

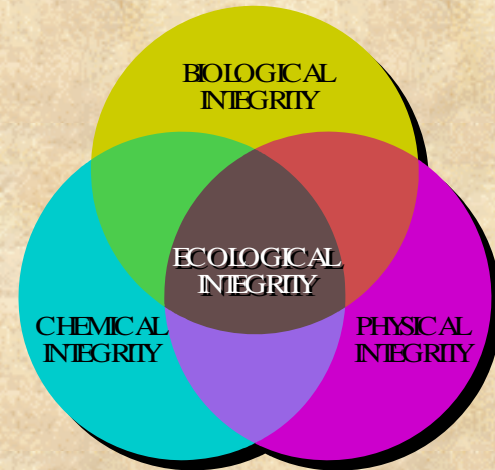
**Using Biological Assessments and Biocriteria in
Water Quality Standards -- The Tiered Aquatic
Life Use Framework (TALU)**

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Clean Water Act

- Objective: “restore and maintain the chemical, physical and biological integrity of the Nation’s waters”
- Interim goal: “water quality which provides for the protection and propagation of fish, shellfish and wildlife ... wherever attainable.”



Water Quality Standards:

- **Designated uses**
- **Criteria**
- **Anti-degradation policy**

Long Term EPA Goal:

All States & Tribes will have improved/refined aquatic life uses and biological criteria in their water quality standards to protect those uses

**Strategy for Water Quality Standards and
Criteria.** (August 2003. EPA-823-R-03-010):

**“All waters of the U.S. will have water
quality standards that include the highest
attainable use....”**

Bioassessments and biocriteria in standards??!!

Concerns and issues that arise:

- How do we do that?
- What if there are no good reference sites?
- Do all waters have to be restored back to pristine conditions?
- Won't too many waters be deemed "impaired"?
- How do we relate an IBI to a designated aquatic life use?
- Do we have to totally revise our standards?
- Won't that require biocriteria limits in permits?

Confusion:

“Impairment”:

1. **A scientifically significant difference in the biological condition (IBI) between the reference condition and a test site.
(Ecological)**
2. **When a designated use is not supported, and/or when criteria designed to protect the use are exceeded or violated. (Regulatory)**

What Can Help?

Tiered Aquatic Life Uses Framework *(TALU)*--

1. *Biological Condition Gradient (BCG)*
2. *Human Disturbance Gradient (HDG)*

Using Biological Assessments and Criteria In Water Quality Standards

TALU Framework is based on common empirical observations and ecological principles. It was developed by a large workgroup and tested with States and Tribes.

- Build on what works in existing State and Tribal programs
- Incorporate latest scientific thinking and capabilities

EPA Workgroup:

21 States, 1 Tribe, 1 Interstate Commission:

**AZ, CA, CO, FL, ID, KS, KY, MD, ME, MN,
MI, MT, NV, NC, OH, OR, ORSANCO,
Pyramid Lake Paiute, TX, VT, VA, WA, WI**

Regional: Arid West and Great Plains

EPA Workgroup:

**US EPA Partners: OST, OWOW, ORD, OEI,
Regions 1, 3, 4, 5, 7, 8, 10**

Federal Agencies: USGS

**Scientific Community: Michigan State University,
University of Montana, University of Kansas
(CPCB), University of Michigan, University of
Ohio (MBI/CABB), Utah State University,
Pennsylvania State, Expert Consultants - Private
Sector**



What is the TALU Framework?

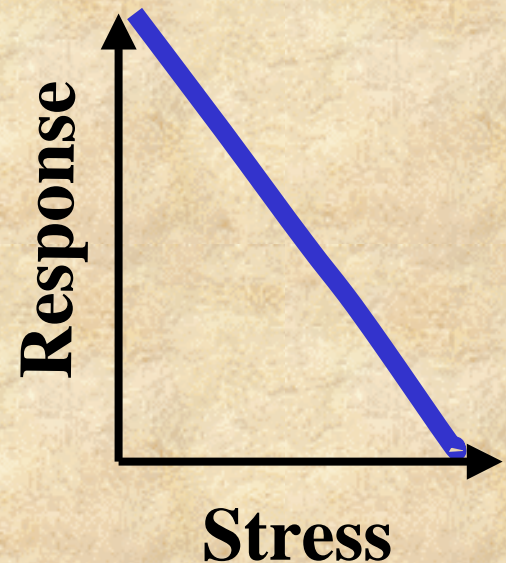
It is a scientific model for predicting biological response to anthropogenic stress.

Longstanding, accepted science.

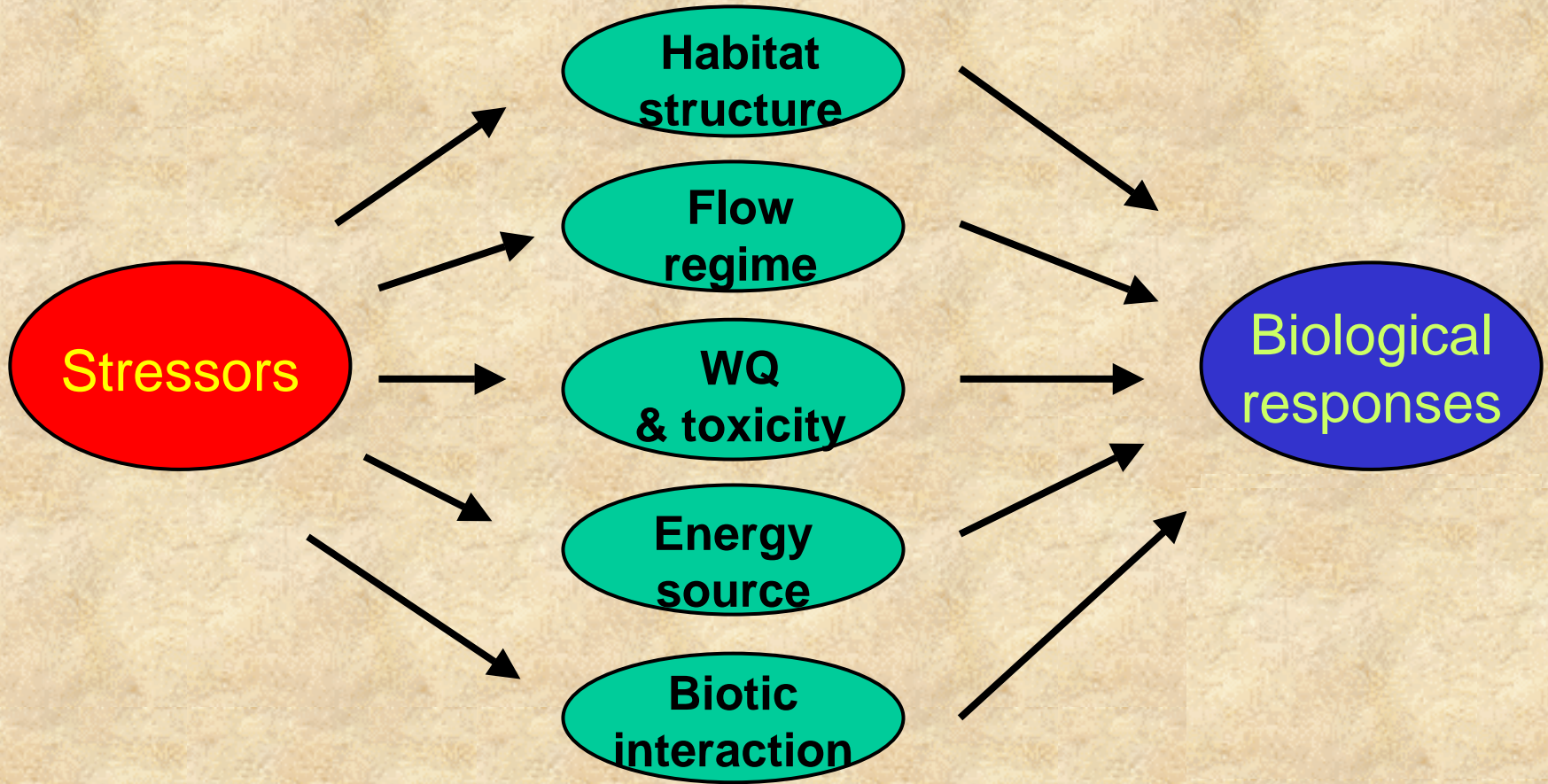
Measurable and predictable.

