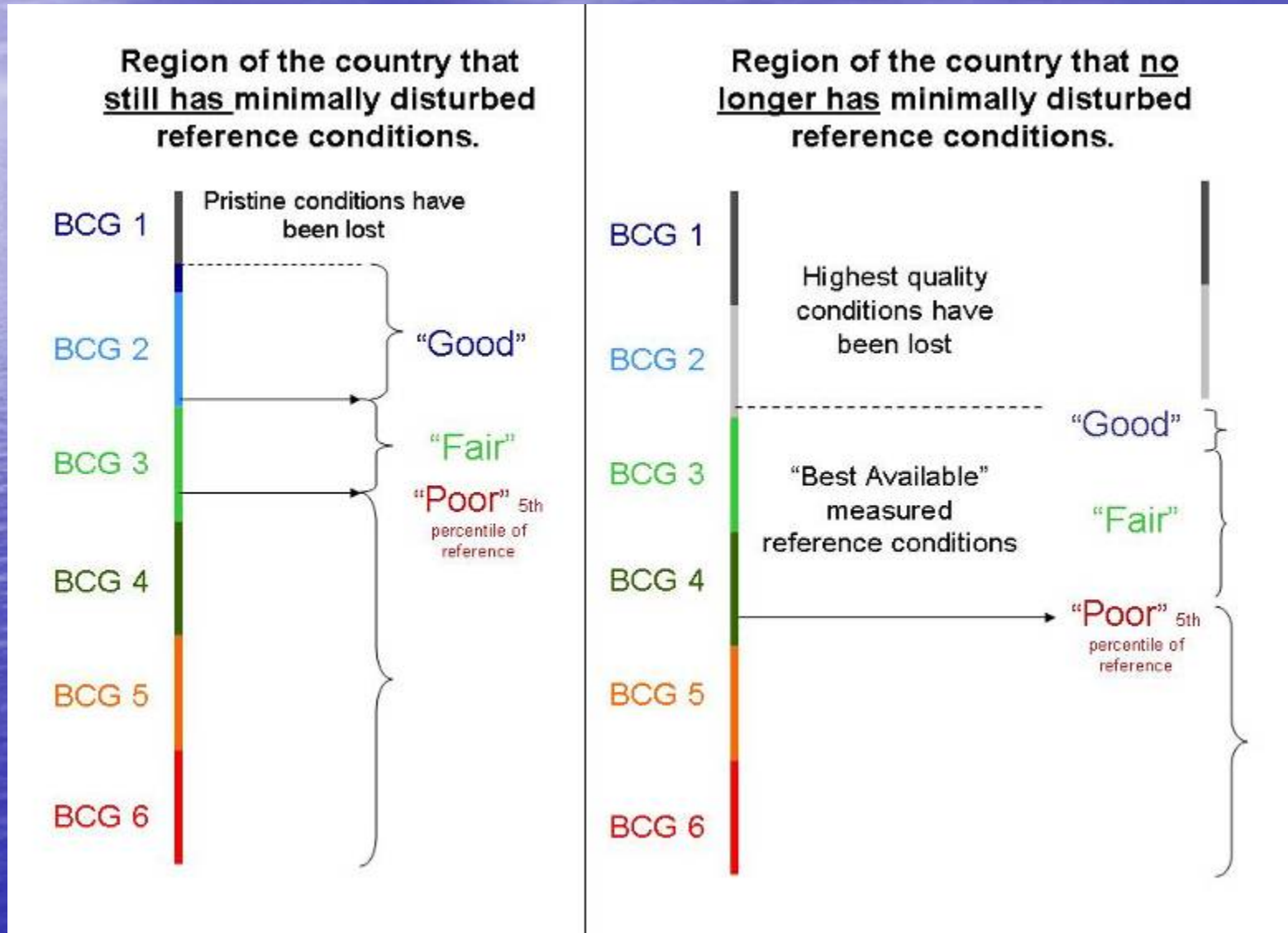
SOME IMPACT - SOME BMPs



HIGH IMPACT – NO BMPS



Technical challenge: Interpreting biological conditions in different regions



Probability is useful but is
not the silver bullet for
nationwide assessment

NARS design costs time & money

- Too few national sites produces insufficient data for use by states
- Manpower required for such little data is not efficient use of resources
- Switching from one waterbody type to another each year compounds this problem

