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Two Non-Traditional Concepts about Large River Reference Conditions:

From Recent Experience on the Upper Mississippi River

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The Nature Conservancy
SAVING THE LAST GREAT PLACES ON EARTH

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Visualizing large, working river goals – perhaps this …

but not this.

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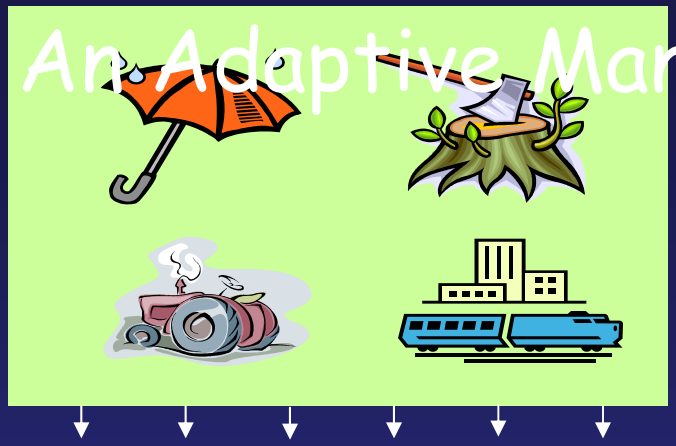
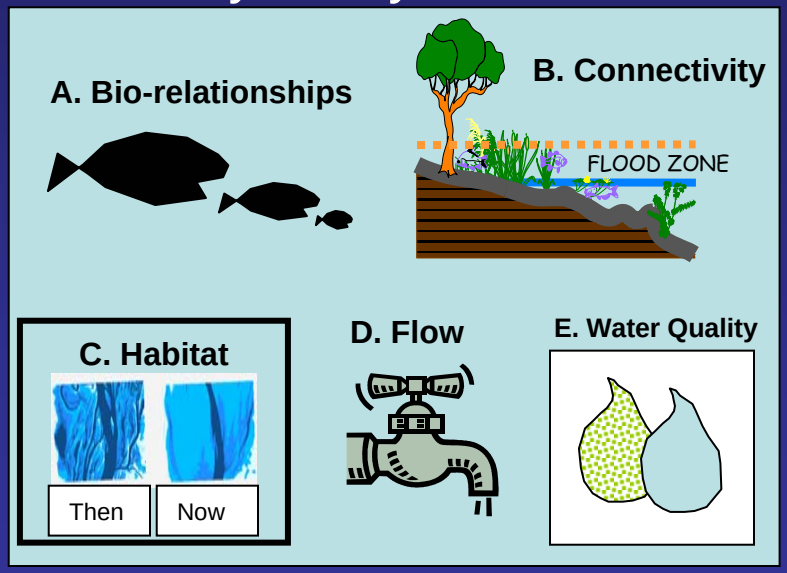
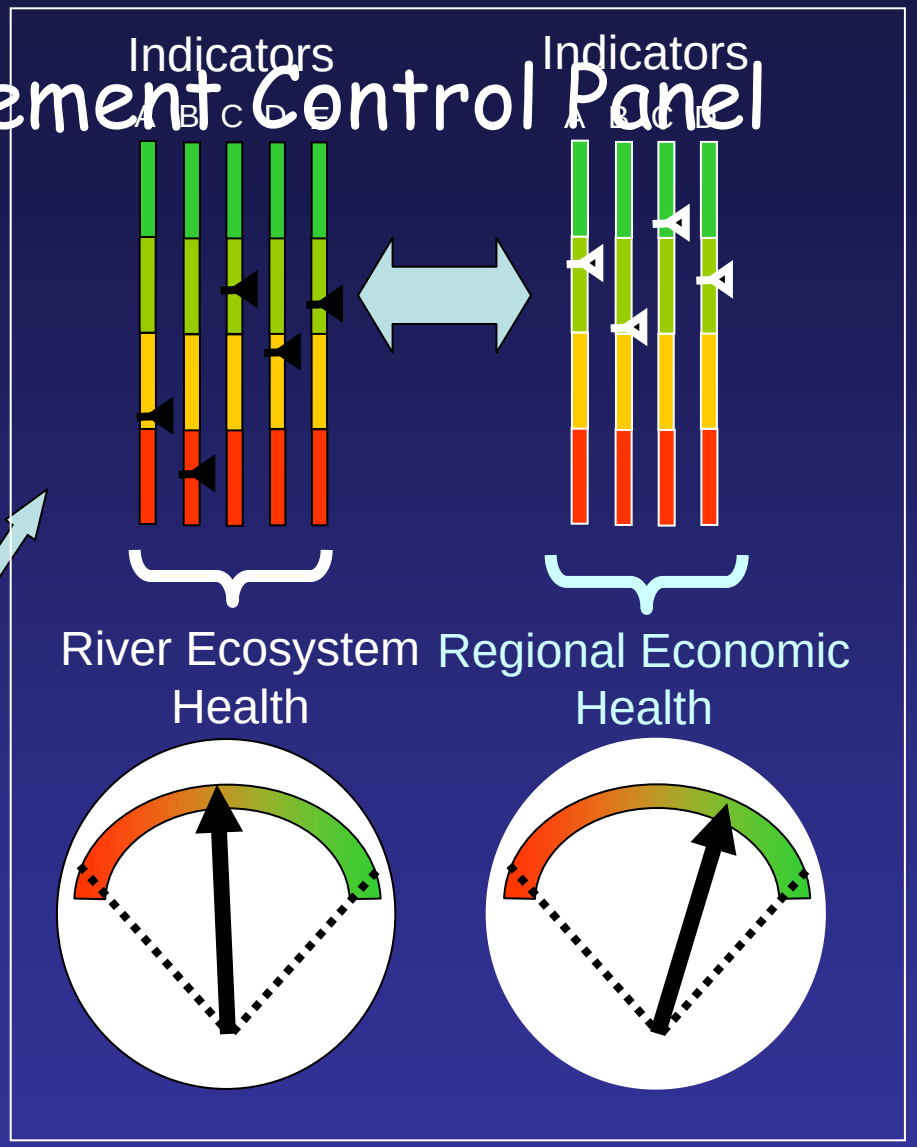
An Adaptive Management Control Panel