--Biocondition Gradient

--Human Disturbance Gradient



Scientific Principles

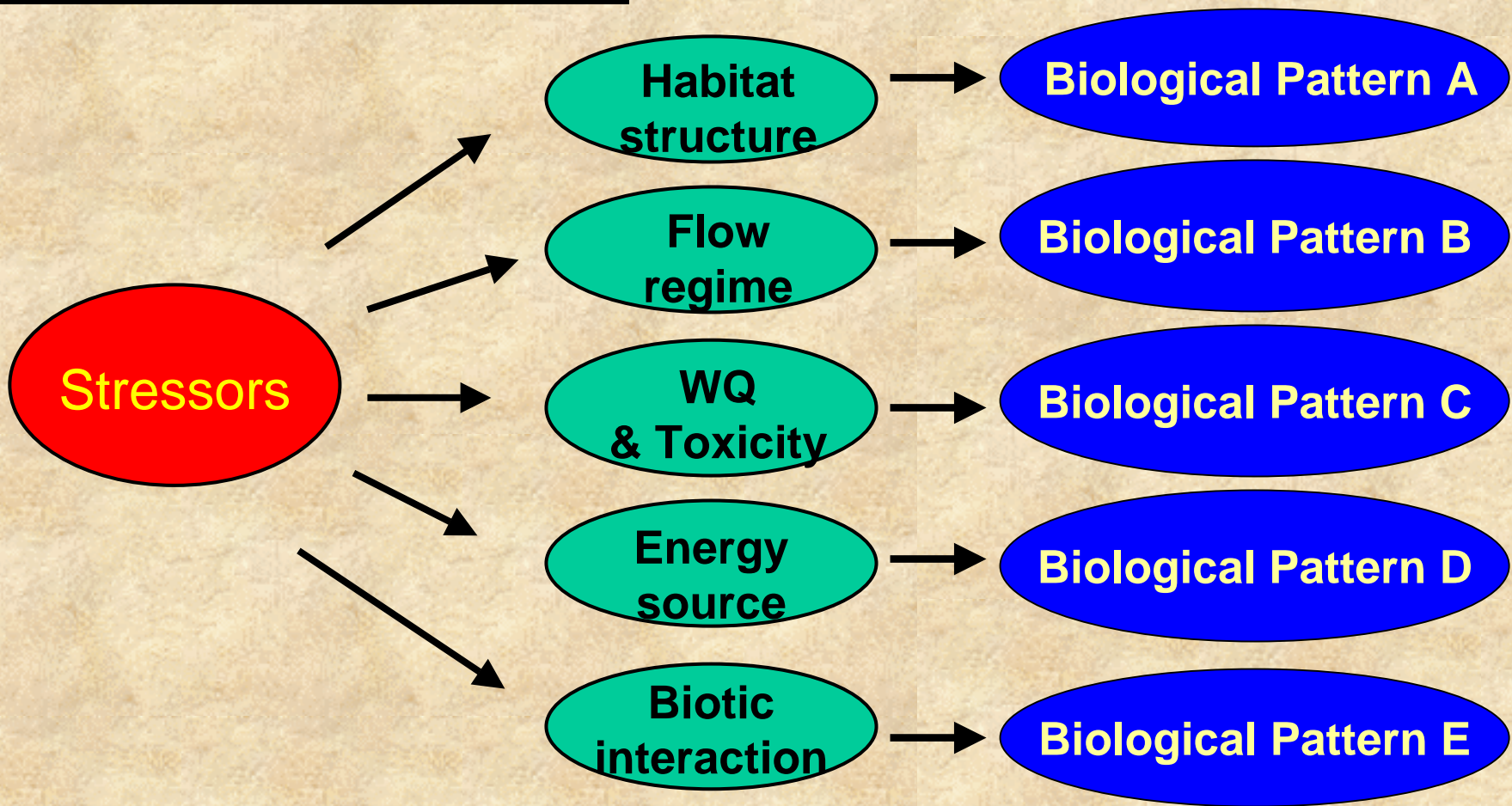


Human activity:
"the drivers"

