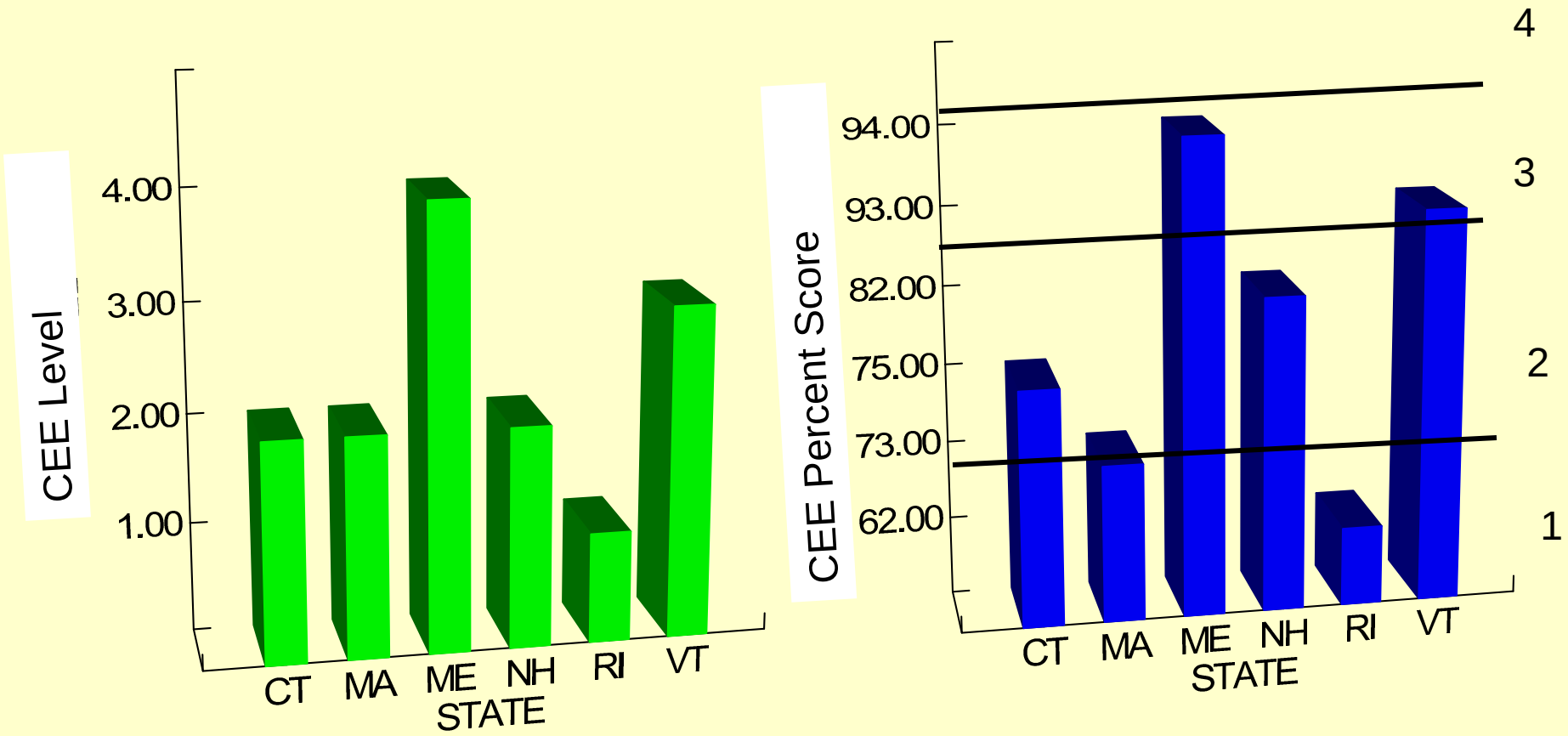
Region 1 States
Critical Elements Evaluation