Basin Conditions



River Key Ecosystem Attributes





Today -

1. "Virtual Reference Condition"
2. "Collective Minimal Standards"

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Almost Equal Phrases on the Upper Mississippi River

"Virtual Reference Condition" ?= "Desired Future Condition" ?= "River Ecosystem Health"

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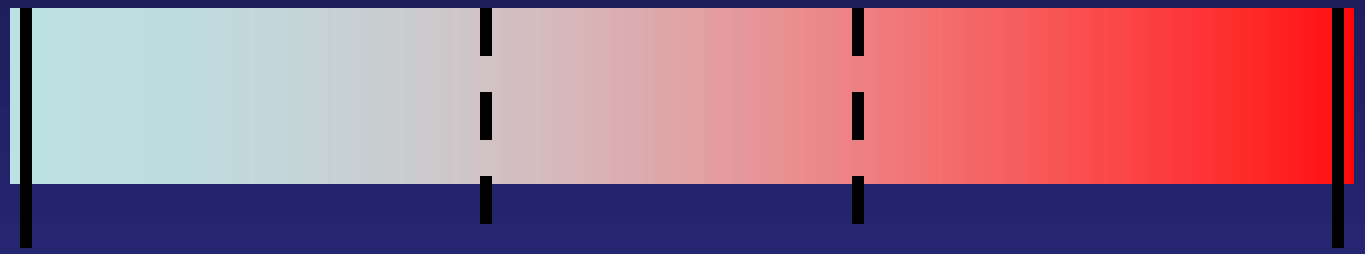
Spectrum of Ecosystem Conditions*



Ecosystem Integrity
Pristine, Undisturbed

Ecosystem Health
Altered, but still mostly controlled by natural processes, can be preferred not just accepted

Degraded

No Life

* Modified from Karr and Chu (1999)