Altered water
resource features

Biological
endpoint

Scientific Principles

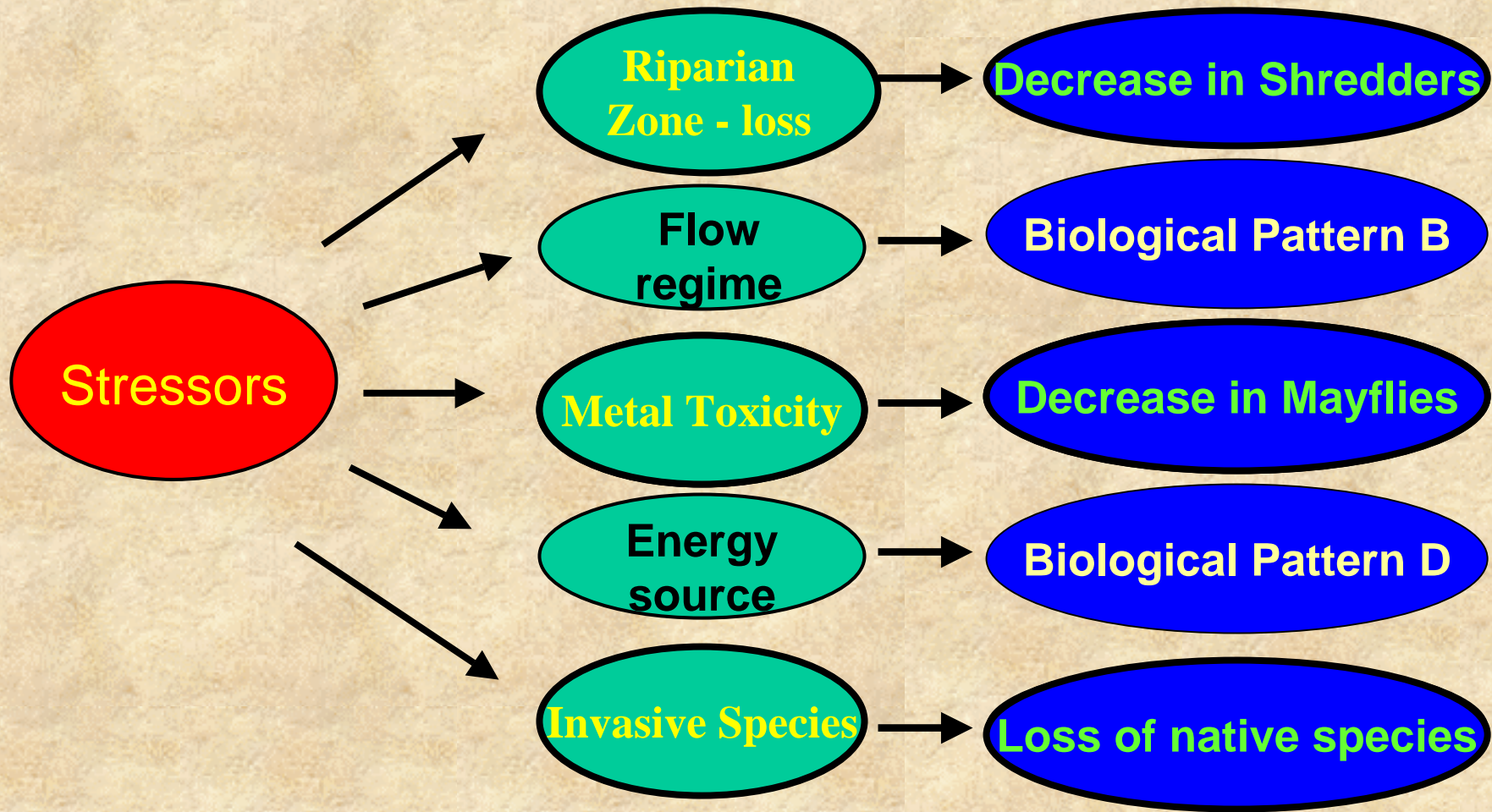


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Scientific Principles

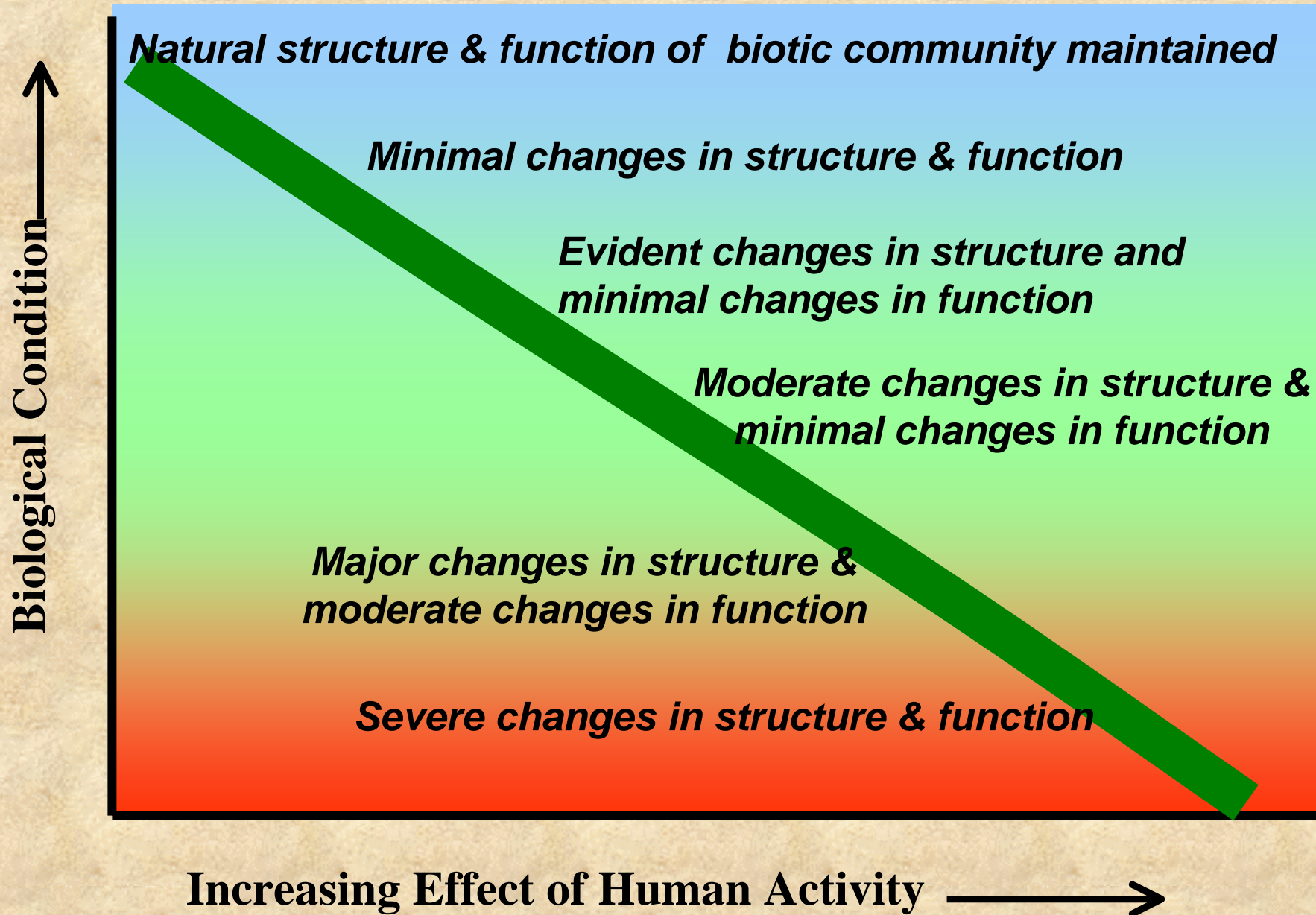


Human activity:
"the drivers"