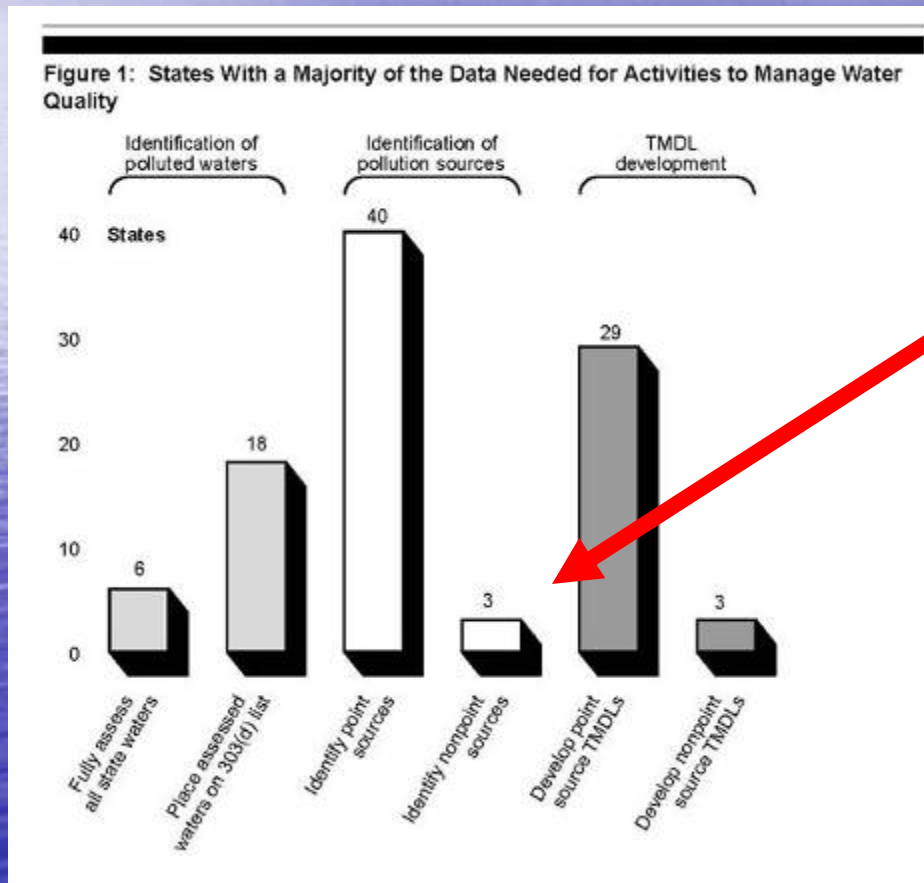
However, there are other issues

- Probabilistic sampling does not capture temporal variability of physical and chemical water column parameters
- Therefore it is not truly representative of water quality