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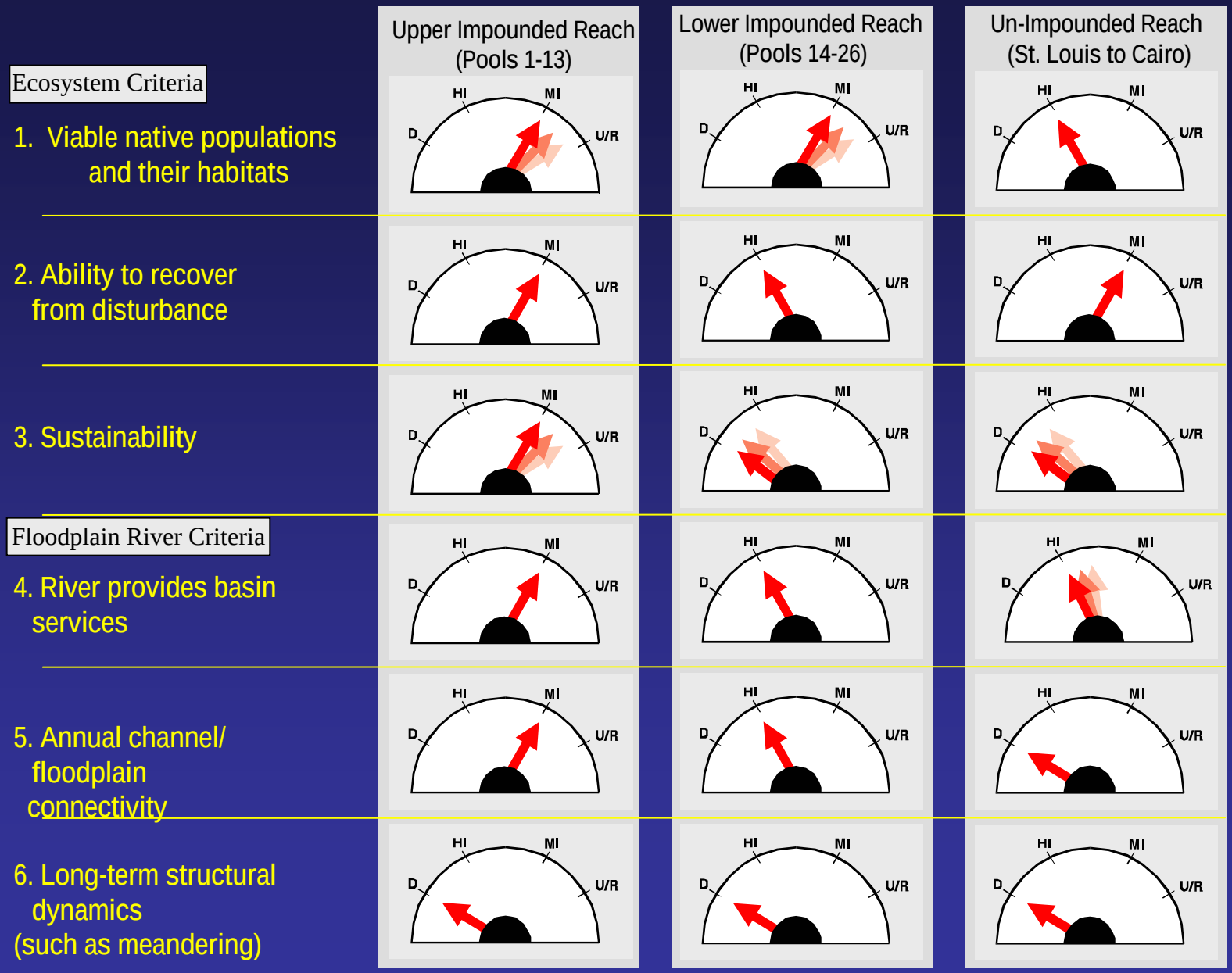
Ecological Assessments of Three Reaches of the Upper Mississippi River



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Problems with Initial "Report Card":

1. Limited quantitative methods
2. Limited participation by public

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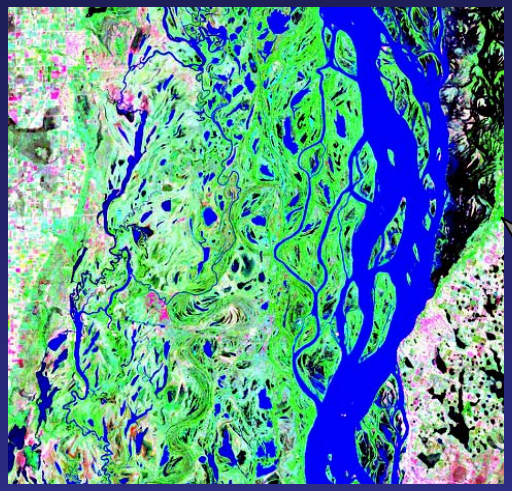
Reference Conditions

(ala J. Nestler at International Aquatic Modeling Group, 2000-2001)

Middle Paraná RIver



Existing River

Historical River

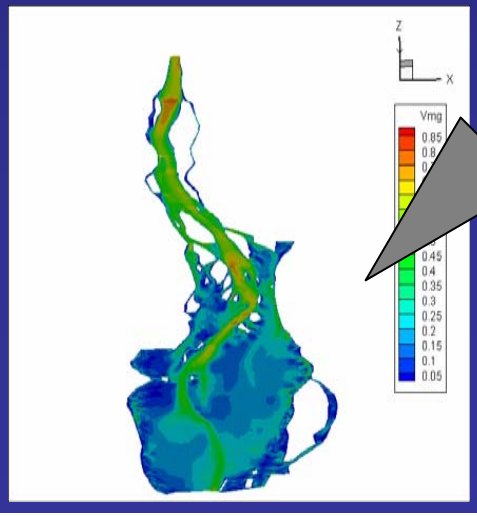
2

1

3

NSF

Virtual Reference



Existing Reference

4

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Nestler's Virtual Reference Condition concepts -

1. Needed to bridge gap between incremental and synthetic approach

2. Multi-variable and based on first principles

3. From model calibrated to historic states, internal sites, and external systems.

Question #1: How many variables does it take to adequately address first principles?

