

Nutrients in Maine: Criteria Development Listing and TMDLs

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Shepherdstown, West Virginia

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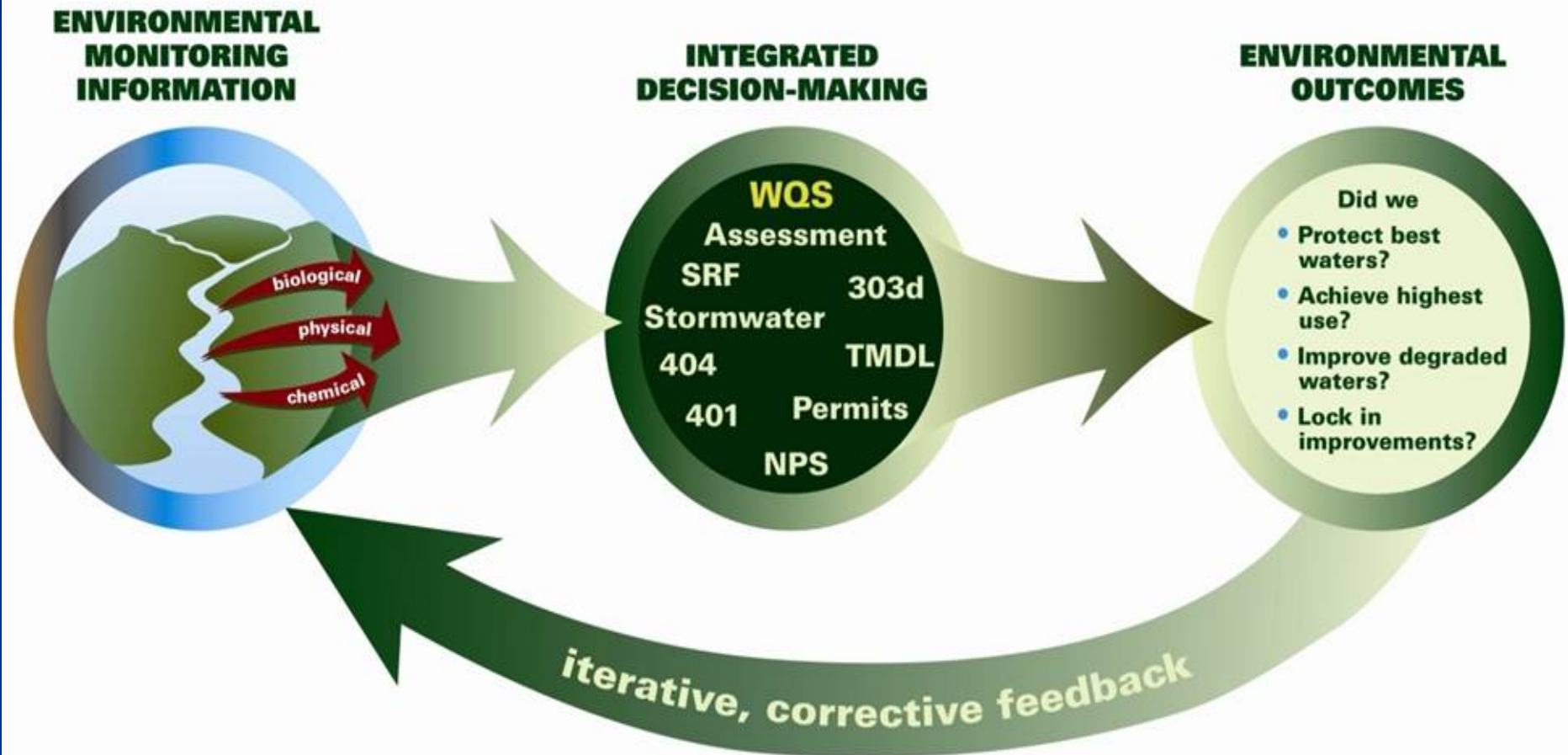
Clean Water Act Sec. 101. Declaration of Goals and Policy

- (a) The objective of this Act is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters.