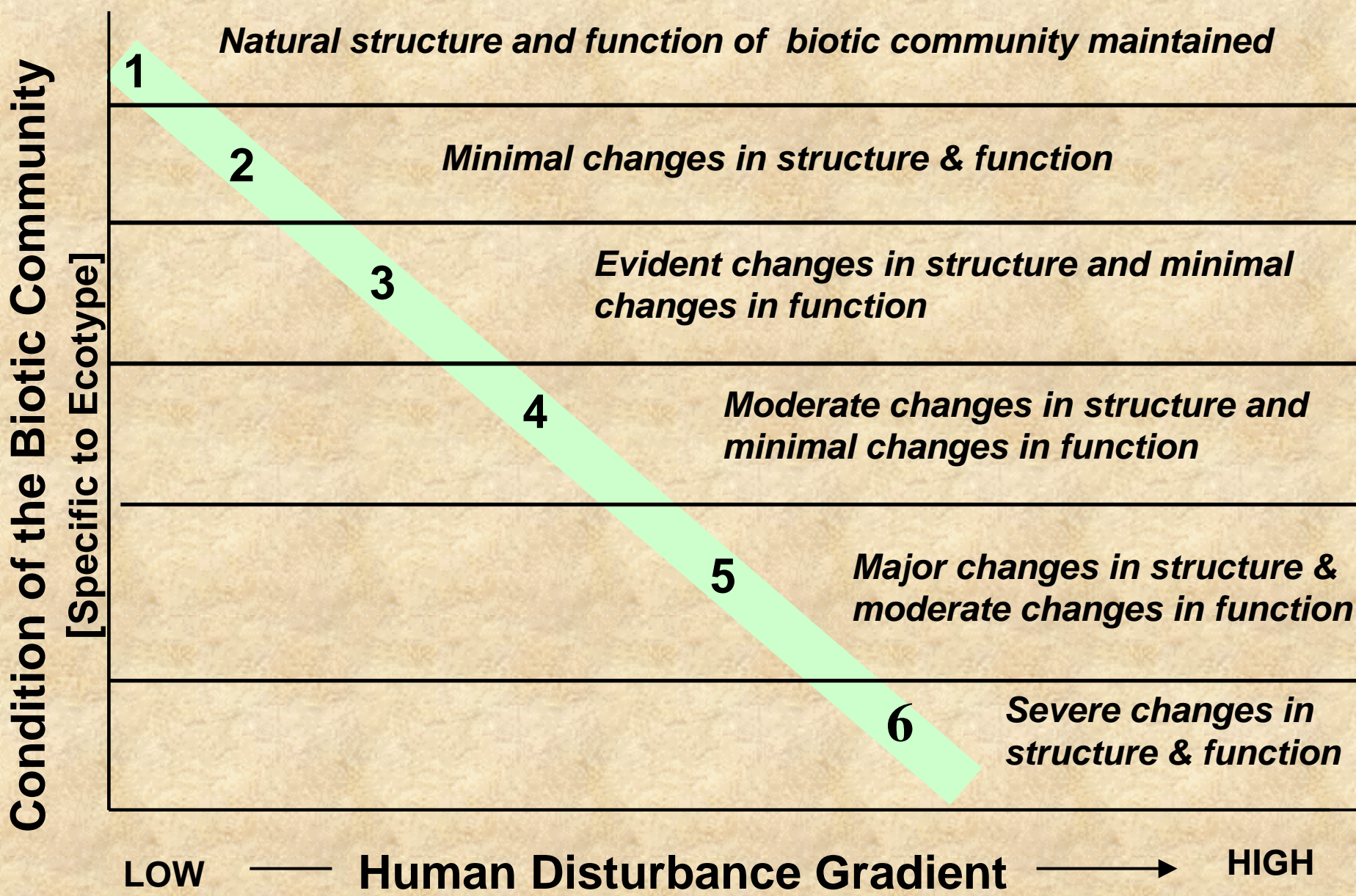
Altered water
resource features

Biological
endpoint

The Biological Condition Gradient – Concept



Tiered Aquatic Life Use- Conceptual Model Tiers of the BCG



Purpose of TALU Framework

Nationally consistent tool for:

- **deriving scientifically defensible, bioassessment-based benchmarks**
- **integrating the benchmarks and biocriteria into WQS**
- **setting designated aquatic life uses that factor in human disturbances (tiering)**
- **better protection for excellent quality waters, more appropriate objectives for others**
- **achievable goals for incremental restoration or UAAs**
- **common bioassessment-based framework for communication & evaluation - public, stakeholders, across political boundaries**

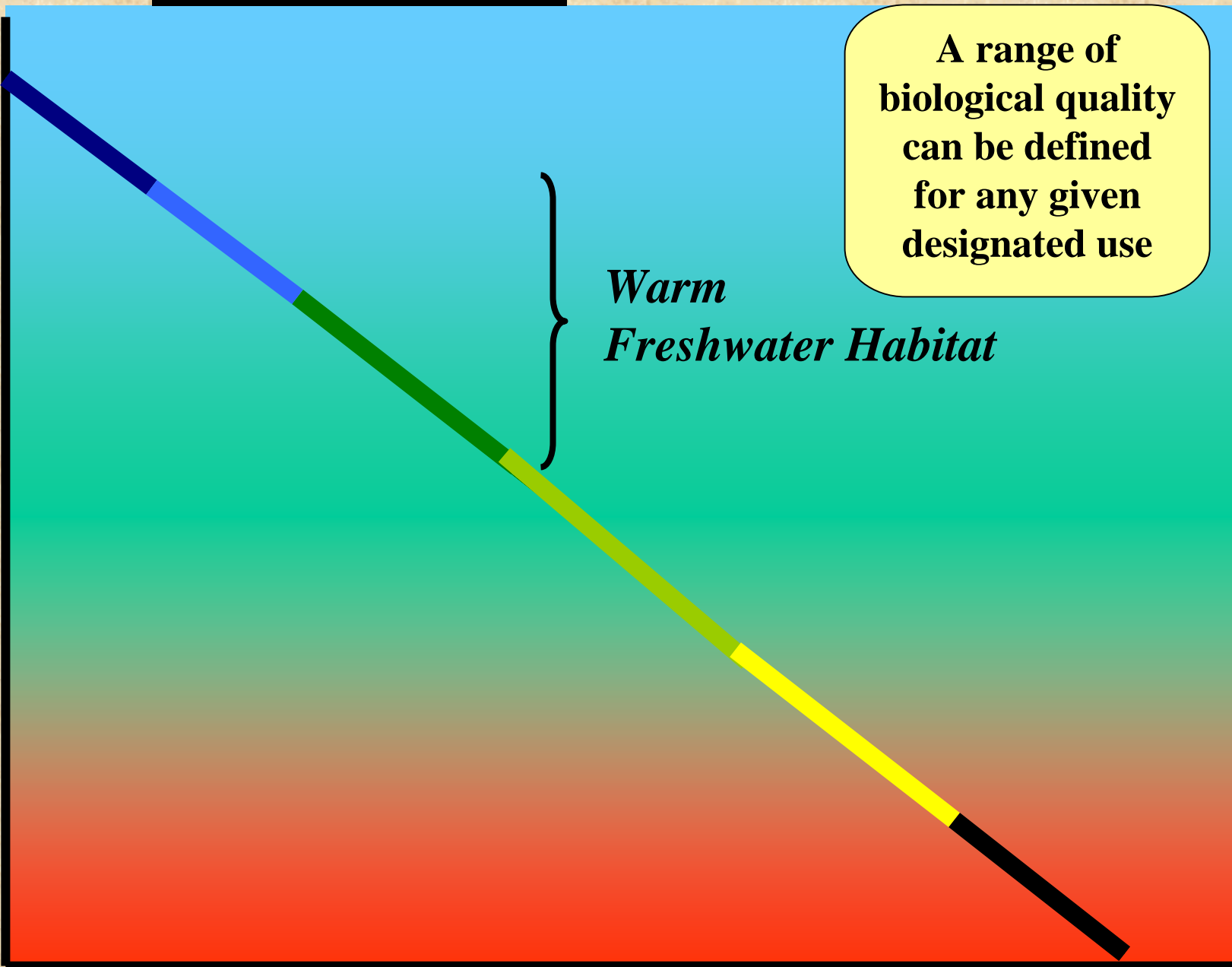
Purpose of TALU Framework

Can fulfill existing WQS program requirements:

- **Better interpret existing designated uses (40 CFR 131.3(e))**
- **Assign more appropriate designated uses (131.10)**
- **Refine and subcategorize designated uses (131.10(c))**
- **Protect Higher Quality Waters (131.12)**
- **Support attainment decisions (130.23)**