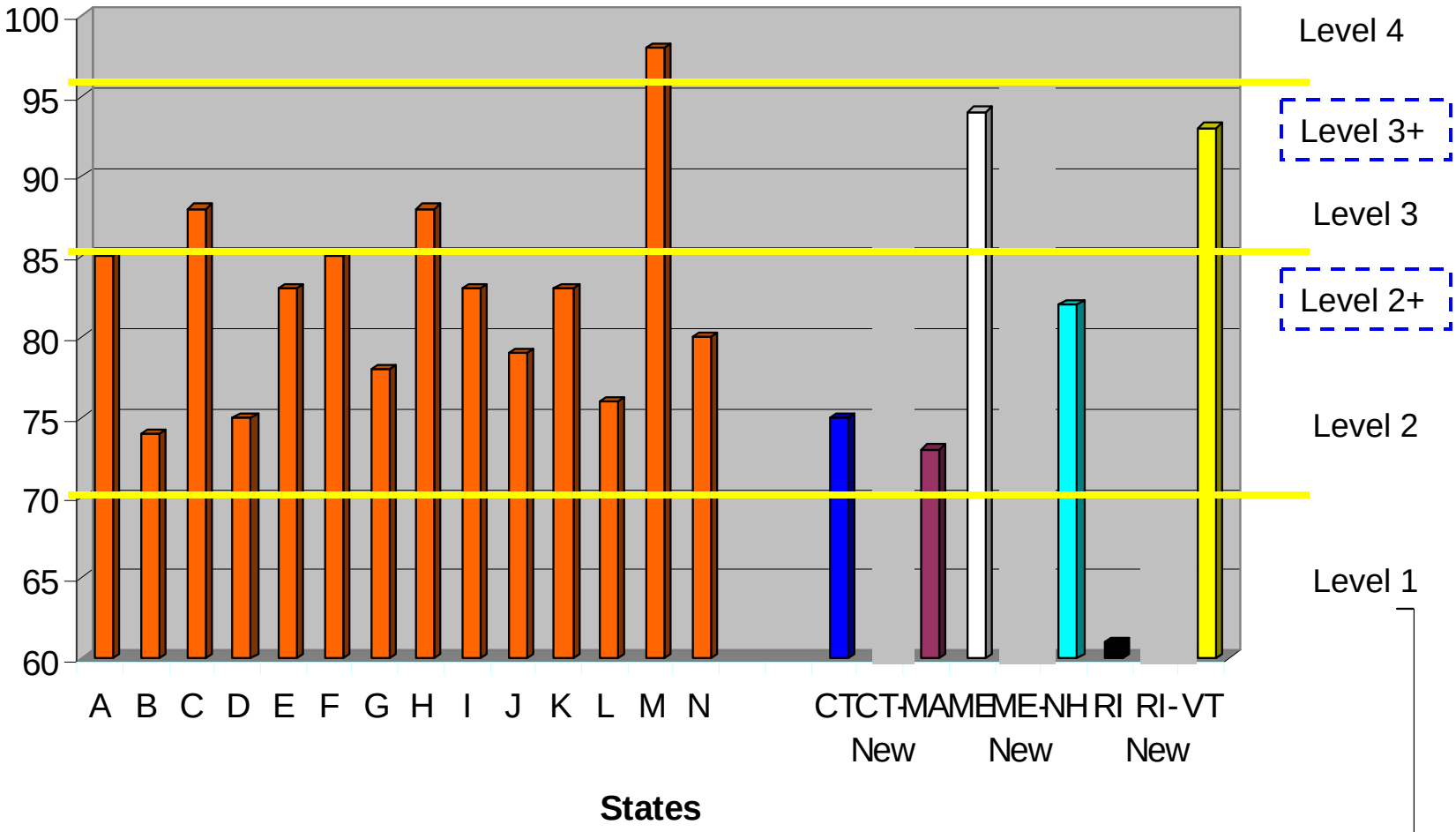
NEAEB
Newport, RI
March 17, 2010

Susan Davies and Chris Yoder

Region 1 Critical Elements Percent Scores and Program Levels



Region 1 and Other Regions



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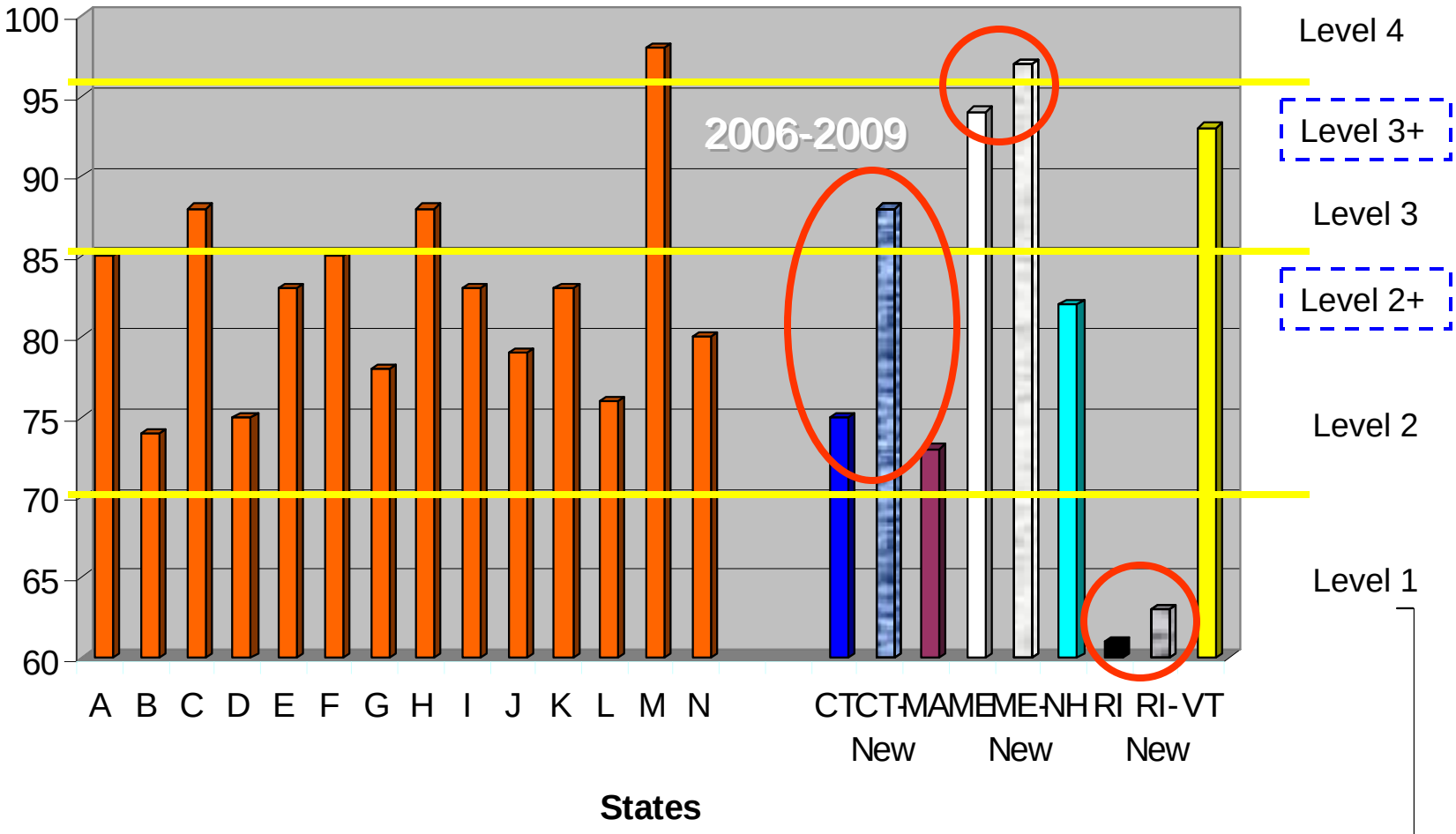


Rhode Island Elements	Fall 2007	Spring 2009	Working on
1. Temporal Coverage	3.5	3.5	4.0
2. Spatial Coverage	4.0	4.0	4.0
3. Natural Classification	2.5	2.5	2.5
4. Criteria for Reference Sites	3.0	3.0	5.0
5. Reference Conditions	2.0	2.0	4.0