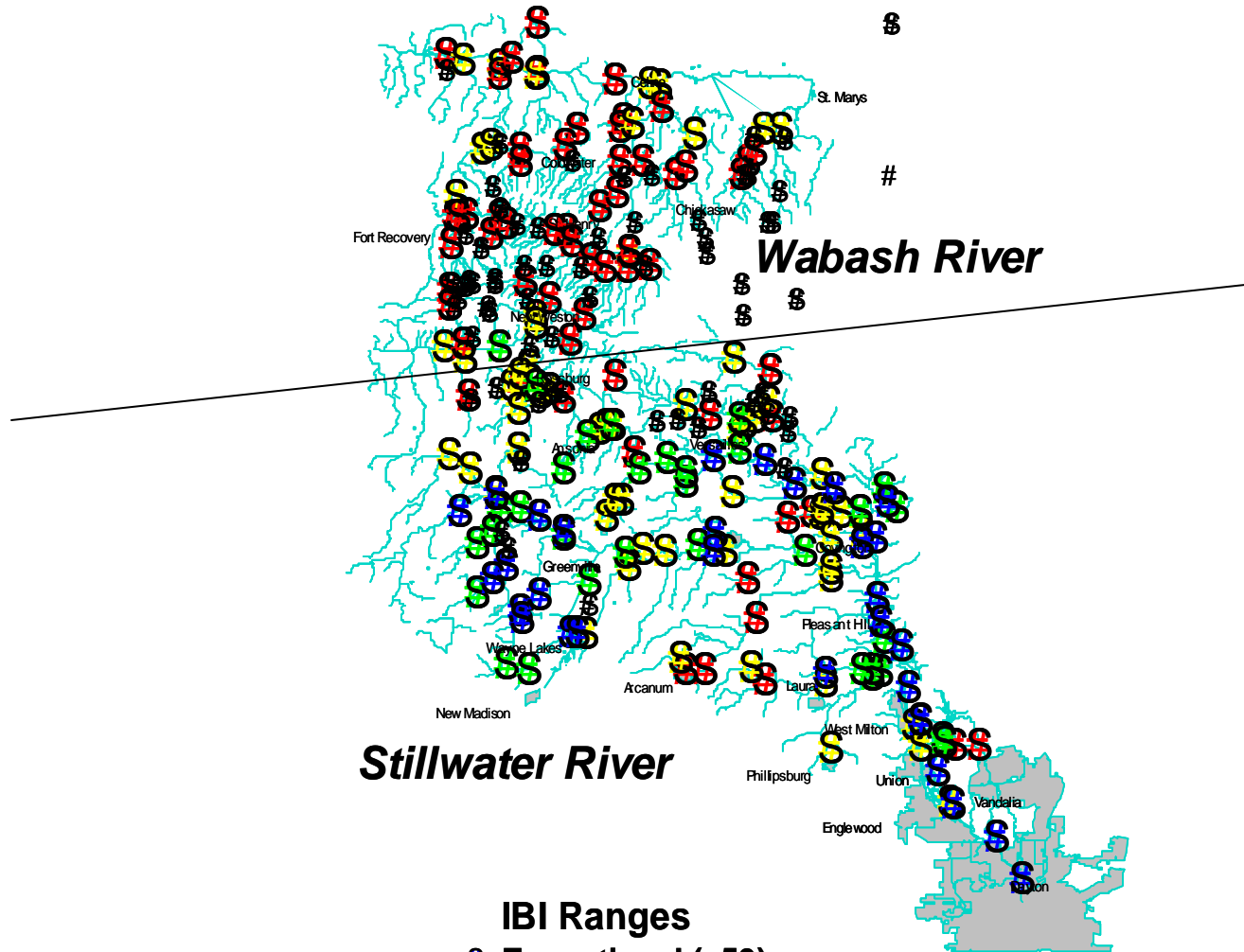
Actual Probabilistic vs. Targeted Monitoring Results

- Actual data from 2001 – 2006
- Reported in 305(b)/303(d) in 2008
- 3,000 targeted stations in 95% of VA's 1247 watersheds (31% of stream miles)
- 350 wadable stream probabilistic stations
- Bacteria impairments differed significantly
 - 57% of targeted stations vs.
 - 21% of wadable stream probabilistic stations