Applications – Interpreting uses

natural
Biological
Condition



Low

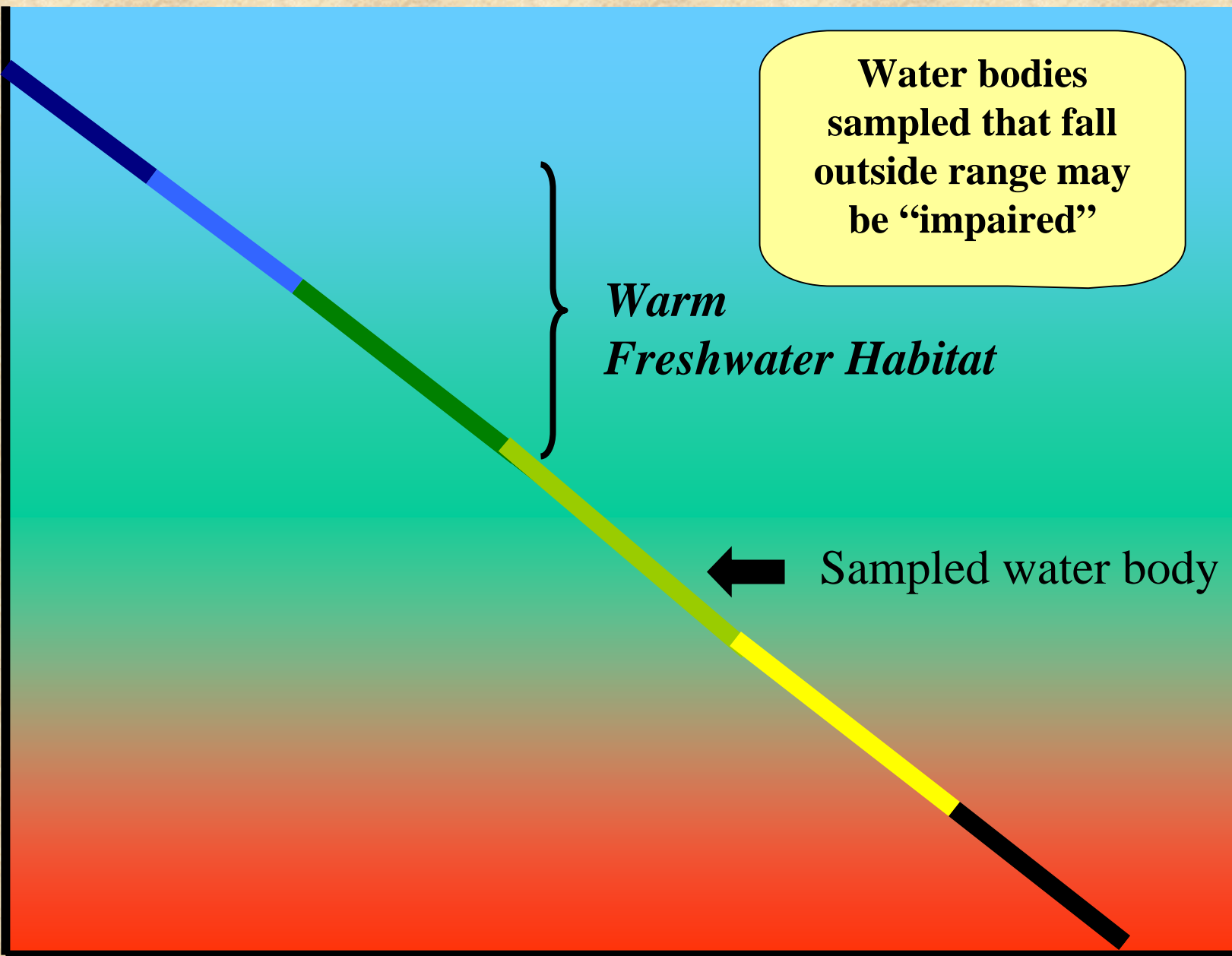
Human Disturbance

High

Applications – Assessing attainment

natural

Biological Condition