6. Taxonomic Resolution	3.5	3.5	4.0
7. Sample Collection	3.5	3.5	3.5
8. Sample Processing	4.0	4.0	4.0
9. Data Management	3.0	3.0	4.5
10. Ecological Attributes	2.5	2.5	3.5
11. Biological Endpoints and Thresholds	2.0	2.0	3.0
12. Diagnostic Capability	2.0	2.0	3.0
13. Professional Review and Documentation	2.0	2.0	2.0
Total Score (Percent)	37.5 (63%)	37.5 (63%)	47 (78%)
Program Level	1	1	2

CT Technical Development 2006-2010

CT 2006

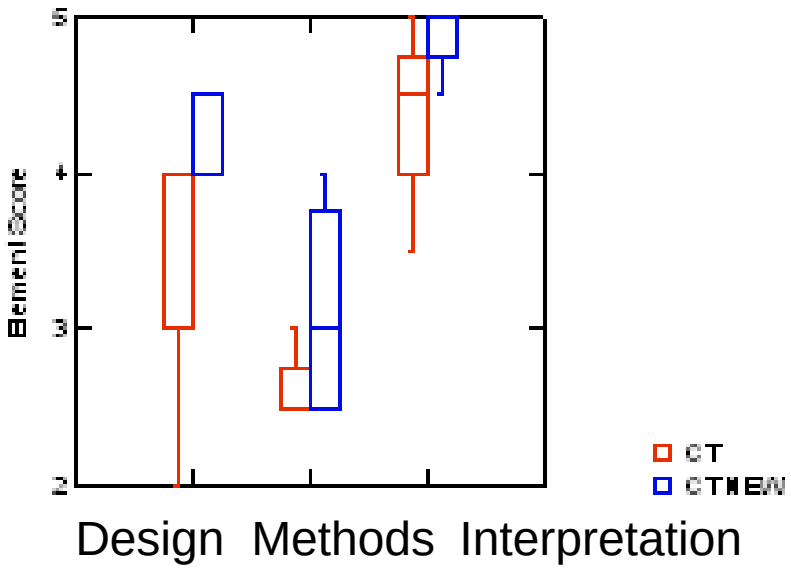
Score=45 (75%)

Level 2

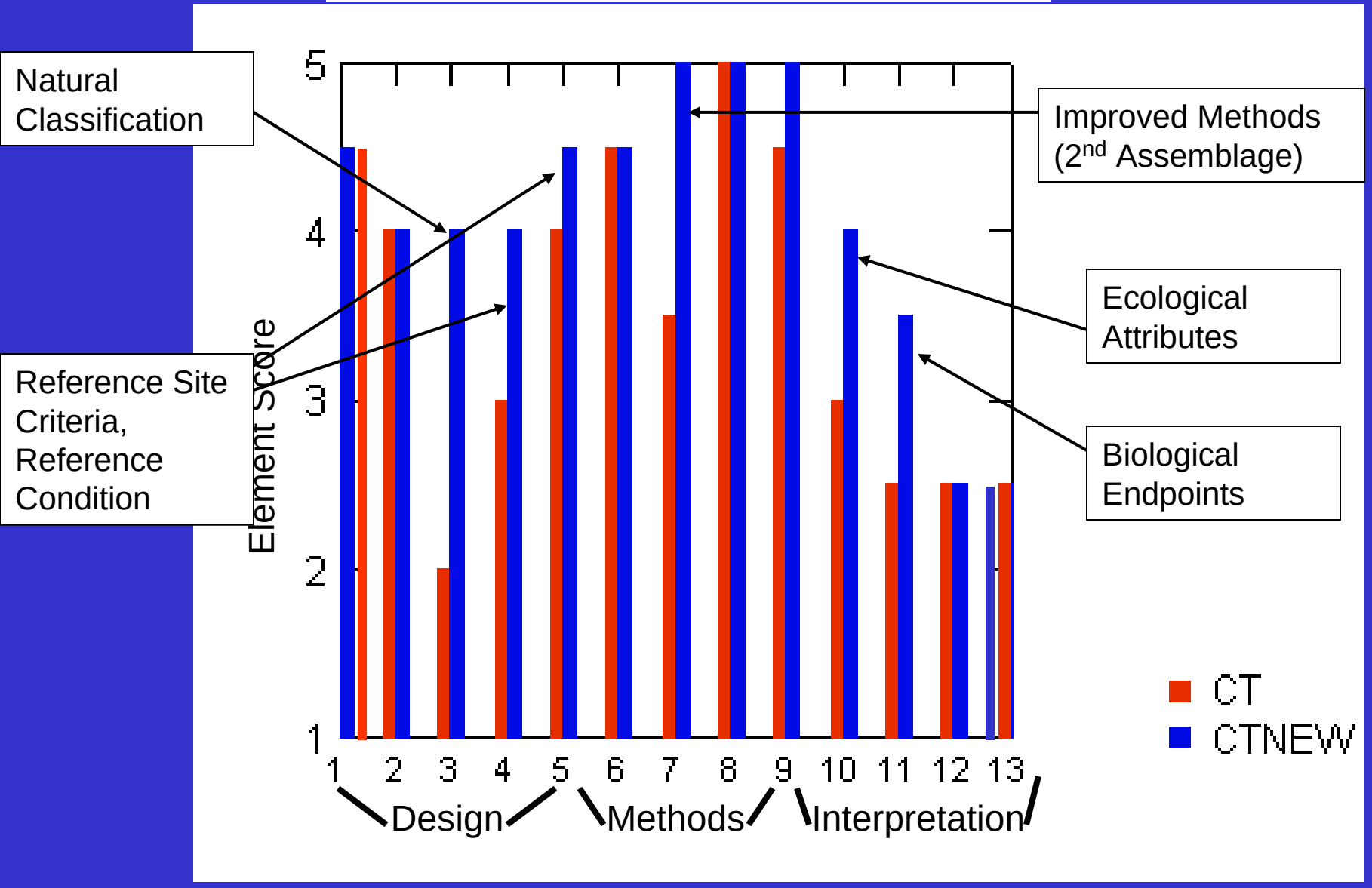
CT 2010

Score=53 (88.3%)