“Congress really did mean what it said” Adler,
R.W. 2003. Env. Law 33:29-77

Robert W. Adler, U. of Utah College of Law

Managing for Environmental Results



Maine Statutory Classes and Criteria

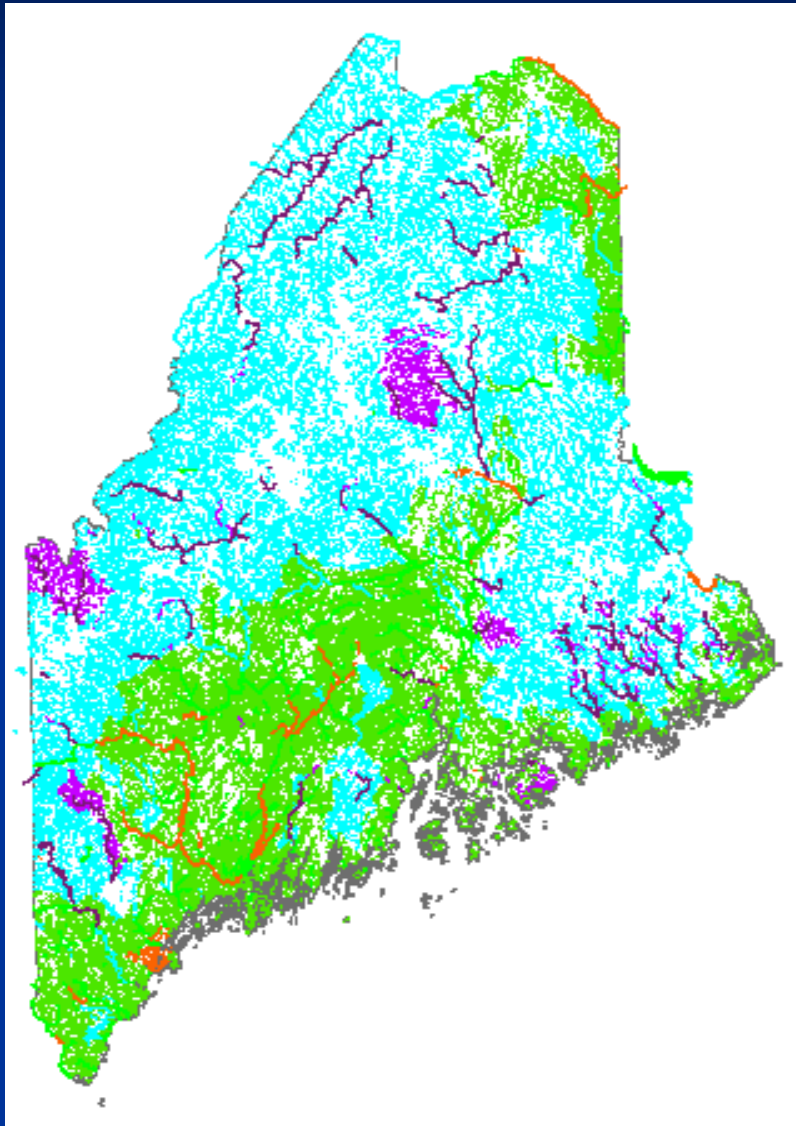
	Dissolved Oxygen	Bacteria (<i>E. coli</i>)	Habitat	Other Criteria
Class A	as naturally	as naturally	free flow and non-degraded	What about biocriteria criteria? tiered
Class B	as naturally	as naturally	natural	as naturally occurs
Class C	as naturally	as naturally	unimpaired	What about nutrient criteria? tiered
Class C (CWA "fishable/swimmable")	5 ppm, or 60% sat.; 30-day avg. 6.5 ppm	126-GM/236/100 ml (instantaneous)	habitat for fish and other aquatic life	community

What about other
AWQC, e.g.
toxics?

Not tiered

***Numeric biocriteria in rule**

Designated Stream Classes



% OF LINEAR MILES OF
STATUTORY
CLASSIFICATIONS

Class AA = 6%
(ONRW)