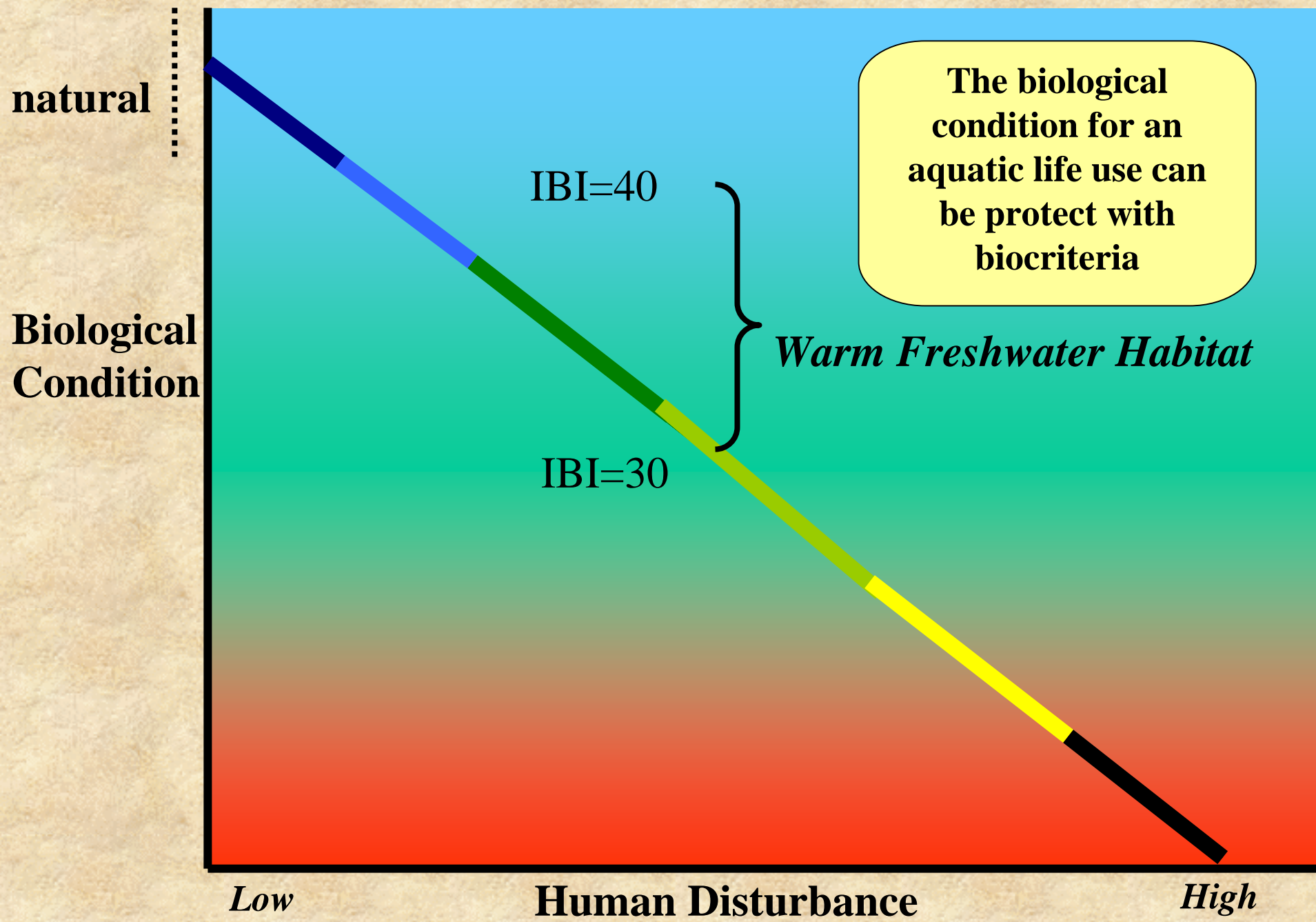


Low

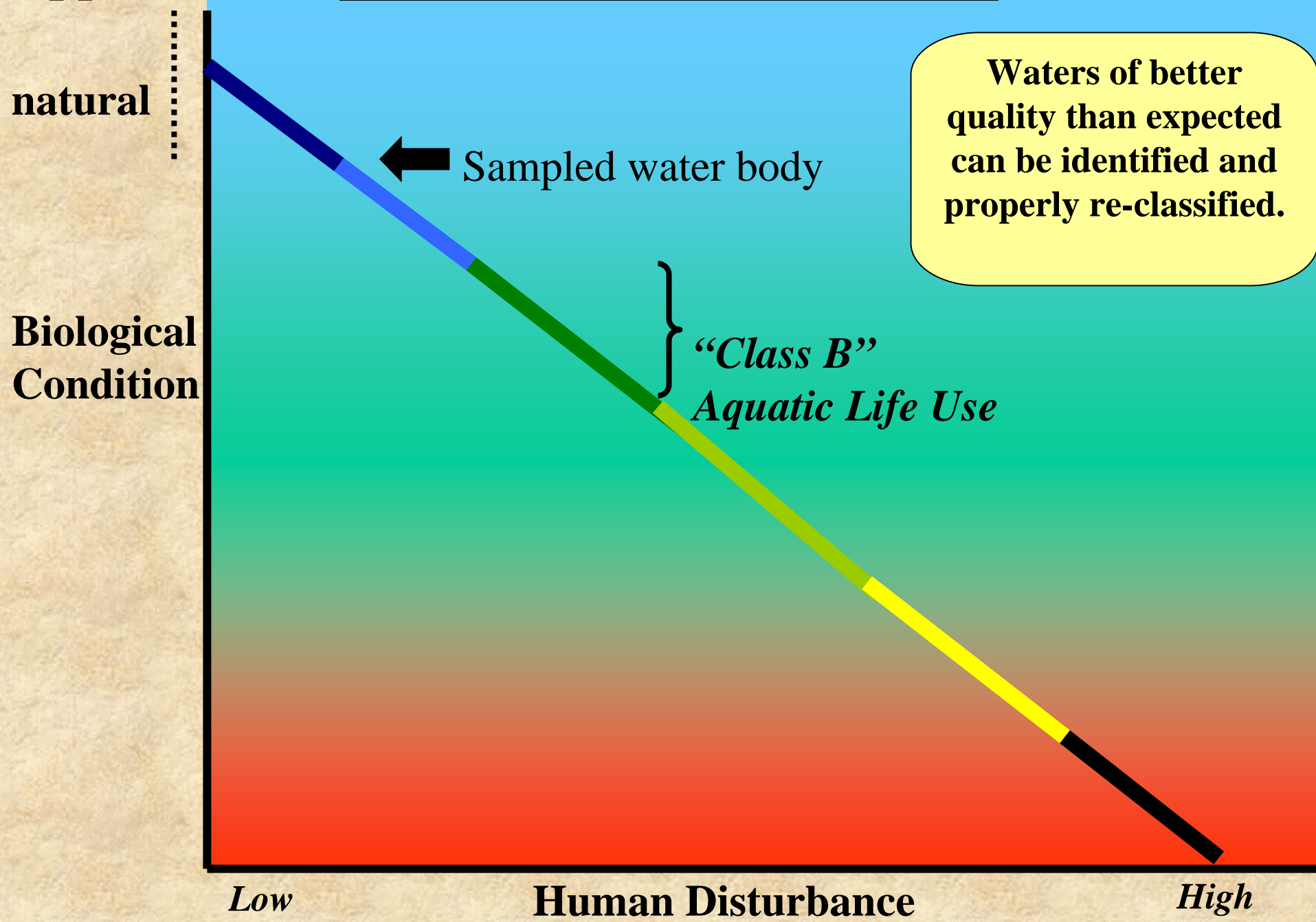
Human Disturbance

High

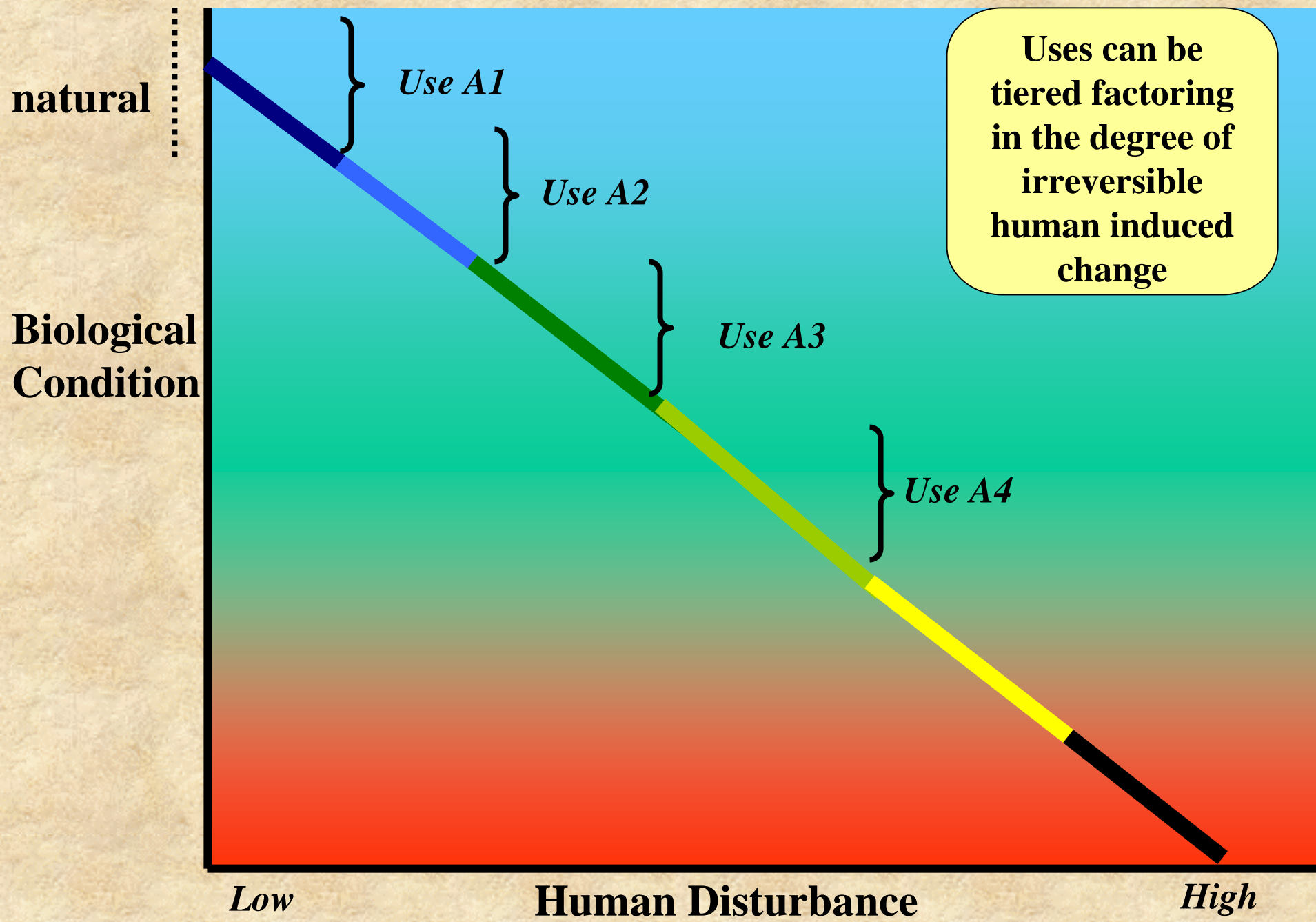
Applications – Setting biocriteria to protect a use