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But, the actual UMR recipe (FOR V.R.C) -

1. Take 2000+ stakeholder needs …
2. Blend and reduce
3. Separate by essential ecosystem characteristic
4. Present as pseudonym for total "desirable future conditions"

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Question #2

Is establishing the

"Virtual Reference Condition"

an objective or subjective task?

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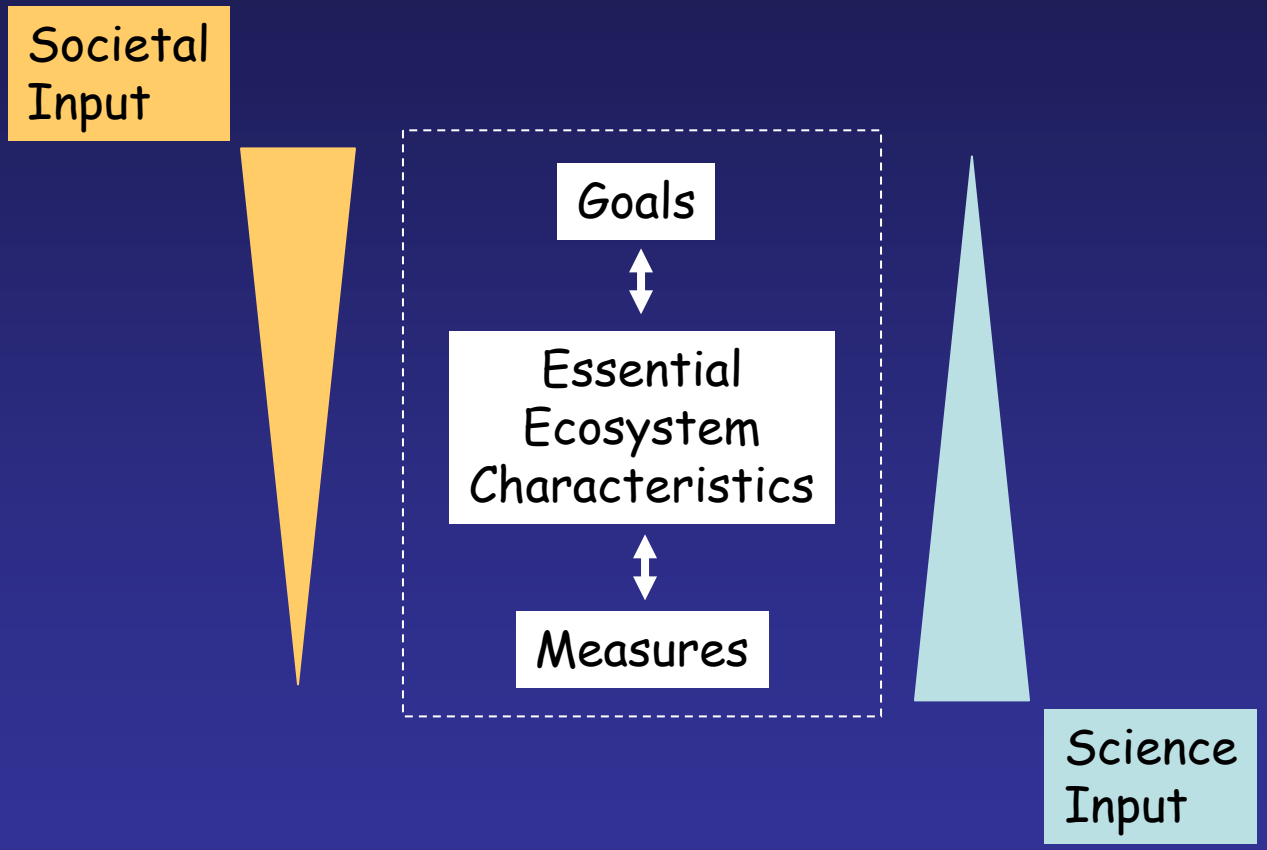
Getting the Goal-setting Process Right -

AN ECOSYSTEM REPORT CARD NEEDS TO BE SCIENTIFICALLY-CREDIBLE AND SOCIALLY ACCEPTABLE



Source: Harwell, et al. (1999)