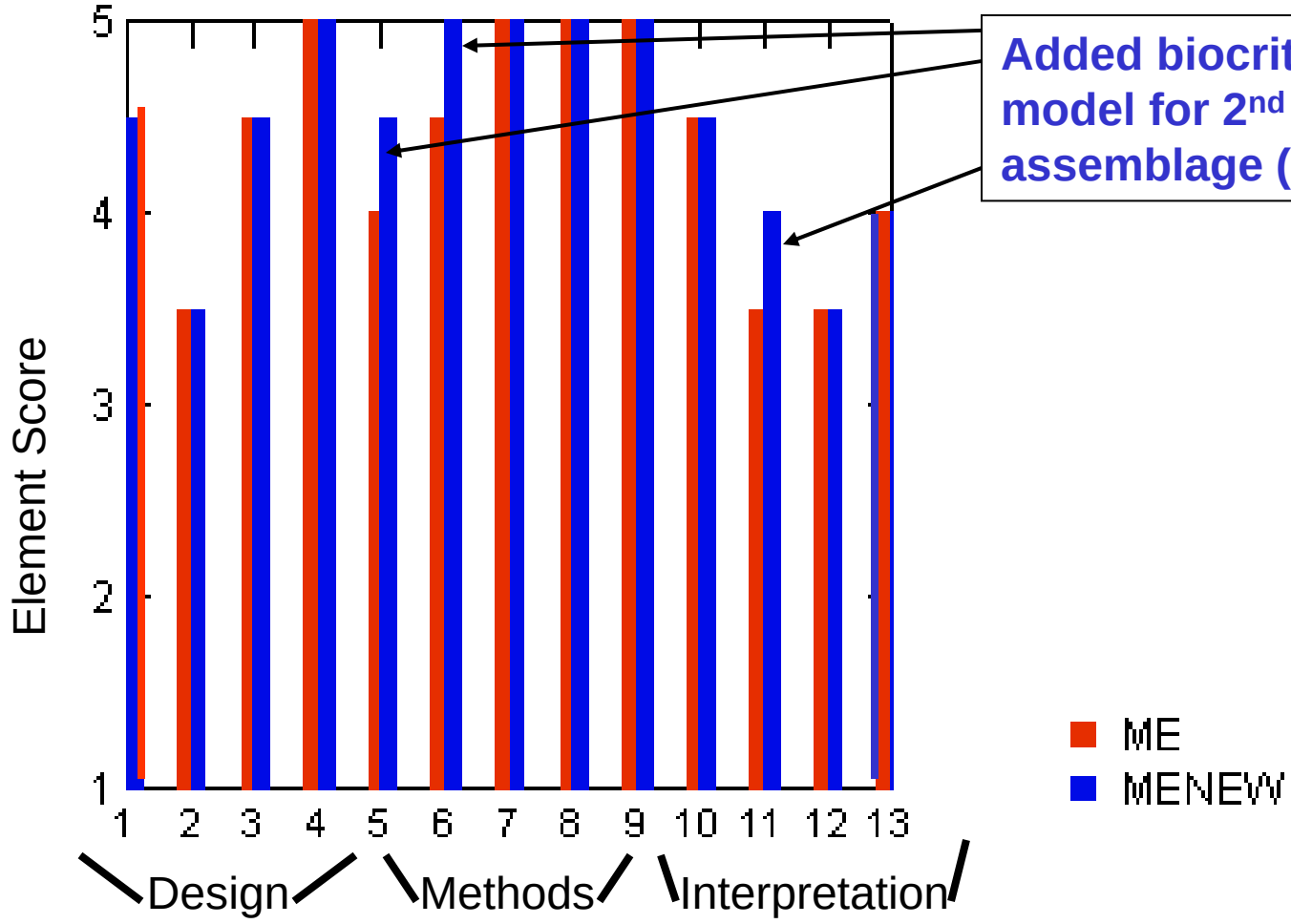
Level 3



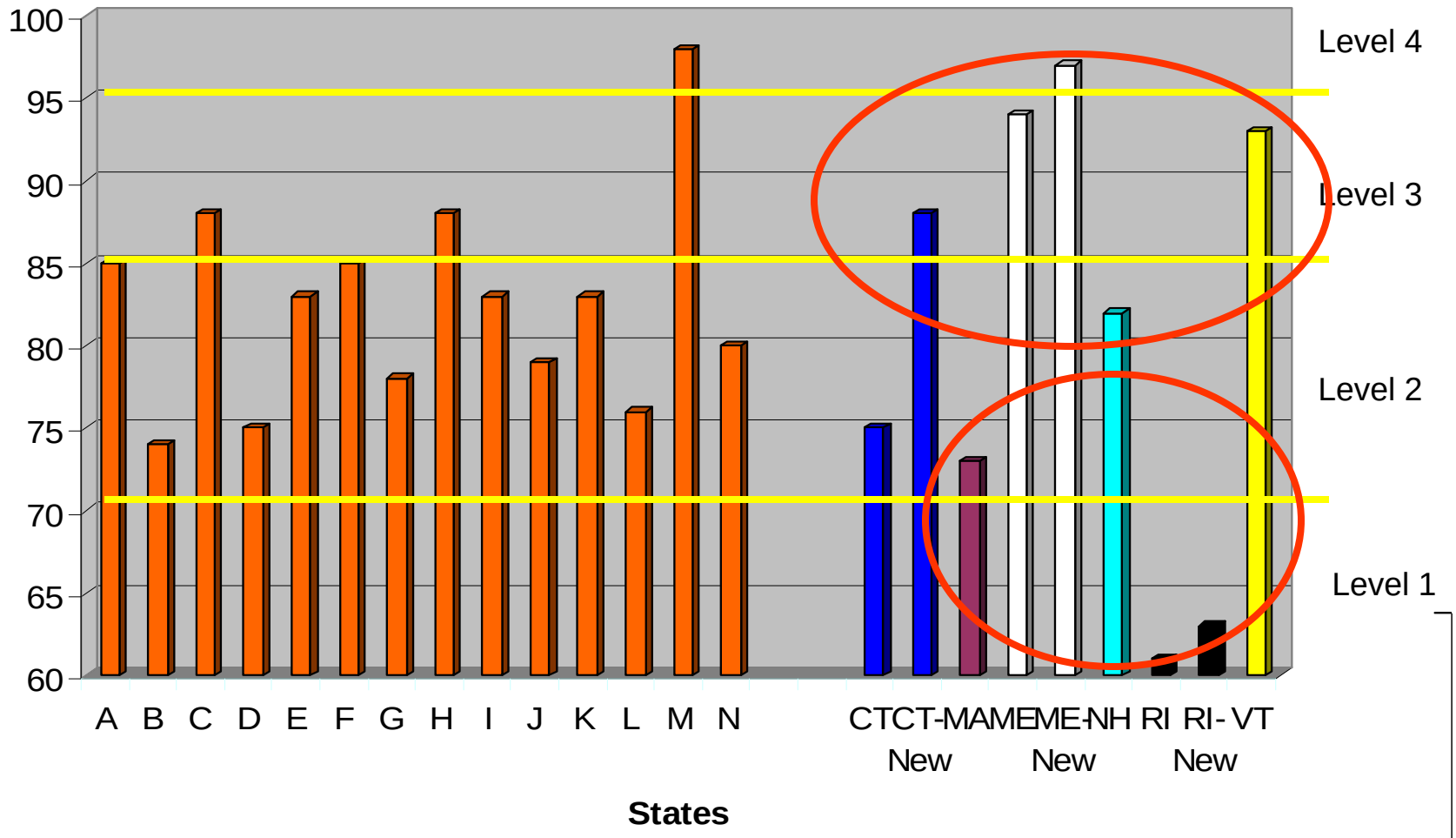
CT Technical Development 2006-2010



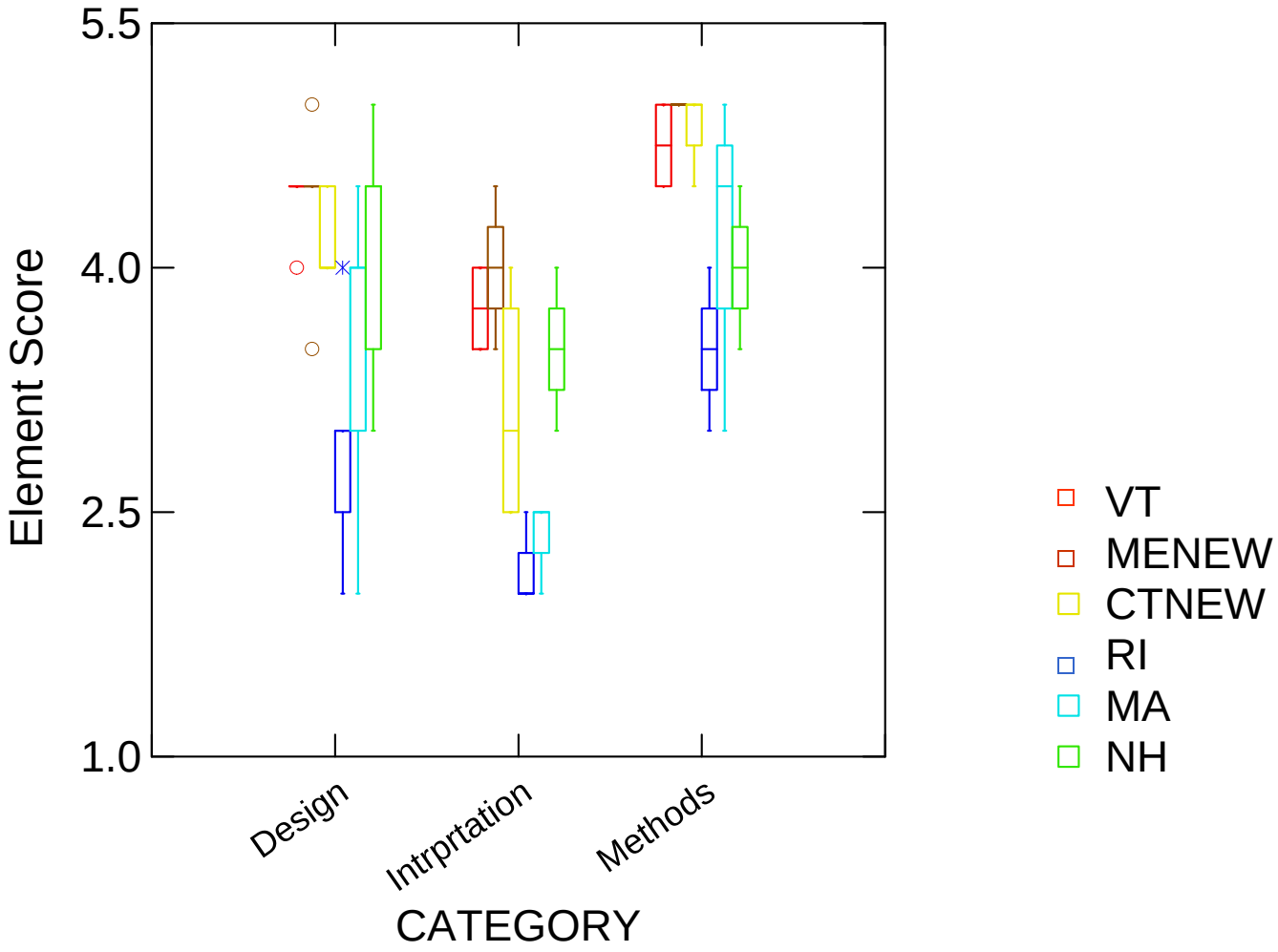
ME Technical Development 2005-2010



Region 1 and Other Regions