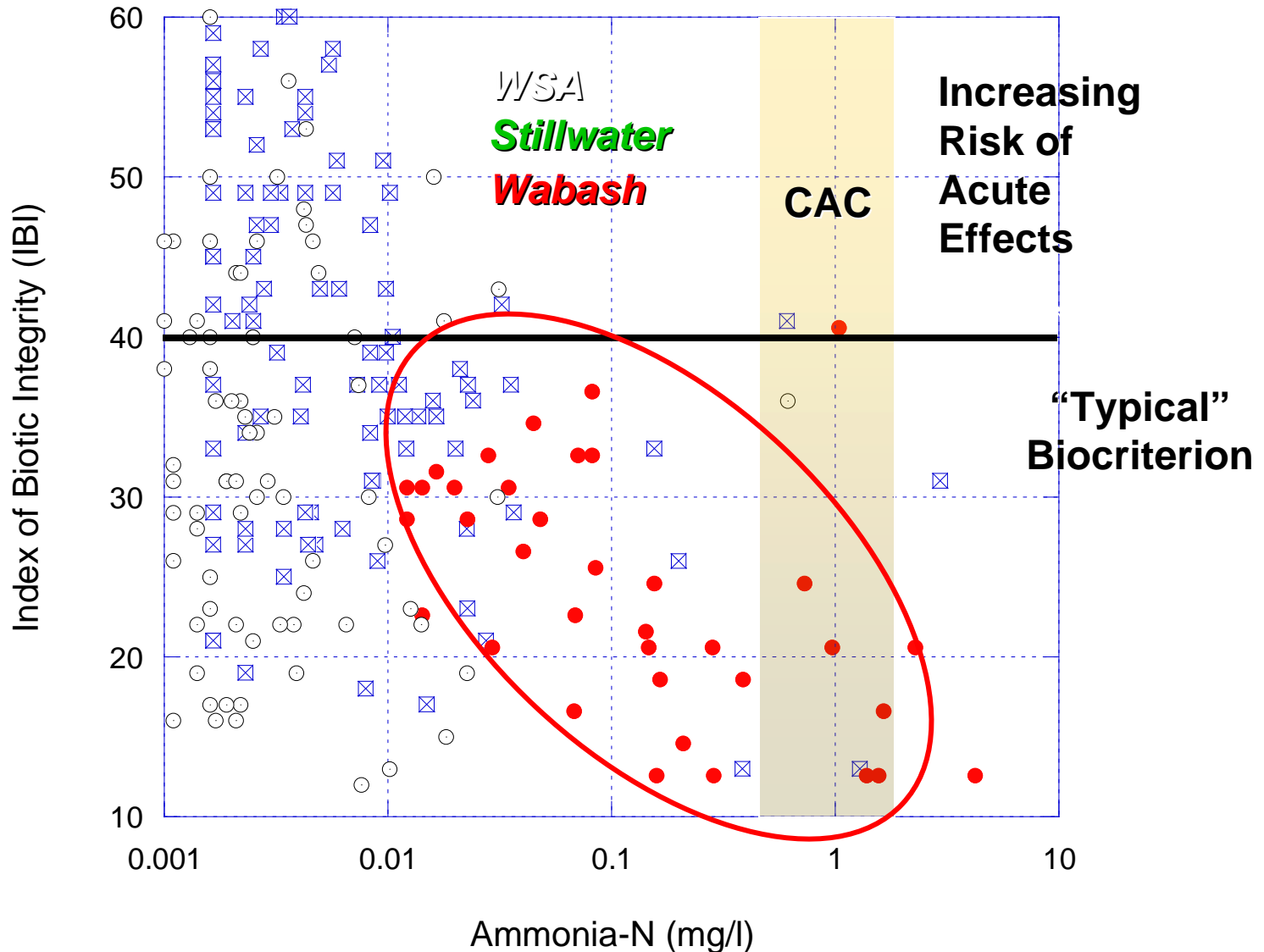
GAO report (2000):



- Probability based sampling was noted to improve detection of NPS



NARS Probabilistic v. Ohio Targeted Sampling



Targeted sampling:

- Scaled properly to detect problems
- Is robust statistically
- Identifies stressors
- Provides causal relationships to stressors
- Therefore is “actionable” information

ASIWPCA's conclusion on GAO criteria:

- NARS is not an improvement on the NWQI
- NARS and state-scale probability mandate do not provide states with actionable information in many cases

Create a standardized
translator so
assessments can be
compared

An example – the Biological
Condition Gradient

The Biological Condition Gradient: Standardized Biological Response to Increasing Levels of Stress

Levels of Biological Condition

Natural structural, functional, and taxonomic integrity is preserved.

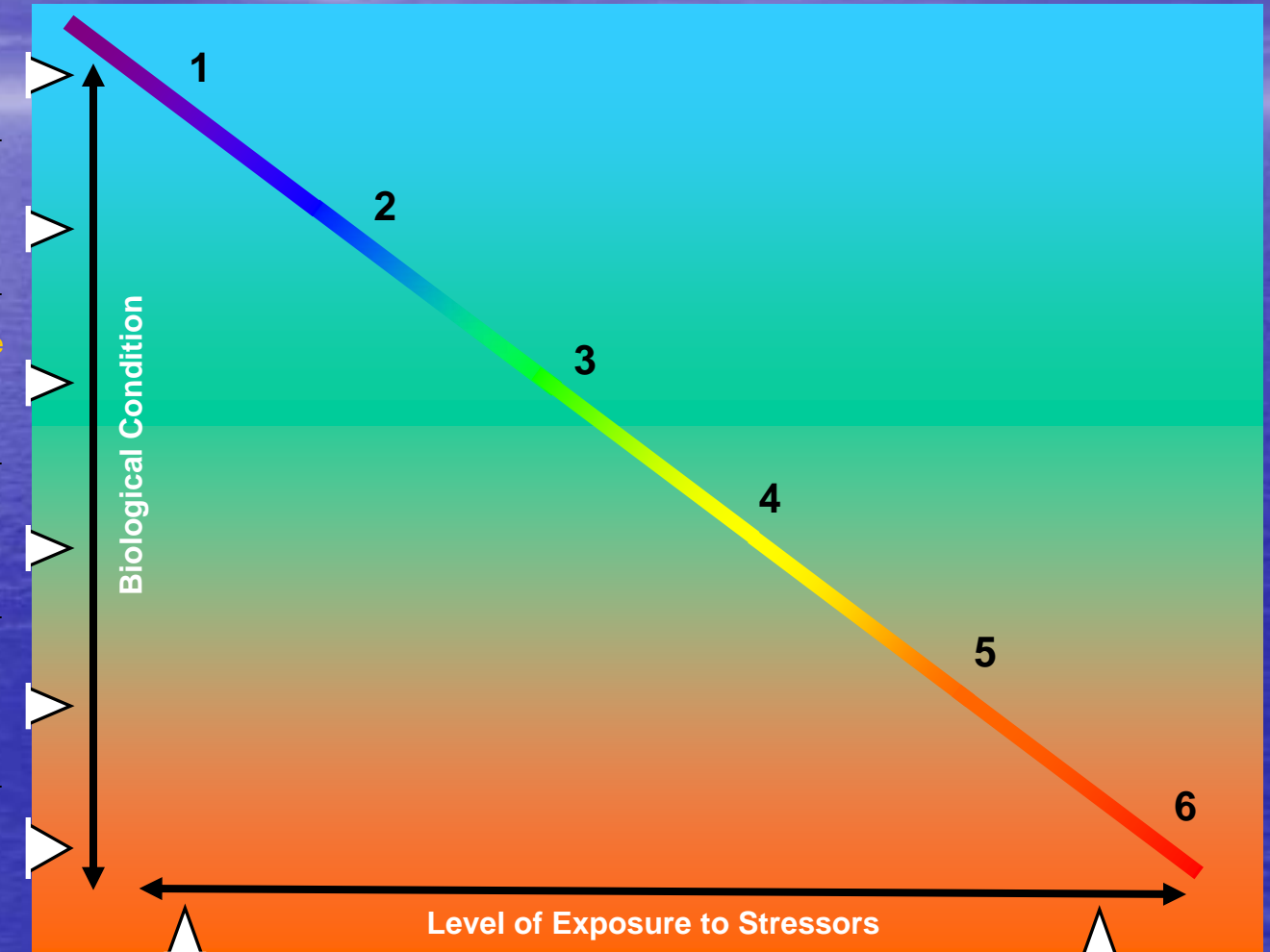
Structure & function similar to natural community with some additional taxa & biomass; ecosystem level functions are fully maintained.