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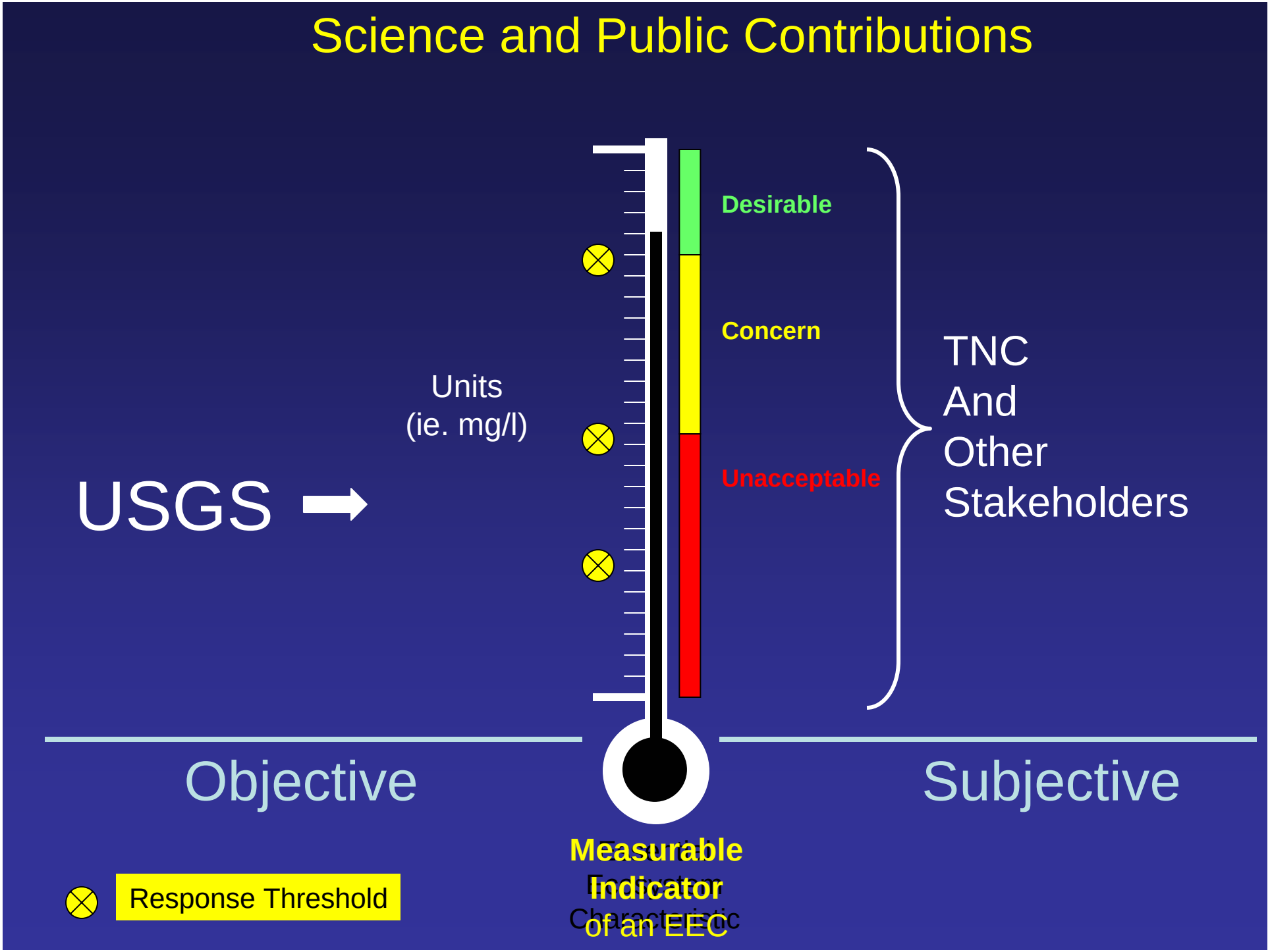
Science and Public Contributions