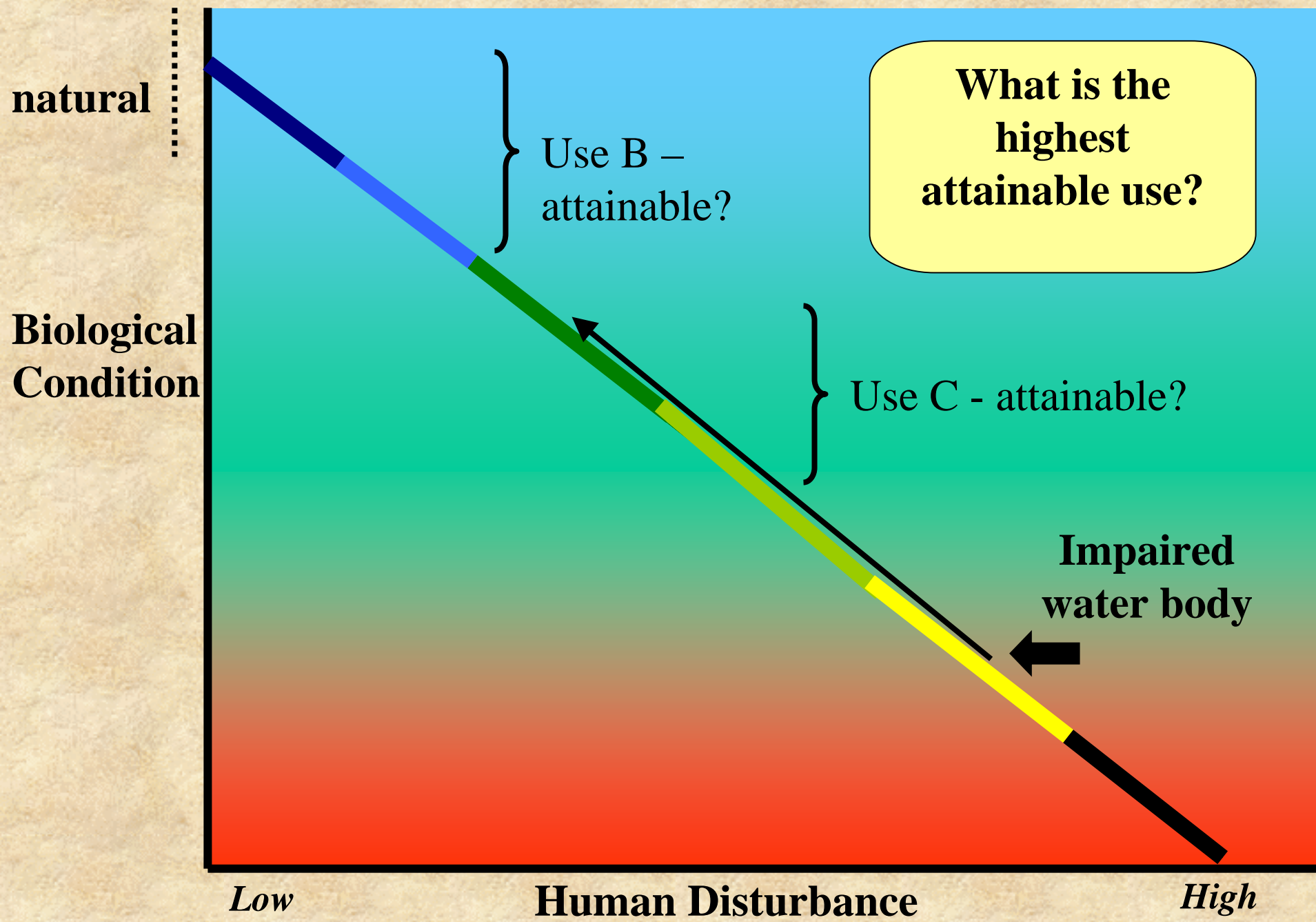
Applications – Protecting outstanding waters



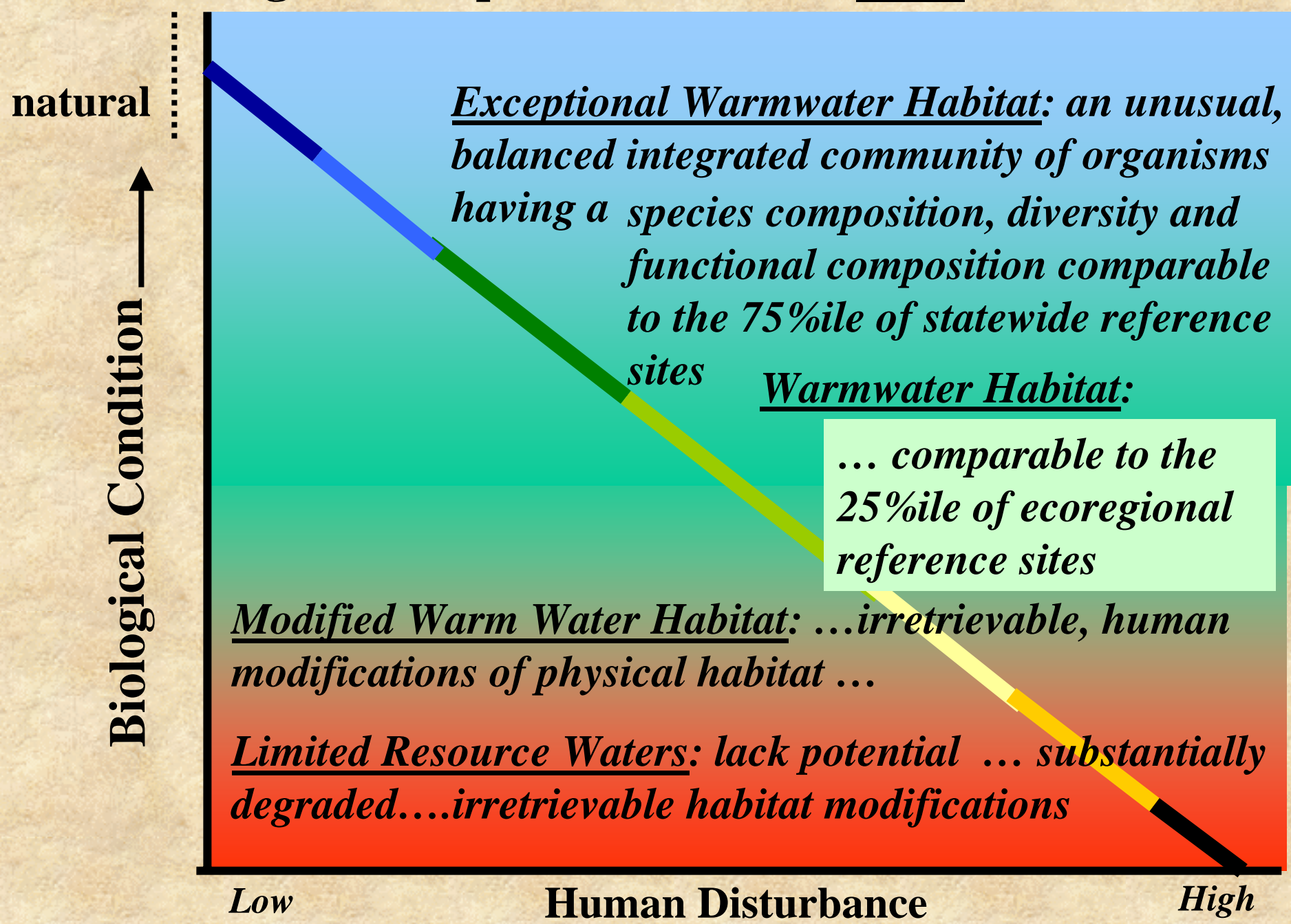
Applications – Tiering or subcategorizing uses