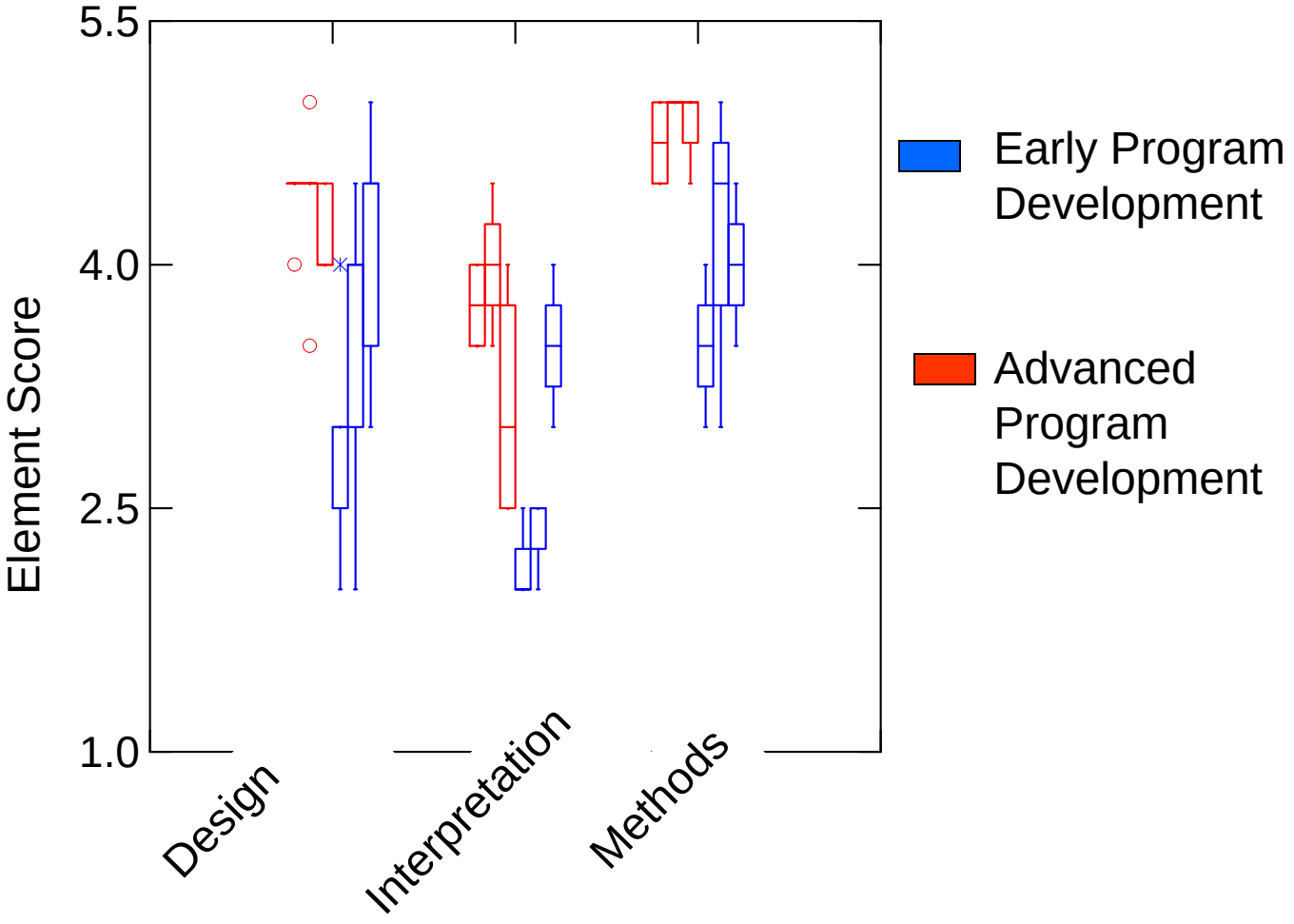


Status of Element Functions
By State

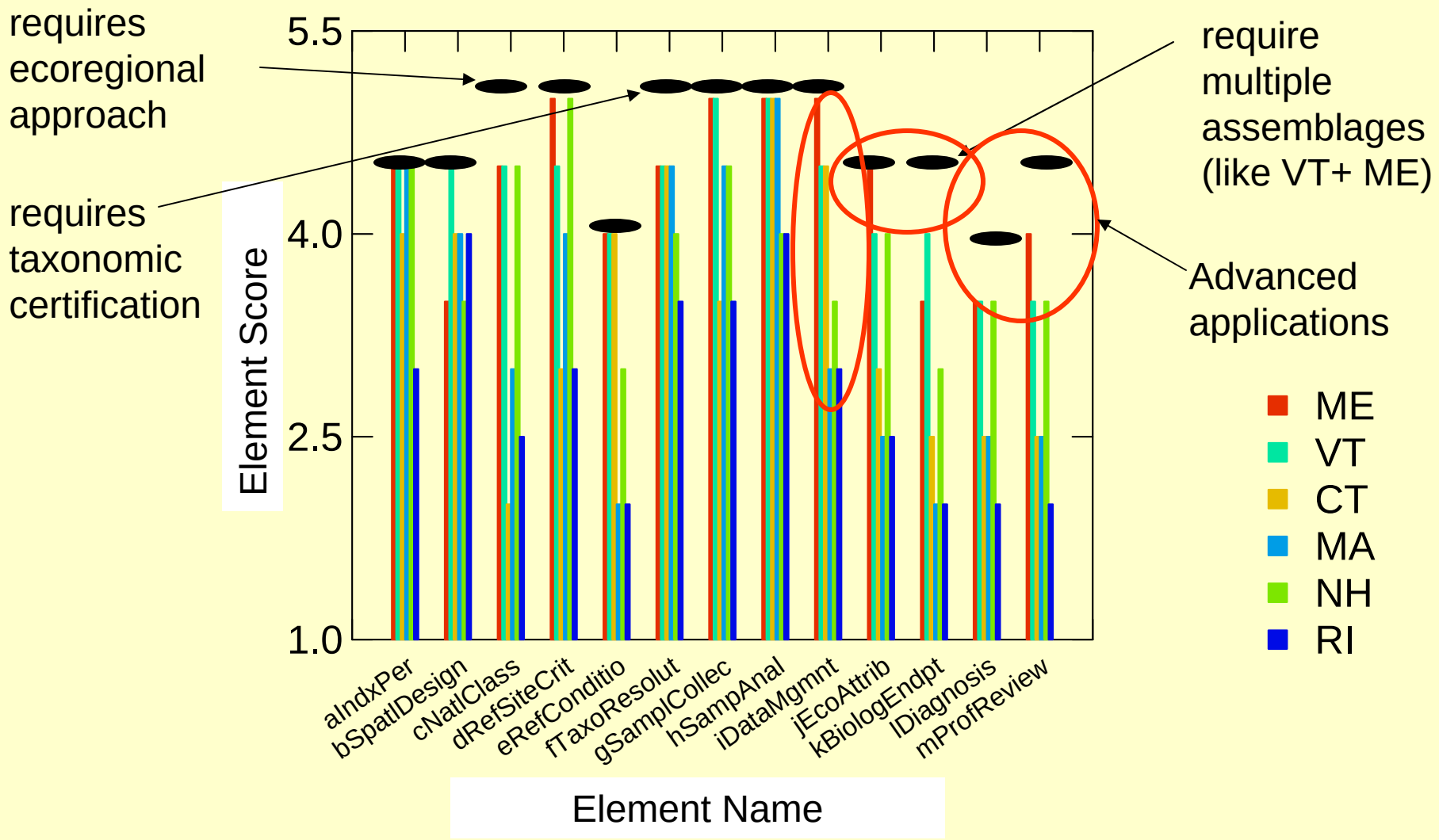


Status of Element Functions-

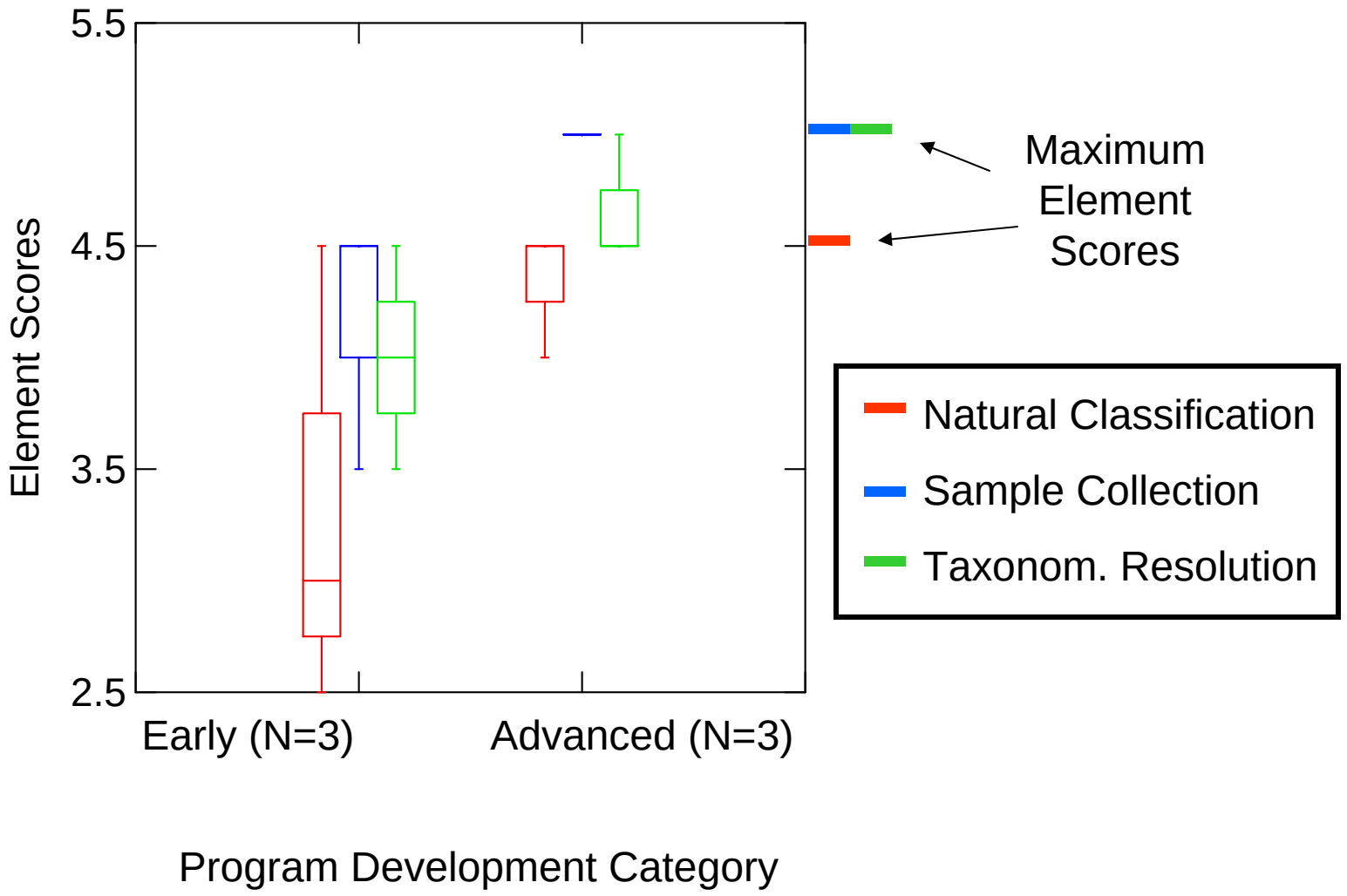
Early vs Advanced State Program Development