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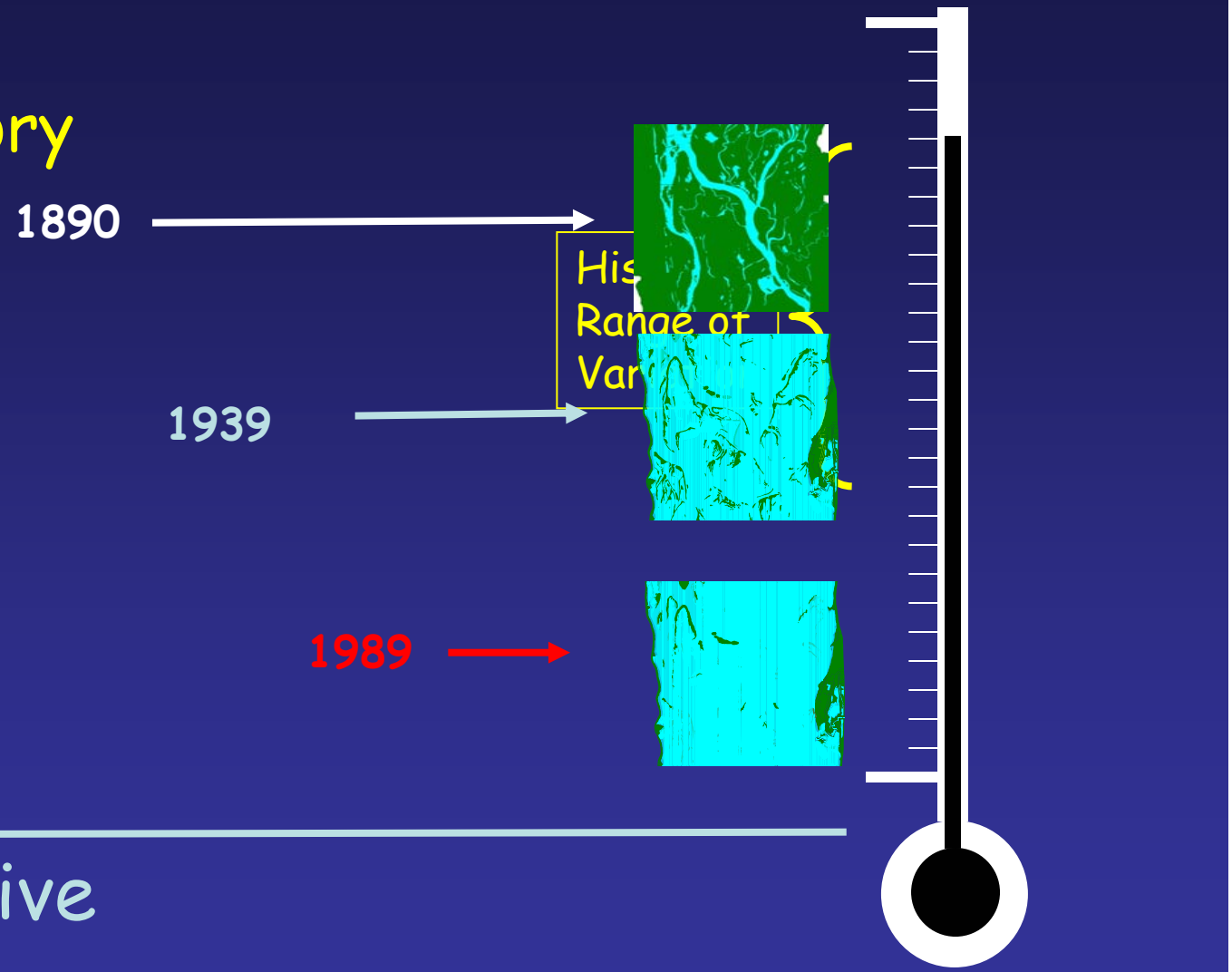
Virtual Reference Condition Approach 1: Based on History



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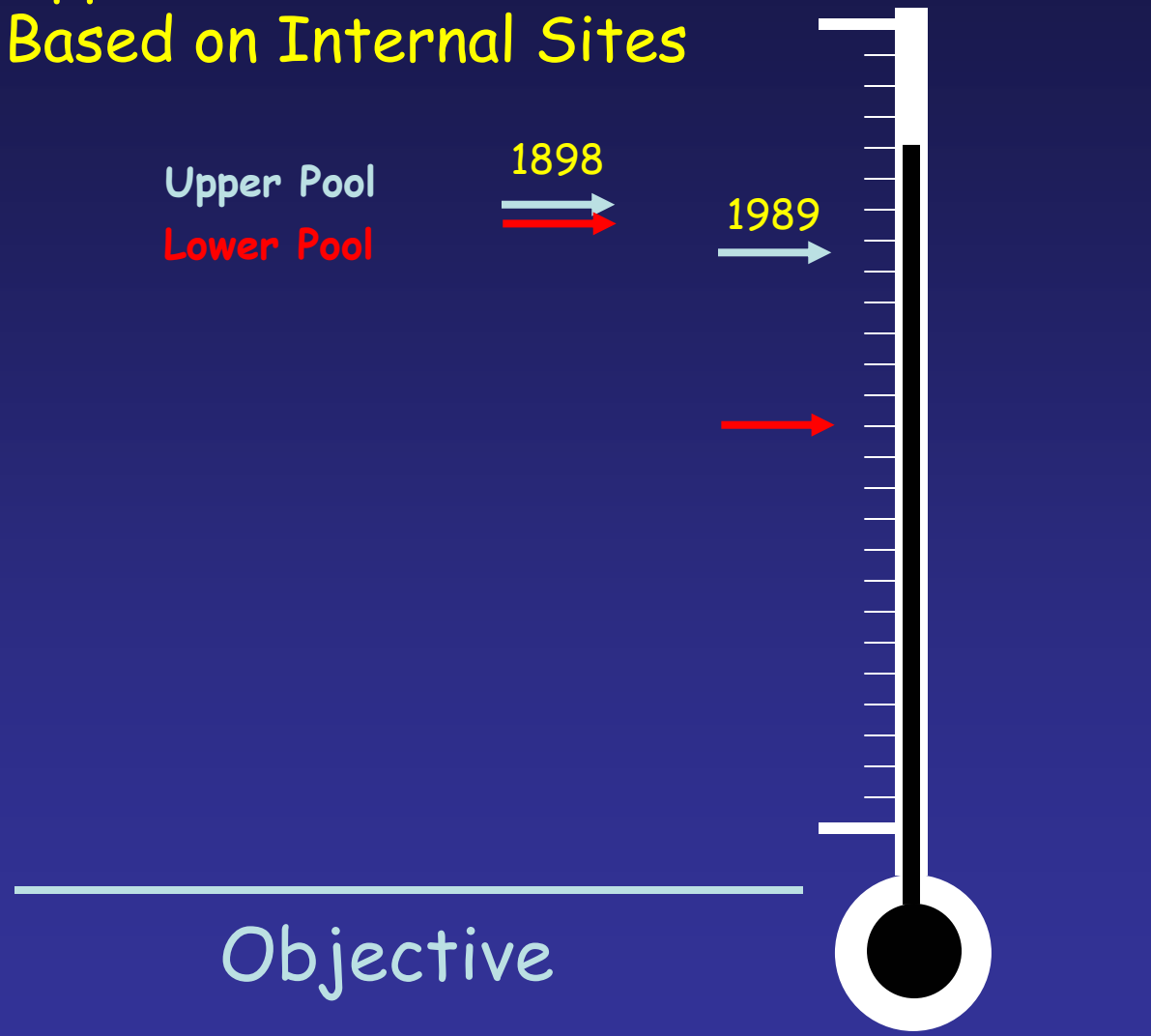
Approach 2:
Based on Internal Sites