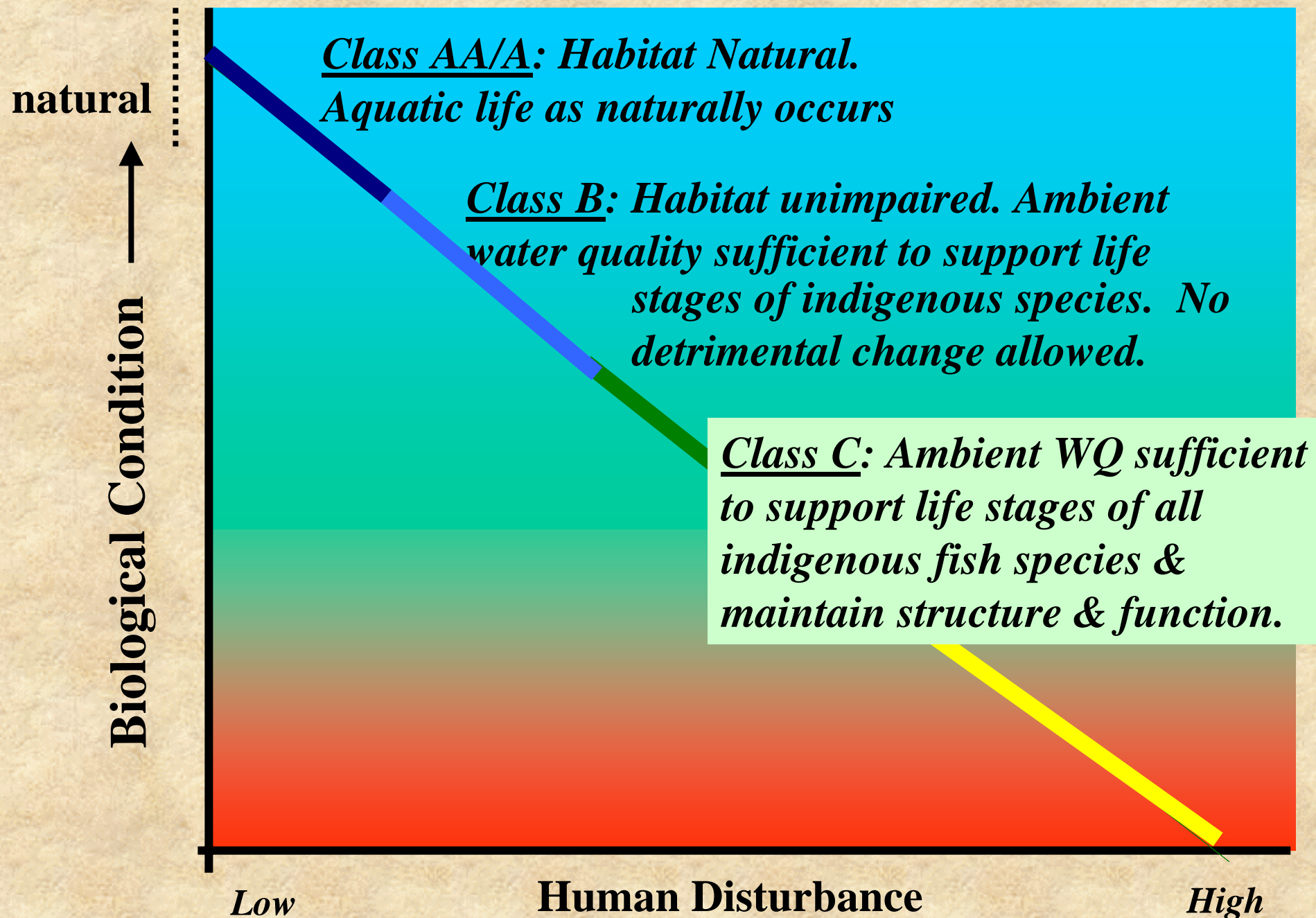
Applications – UAAs and setting restoration goals



Tiered Designated Aquatic Life Uses: Ohio



Tiered Designated Aquatic Life Uses: Maine



Products from TALU Effort (2004):

- 1. TALU Model (BCG and HDG)**
- 2. Technical Underpinnings:**
 - strengths of current model and areas of uncertainty**
 - relationship between BCG and WQC**
 - critical elements of a biological assessment program**
- 3. Implementation Options**
- 4. Case Examples: Different Places and Types of Water bodies (streams, rivers, wetlands, estuaries, arid west)**

BASIC

Levels:

1. Bioassessments are a better way to measure aquatic life as they ID and describe more ecologically the aquatic resources that a State has. They also more directly interpret the CWA
2. Bioassessment measurements can be used to interpret a State narrative general aquatic life protection standard. This may apply to all designated aquatic life uses.
3. Bioassessment/biocriteria (an index) can be used to quantify the interpretation of a State's general aquatic life standard.
4. Biocriteria (an index) can be used to quantify the interpretation of a State's narrative biocriterion (if they have such). This may apply to all designated aquatic life uses
5. Bioassessment measurements can be used to interpret compliance of a water body with an existing State designated aquatic life use(s).
6. Biocriteria (an index) can be used to quantify the compliance of a water body with a State's existing designated aquatic life use. This may apply to all designated aquatic life uses or can be tiered by designated use.
7. The BCG provides a spine/ backbone or yard stick on which to implement the above relative to Reference Condition that approximates Biological Integrity.
8. Bioassessment/biocriteria/BCG/HDG/TALU can be used to subcategorize (refine) existing aquatic life uses relative to the current use of a water body, Ref. Condition and human disturbance-- to determine highest achievable biological condition. This would be bioassessment-based uses.
9. Bioassessments/biocriteria/BCG/HDG/TALU can be used to set new aquatic life uses a State's system currently does not include (appended into the current set of uses).
10. Bioassessments can be used to construct a whole new set of designated aquatic life uses (bioassessment based-uses, not water temp. based, recreation-based or fishery-based).
11. Bioassessments/BCG/HDG can be used to construct a whole new set aquatic life uses with subcategories or tiers related to biological integrity and one another. Biocriteria can be adopted to legally define and protect the biological condition of each use.

COMPLEX