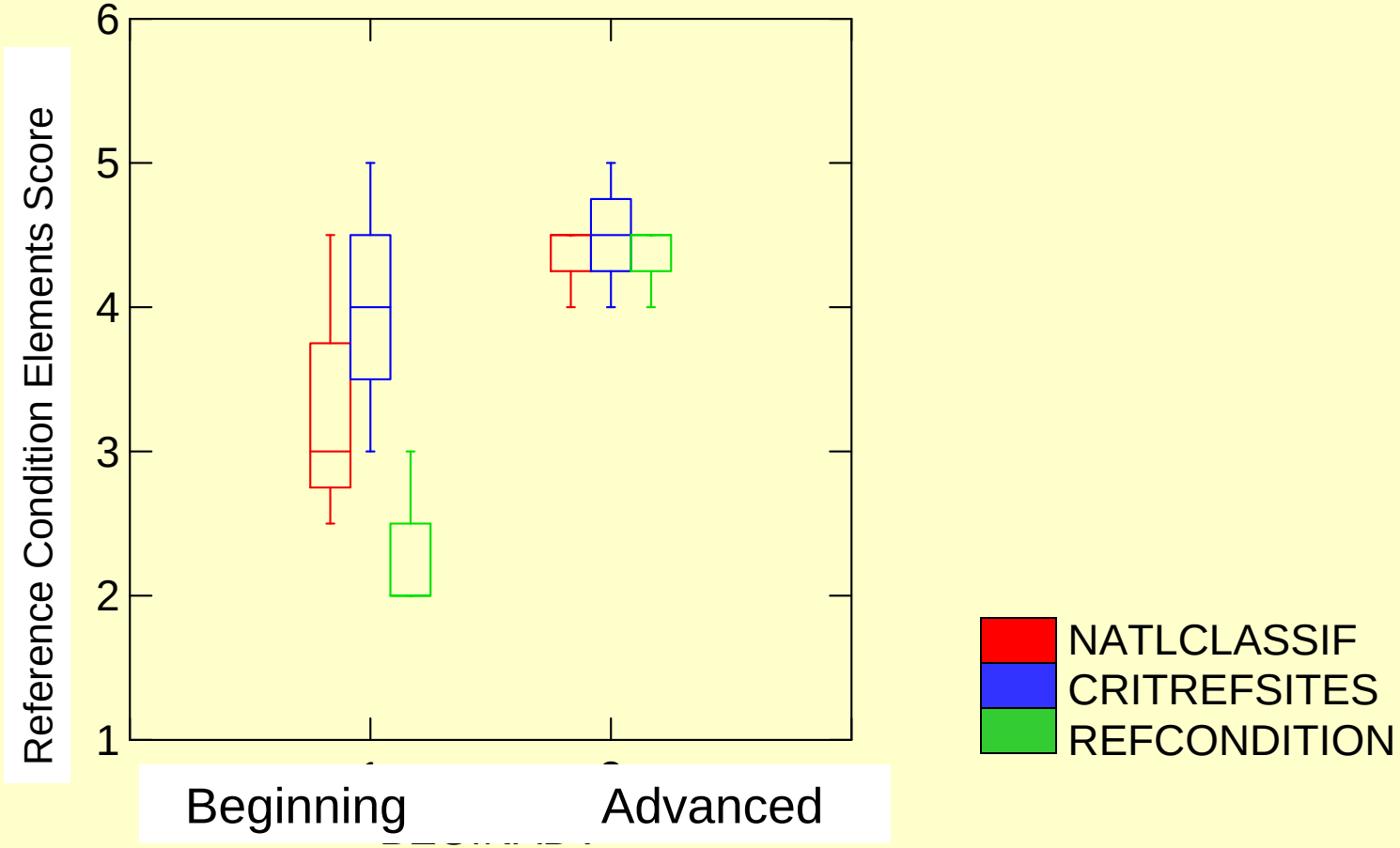
Element Scores, All States



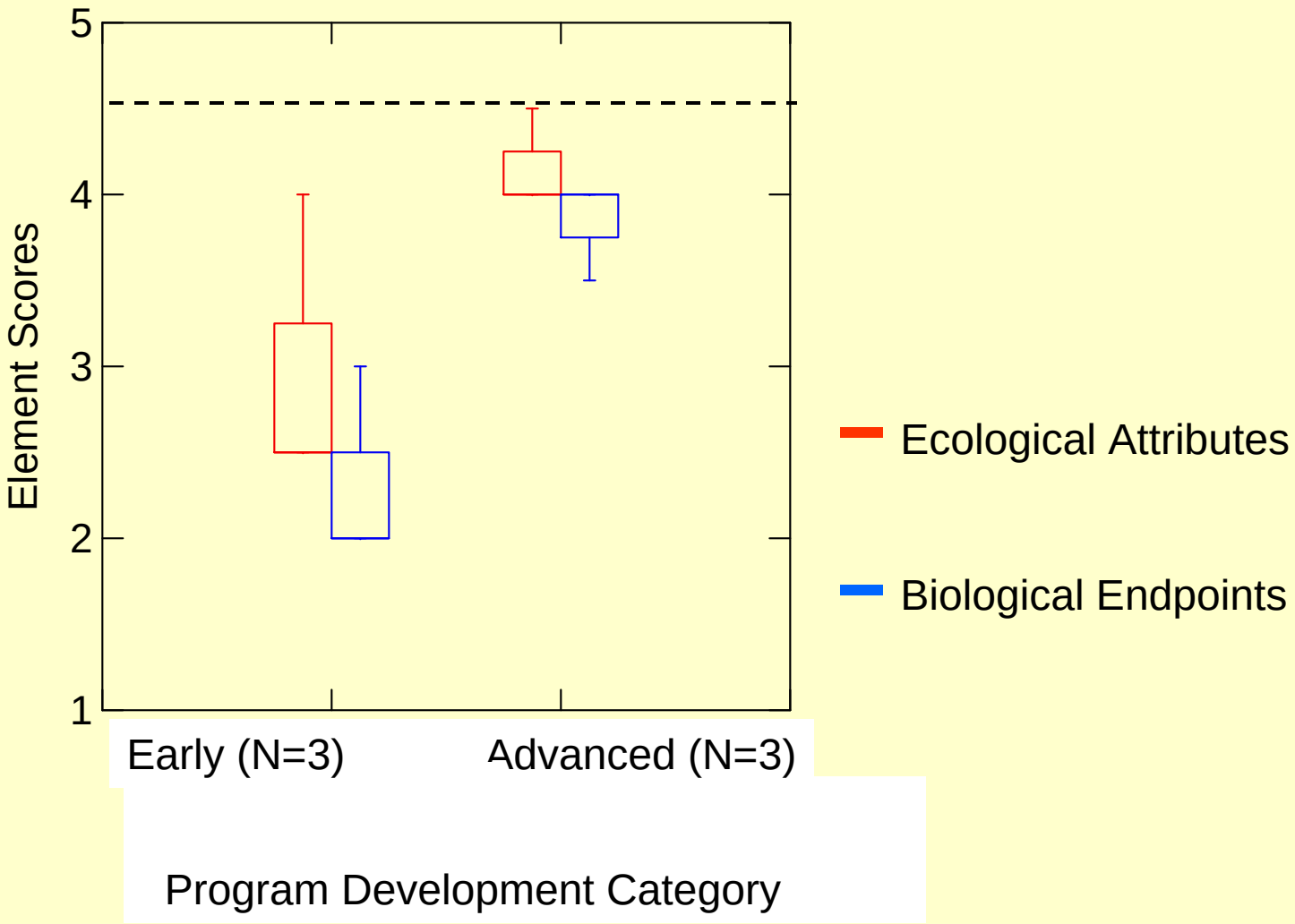
Foundational Design and Methods Elements



Reference Condition Elements



BCG-Based Elements



Use of Biological Information in Water Quality Management

Dave Courtemanch: "The majority of arguments in environmental management involve information ***uncertainty***."

- **Determines the vulnerability of:**
  - **any associated decision**
  - **management plans, outcomes**
  - **investments**
- **Controlled, but not eliminated, by monitoring designs.**
- **Explained through statistical statements.**
- **Proficiency of technical program determines Agency credibility**

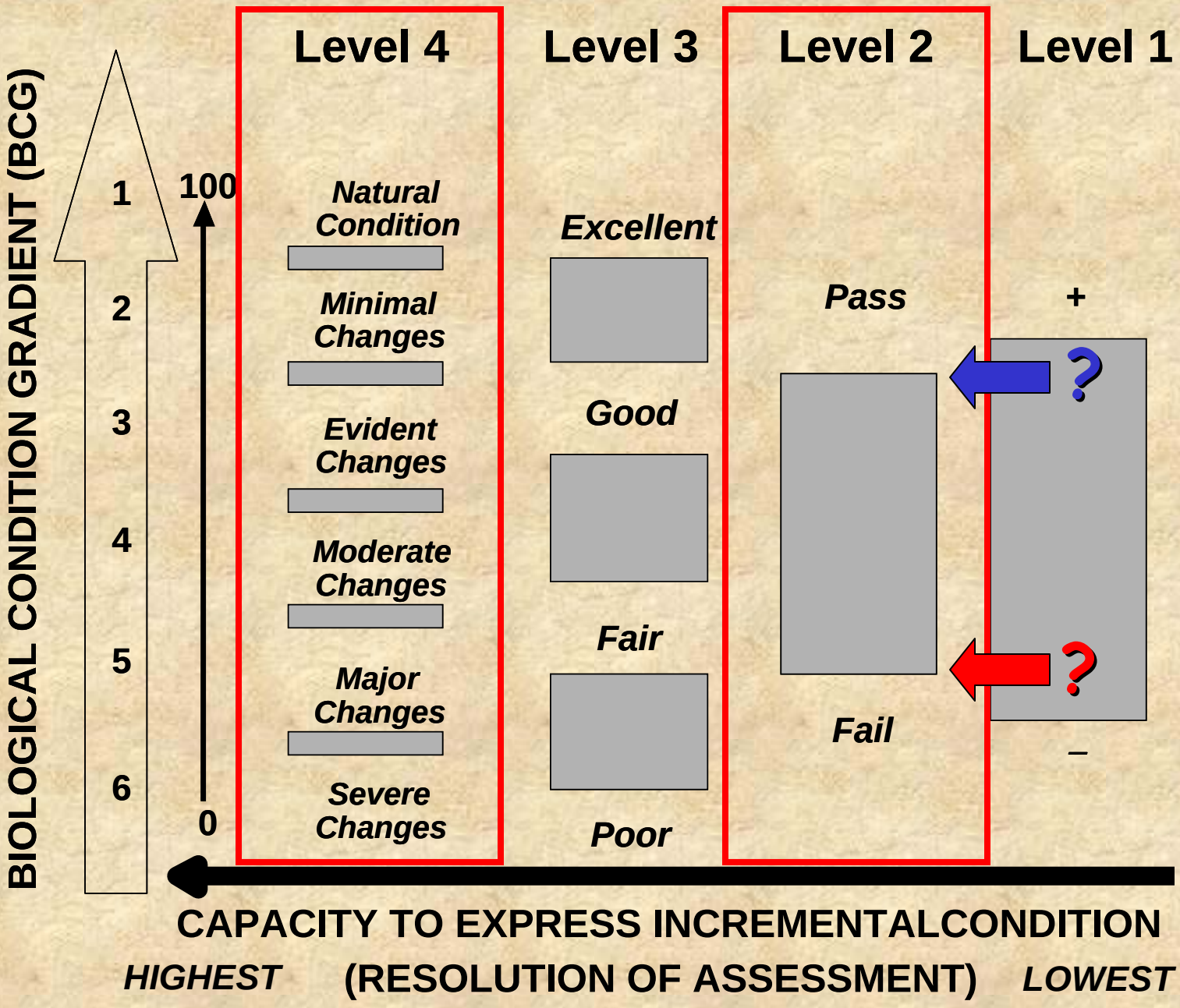

Level 4
Level 3
Level 2
Level 1
BIOLOGICAL CONDITION GRADIENT (BCG)
1
2
3
4
5
6
100
0
Natural Condition
Minimal Changes
Evident Changes
Moderate Changes
Major Changes
Severe Changes
Excellent
Good
Fair
Poor
Pass
Fail
+
–
?
?
CAPACITY TO EXPRESS INCREMENTALCONDITION
HIGHEST (RESOLUTION OF ASSESSMENT) LOWEST

Table 6. Relative degree to which major water quality management program areas are supported by monitoring and assessment in each of the Region V states.

State	Basic Reporting		WQS Program					Watersheds/ NPS		TMDL/303d		NPDES/Other Permitting							
Agency	Status[21]	Trend[22]	Tiered Uses[23]	UAA[24]	Refined WQC[25]	Anti-deg.	Site-Specific Crit.Mod.[26]	NPS/BMP Effective-ness	Hab-itat[27]	List/ Delist	TMDL Dev.[28]	WQ BELs[29]	Priority Setting[30]	CSOs/ SSOs	Storm-water Ph. II&II	WET Limits/ Cond.[31]	Sever-ity/ Extent[32]	Enforce ment[33]	404/401 Dredge & Fill[34]
IL EPA	●	○	–	◐	–	–	○	○	◐	◐	○	◐	○	○	–	–	○	◐	–
IN DEM	●	○	–	○	–	–	–	○	○	○	○	○	–	–	–	–	–	○	–
MI DEQ	●	○	–	–	–	–	○	◐	◐	●	◐	●	○	○	–	○	–	◐	–
MN PCA	●	○	–	◐	○	–	–	◐	◐	○	○	◐	○	–	–	○	○	○	–
OH EPA	●	●	●	●	●	●	◉	●	●	●	●	◉	◉	◉	◉	◉	●	●	◉
WI DNR	●	○	○	◐	–	○	–	◐	●	○	○	◐	–	–	◐	–	◐	◐	–