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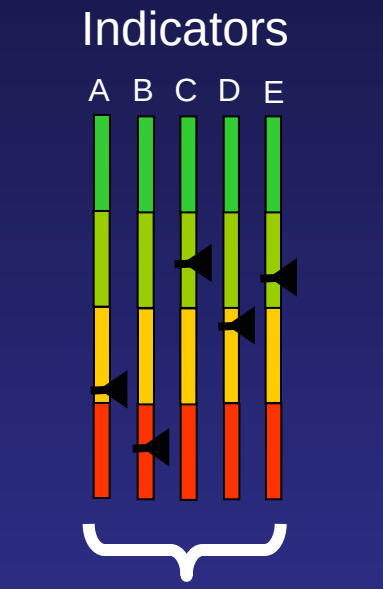
But what happens when we try to synthesize variables?



mg/l
\+ acres
\+ invasive species
\+ ..
\+ ..

???

Question #3: Can a Multi-variable approach be Objective?

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"Collective Minimal Standards"?

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The UMR Navigation-Ecosystem Sustainability Program (N.E.S.P.)

Goal = Economic and Ecosystem Sustainability

Scope of TNC's Great Rivers Center for Conservation and Learning

Total System Quality = *f(economy) + f(ecosystem) + f(culture)*

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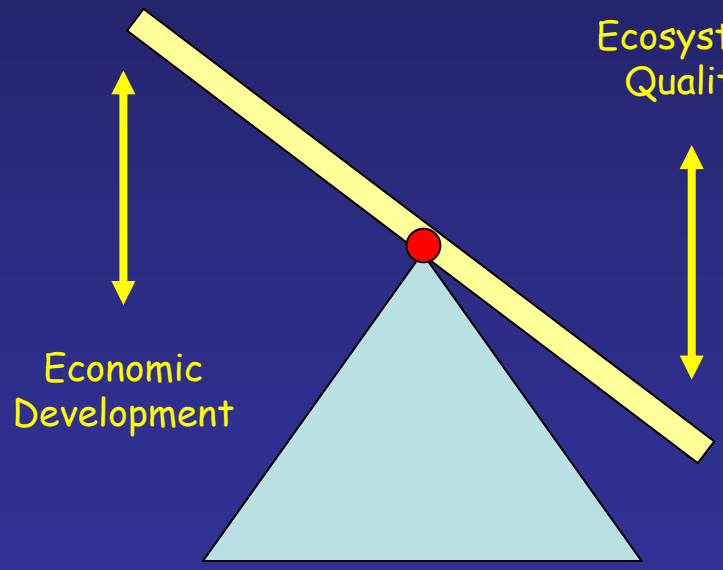
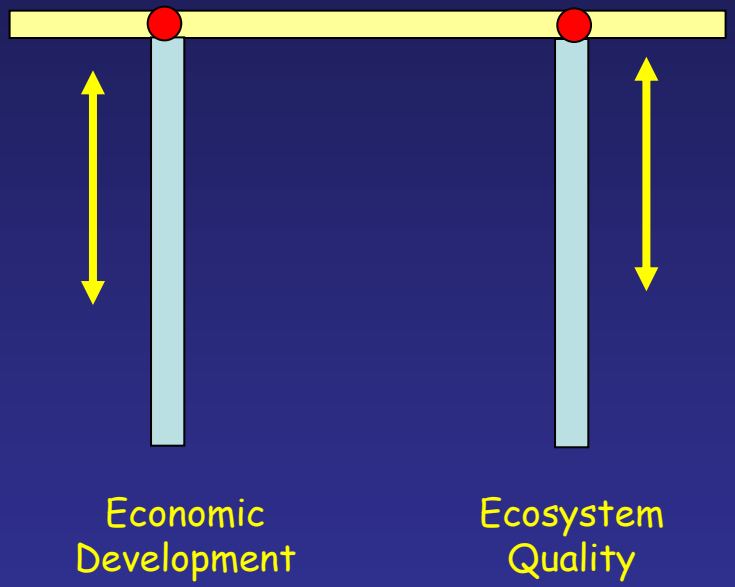
Two Models of Economic/Ecosystem Relationships