Evident changes in structure due to loss of some rare native taxa; shifts in relative abundance; ecosystem level functions fully maintained.

Moderate changes in structure due to replacement of sensitive ubiquitous taxa by more tolerant taxa; ecosystem functions largely maintained.

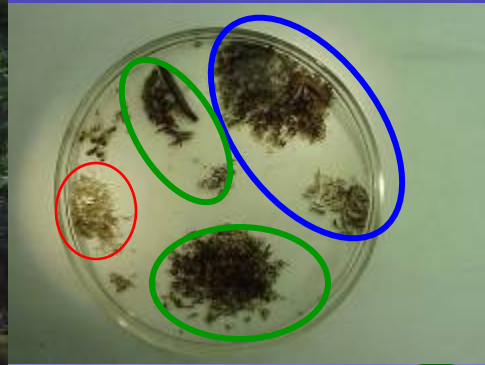
Sensitive taxa markedly diminished; conspicuously unbalanced distribution of major taxonomic groups; ecosystem function shows reduced complexity & redundancy.

Extreme changes in structure and ecosystem function; wholesale changes in taxonomic composition; extreme alterations from normal densities.



Watershed, habitat, flow regime and water chemistry as naturally occurs.

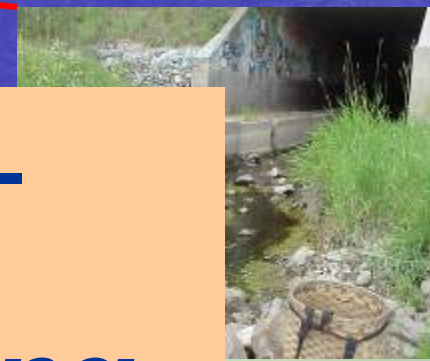
Chemistry, habitat, and/or flow regime severely altered from natural conditions.