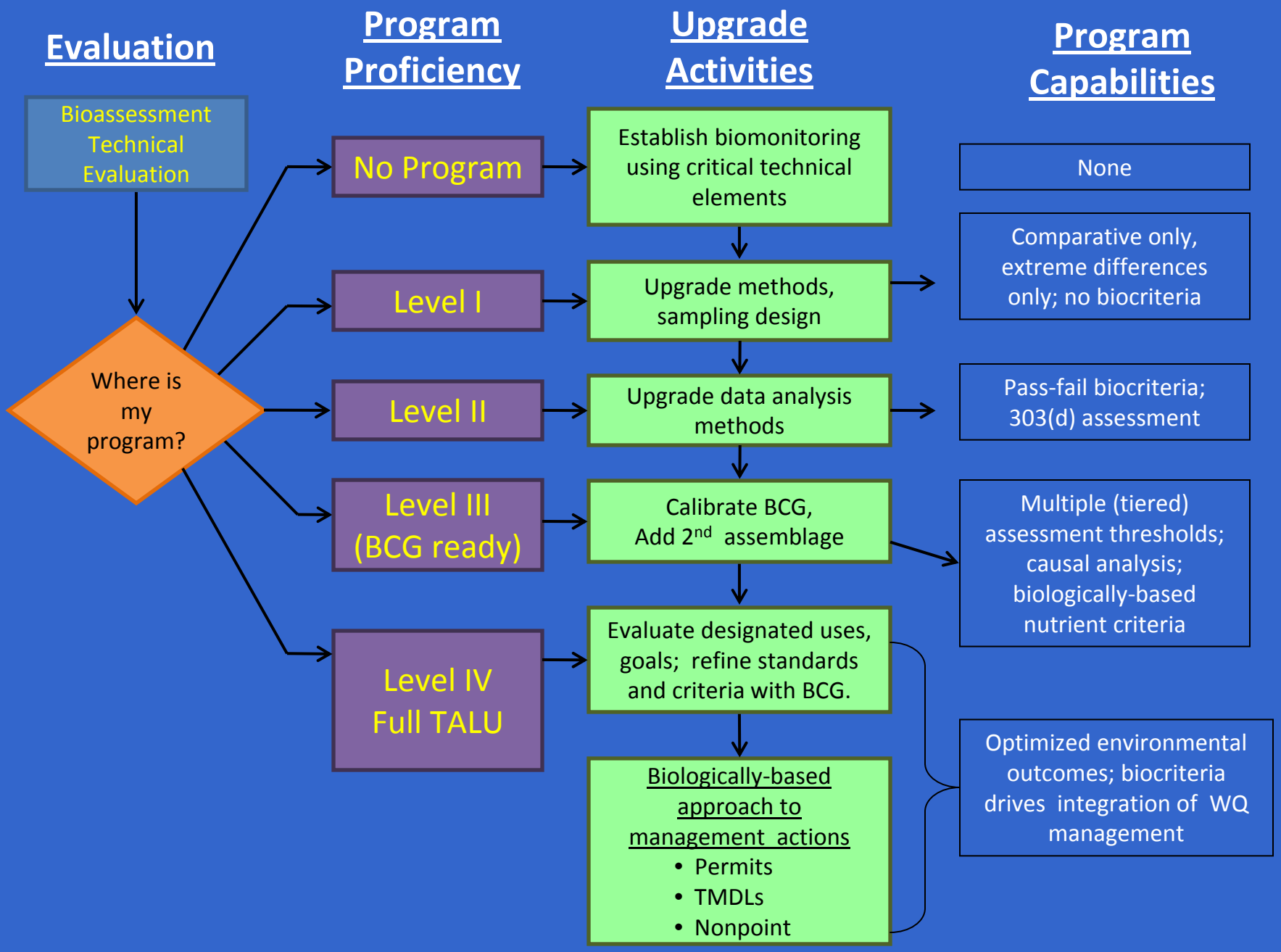
L2

L4

● - Well developed and routine process for using monitoring & assessment for at least 5-10 years; based on an integrated indicators framework process and comprehensive watershed design.
◉ - Process and tools are available, but usage is no longer routine and occurs only on a project or issue specific basis.
◐ - Project or site-specific use of monitoring & assessment consisting of upstream/downstream studies, paired stream studies (no comprehensive watershed design).
○ - Occasional or infrequent usage or under development.
– No support from ambient monitoring & assessment.

[21] Basic attainment/non-attainment assessment for aquatic life use status including delineation of causes and sources of threat and impairment.
[22] Sufficient information to report aggregate status of ecotypes over at least a 10 year period; does not refer to analysis of fixed station chemical trends.
[23] Tiered uses that are developed based on assemblage assessments and which correspond to EPA's biological condition axis; does not include fishery based or general uses.
[24] Includes any use of ambient monitoring data to change designated uses, both "upgrades" and "downgrades".
[25] Ambient data is used to develop water quality criteria and/or influence the application or implementation of WQC (exclusive of pH, hardness, and other single modifiers).
[26] Ambient survey data is used to ground truth EPA's site specific criteria process (water effects ratio).
[27] Habitat assessment is linked to biological assessment and listed as a cause of impairment.
[28] Includes using ambient data to support TMDL development and determine success of TMDL implementation beyond basic calibration data.
[29] Water quality based effluent limits – ambient data is used to develop an assessment of the overall effect of the subject discharge on the receiving waters.
[30] Ambient data is used to influence priority setting for NPDES permitting and/or SRF funding priorities.
[31] Ambient survey data is used to develop WET testing requirements and/or effluent limits in NPDES permits.
[32] Assessment framework allows for determination of incremental departures and changes beyond pass/fail and communicates severity of problem over space & time.
[33] Direct use of ambient survey data to support enforcement in terms of demonstrating that action is both legal and reasonable.
[34] Direct support of general policy and site-specific decisions for the 401 certification of 404 dredge and fill permits.

Upgrading Bioassessment and Biocriteria Programs



Defining the 101(a) Objective… …and 101(a)(2) Goal

- **101(a) "Biointegrity Objective"**
  - "…restore and maintain the physical chemical and biological integrity of the Nation's waters."

- **101(a)(2) "fishable-swimmable" Goal**
- "…**Interim Goal** to provide for protection and propagation of fish, shellfish and wildlife……..**by 1983**"

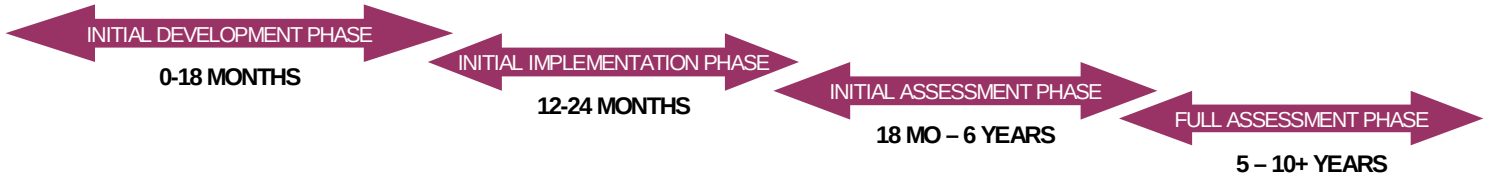
Defining Bio-Integrity Thresholds- *partnership of science and policy*

- a public policy task
  - Requires transparency
  - Requires public participation
  - Requires weighing socio-economic and environmental costs and benefits
- a technical task
  - Requires knowledge of the strengths and limitations of the science
  - Requires knowledge of biological potential
- credible bioassessment programs make it possible

Program Development Milestones *(TALU Methods doc 2005, p. 94)*

1. Establish conceptual foundation
2. Merge science and policy foundations
3. Establish monitoring program
4. Develop and validate quantitative thresholds
5. Apply tiered uses in water quality management

Bioassessment & Biocriteria Program Developmental "Timeline"



1. Establish Conceptual Foundation

- Science
- Policy

2. Merge Scientific & Policy Foundations

- Link conceptual TALU tiers to regional BCG conceptual model
- Evaluate for consistency with existing WQS framework
- Draft or refine narrative ALU descriptions

Start-Up Tasks: Initial Technical Development Tasks

- Outfit laboratory and field facility
- Office accommodations
- Database support infrastructure

Methods Development

- Review and select candidate methods and protocols
- Consider MQO/DQO needs
- Test methods for applicability
- Analyze test results – select methods

Start-Up Tasks: Initiate Monitoring Strategy

Classification Issues

- Consider spatial stratification issues
- Develop and test reference condition approach
- Select and sample reference sites
- Develop index development and calibration strategy

Assessment Issues

- Use data for "makeable" decisions
- Initiate exploratory analysis of biological responses to stressors

Program Implementation

- Evaluate via bioassessments

Program Maintenance

- Link to TALUs via BCG

3. Establish Technical Program

4. Develop & Validate Quantitative Thresholds

5. Application in WQ Management

Water Quality Program Support

- Develop capacity to support WQ programs (WQS/UAAs, TMDLs, permits, planning)
- Formalize and increase water quality program support as capacity is developed (biological data should support more decisions)

Water Quality Program Support

- Fully functioning bioassessment program supports WQS (UAAs, ALU, biocriteria) and basic program needs (305b/303d)
- Program dev't should be fully initiated – e.g., integrated chemical, physical, and biological database supports tool, criteria, & policy dev't. (ongoing)