(a)

Co-dependency



(b)

Independency

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Theoretical Health/Wealth Relationships During 3 Stages of Natural Resource Use

Ecosystem Health

Total Wealth

Paraguay

Mississippi

Yangtze

Restoration
??

Stable/
Sustainable

Taking

Negative
Feedback Loop

Time >>>

"Manufactured" Wealth"

"Natural" Wealth

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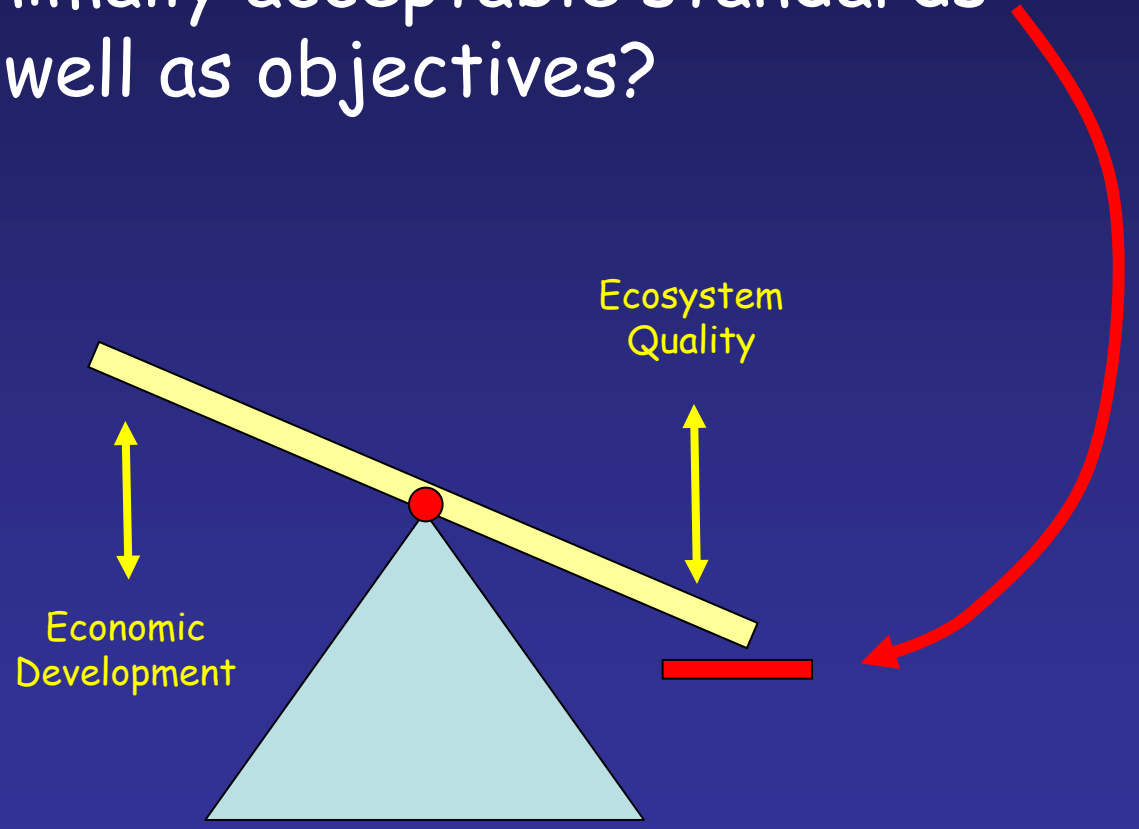
Question #4: Under the co-dependency model -

Don't we have to establish minimally acceptable standards as well as objectives?



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Review of Questions:

1. Do reference conditions have to be objective?
2. How many variables are necessary to adequately address first principles?
3. Can a multi-variable approach be objective?
4. Minimal standards as well as objectives?