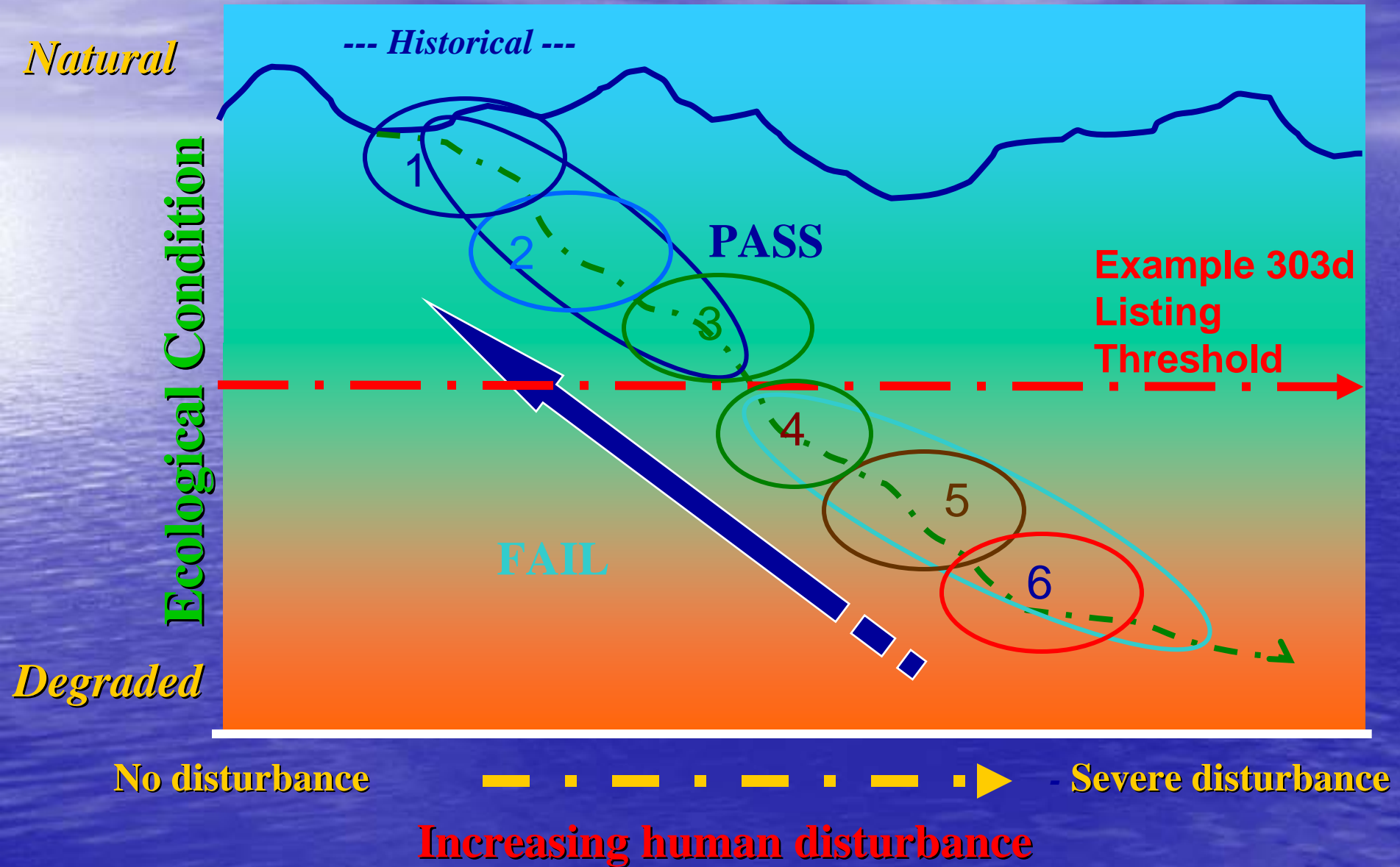
	Tier 1	Tier 3	Tier 6
Attribute 1	As predicted	Some may be	Absent
Attribute II	As predicted	Some loss, with	Absent
<i>Sensitive- rare taxa</i>	for natural occurrence, with at most minor changes from natural densities	replacement by functionally equivalent <i>Sensitive- ubiquitous taxa</i>	

Empirical observations-

The real world: monitoring

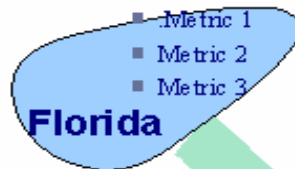


Hypothetical Pass-Fail Aquatic Life Use Scenarios



Different sampling assessments translated via standardized BCG

**Numeric
Criteria=IBI**



**Numeric
Criteria=% O/E**



**Numeric
Criteria=P(Class X)**



Local State/Tribal Bioassessment methods



1

2

3

4

5

6

Natural

Degraded

RECOMMENDATIONS

- Redesign National Monitoring Survey to build state capacity in monitoring and assessment
- Create assessment tools that build a valid national assessment of water quality
- Better incorporate state monitoring strategies in assessment of U.S. waters
- Eliminate mandate for state-scale probabilistic surveys