Quality Improvement Process

Continuously evaluate program – develop and implement refinements

Evaluate effectiveness of initial decisions – make needed adjustments

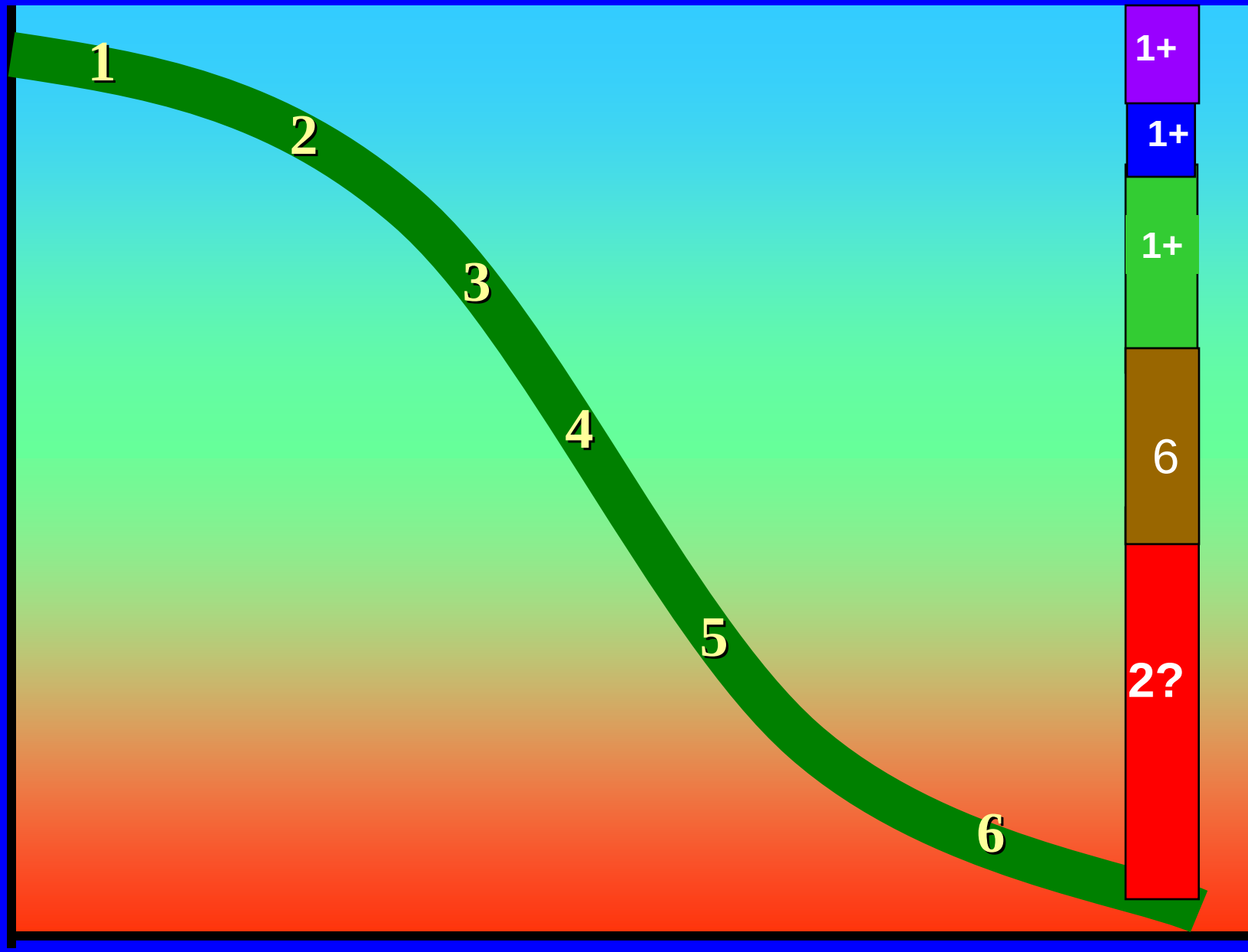
Northeast States and TALU development

CT	CEE Review completed; **BCG calibrated**	Non-Tiered ALUs ***Draft tiered numeric biocriteria in prep***
ME	CEE Review completed; **State-developed tiered numeric biocriteria**	**TALU fully implemented in WQS; tiered numeric biocriteria**
MA	CEE review complete; RBP rule-of thumb approach	RBP; Non-Tiered ALUs
NH	CEE review complete; **State-developed bioassessment methods**	IBI; Non-Tiered ALUs
RI	CEE Review completed**;** RBP rule-of thumb approach;	RBP; Non-Tiered ALUs
VT	CEE review complete **; State developed tiered numeric biocriteria**	**TALU in WQS; waters not designated yet**
NY	**No CEE ;State developed and tested numeric biocriteria thresholds**	Non-tiered ALUs

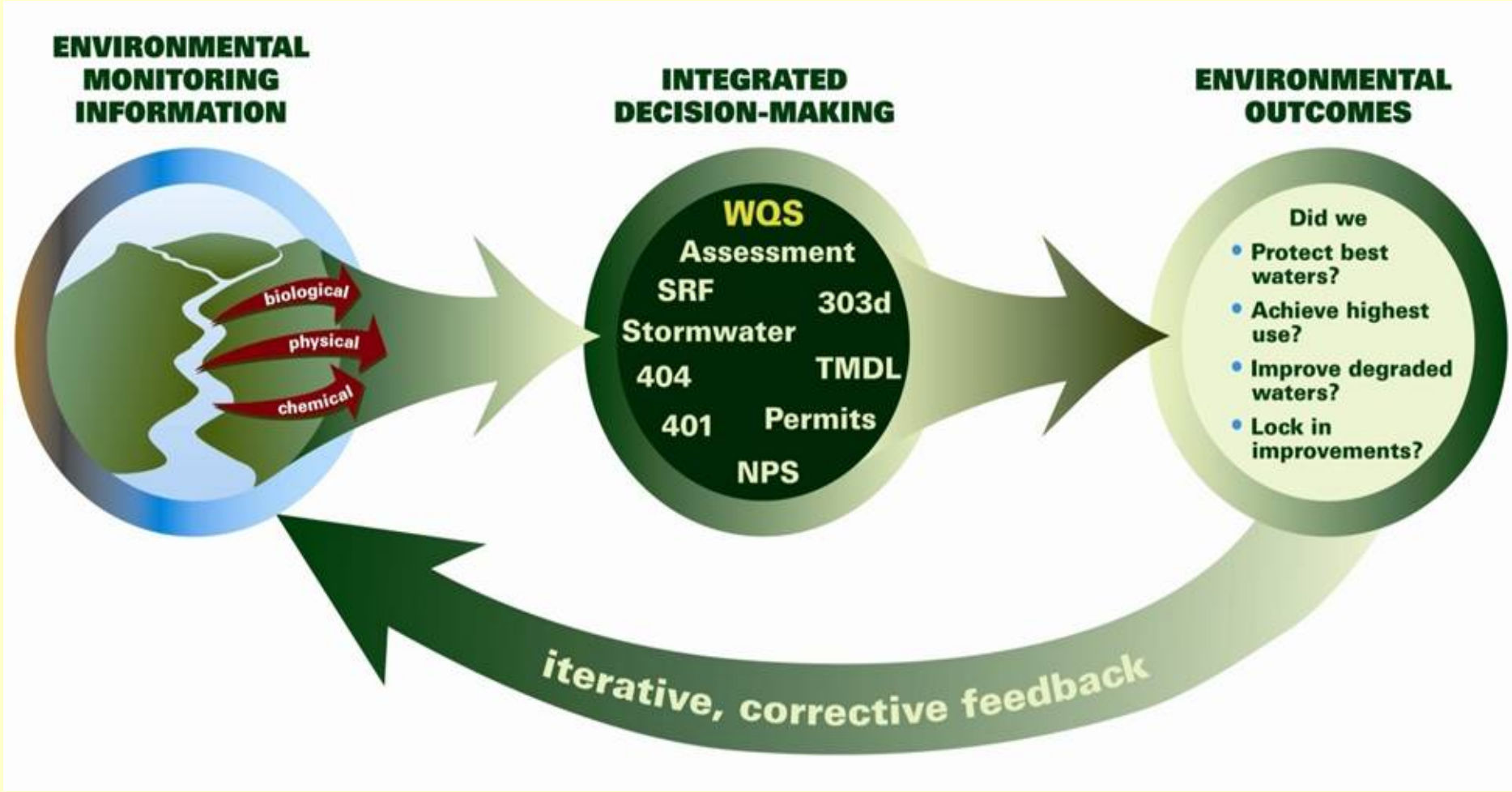
State Self-Test Tally

Question	Yes	Maybe	No
1. Protect high quality resources?	2	-	7
2. Intervene @ ⇩ BCG?	2	1	6
3. Co-ord Mgmnt action?	2	1	6
4. Lock-in incremental improvement?	5	2 (TMDL driven)	2
5. Set attainable goals for highly impaired?	4	2 (UAA)	3
6. Re-Class/Triennial Review Process?	6	-	3

Designated Aquatic Life Uses: Number of Region 1 States



Managing for Environmental Results



TALU and Biocriteria Options

Easier to implement; weakest foundation for decisions

Apply in methods/guidance

Apply in policy

Non-regulatory basis

Harder to implement; strong legal foundation for decisions

Apply via narrative WQS

Apply via numeric WQS

Regulatory basis