Anti-deg Tier 3

Class A = 45%

Anti-deg Tier 2 1/2

Class B = 47%

Anti-deg Tier 2

Class C = 2%

Anti-deg Tier 1

*(Class C ~8-10% for large
rivers and urban streams)*

Maine 303d Listing

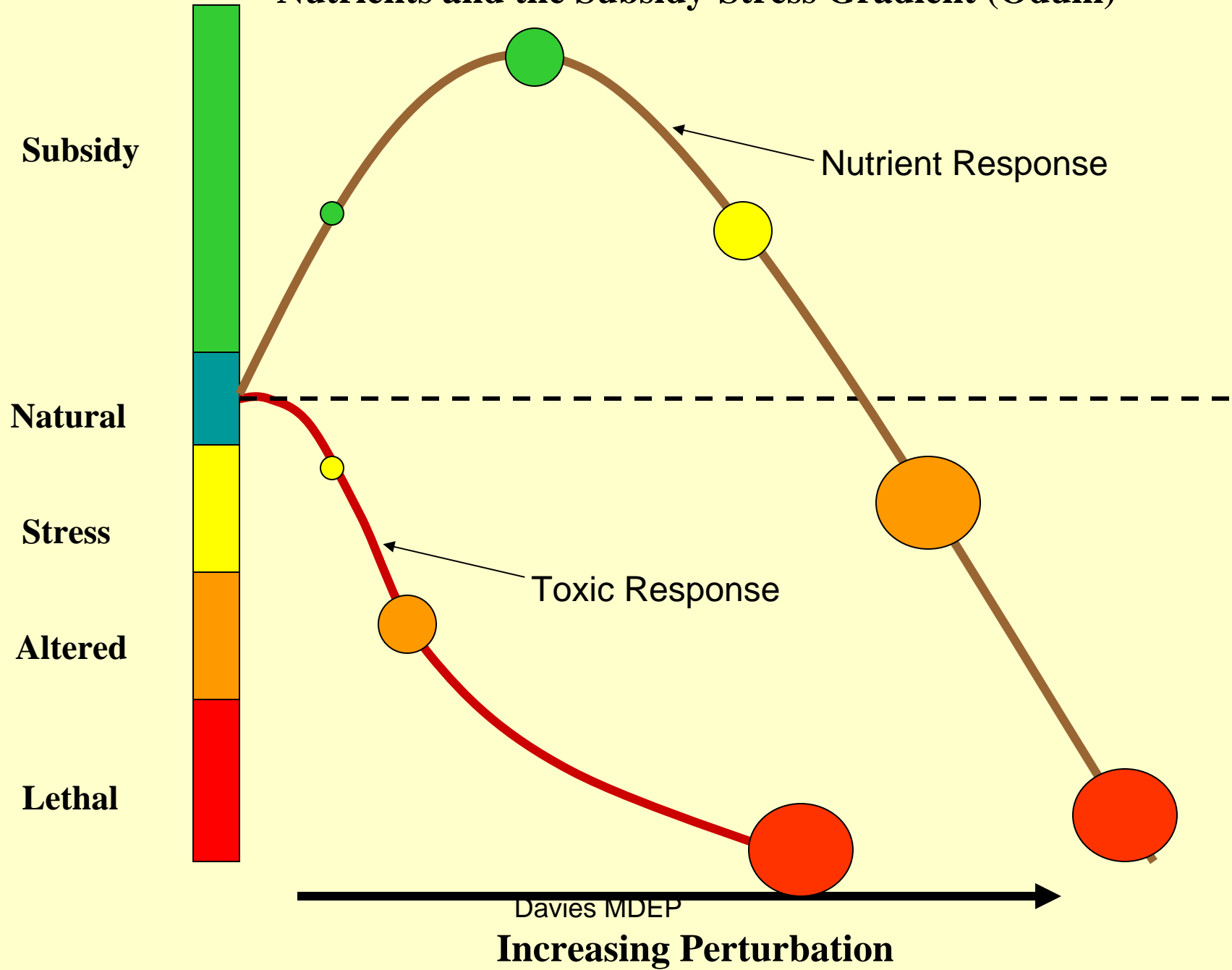
Legislative Class	Monitoring Result	Attains Class?	Next Step
A	A	Yes	--
C	B	Yes	Upgrade ?
A	B	No	TMDL
B	NA	No	TMDL

Maine's Nutrient Management Strategy

- Use **environmental response indicators** to
 - trigger listing
 - trigger enforcement action
 - TMDL restoration targets (Goal=↓ algae;↑ Secchi;↑ DO, etc)
- Use **nutrient concentration** thresholds for:
 - watershed planning
 - permitting/modeling targets
 - SI → confirm if nutrients the cause of AL impairment

Concentrations \neq impairment of
aquatic life or recreational uses!

Nutrients and the Subsidy-Stress Gradient (Odum)



Maine TP Criteria

- **Class GPA (lakes) – 15 ppb**
- **Class AA/A – 18 ppb** **Anti-deg Tier 3**
- **Class B – 30 ppb** **Anti-deg Tier 2-2 ½**
- **Class C – 33 ppb** **Anti-deg Tier 1**
- **Marine SA, SB and SC**-under development

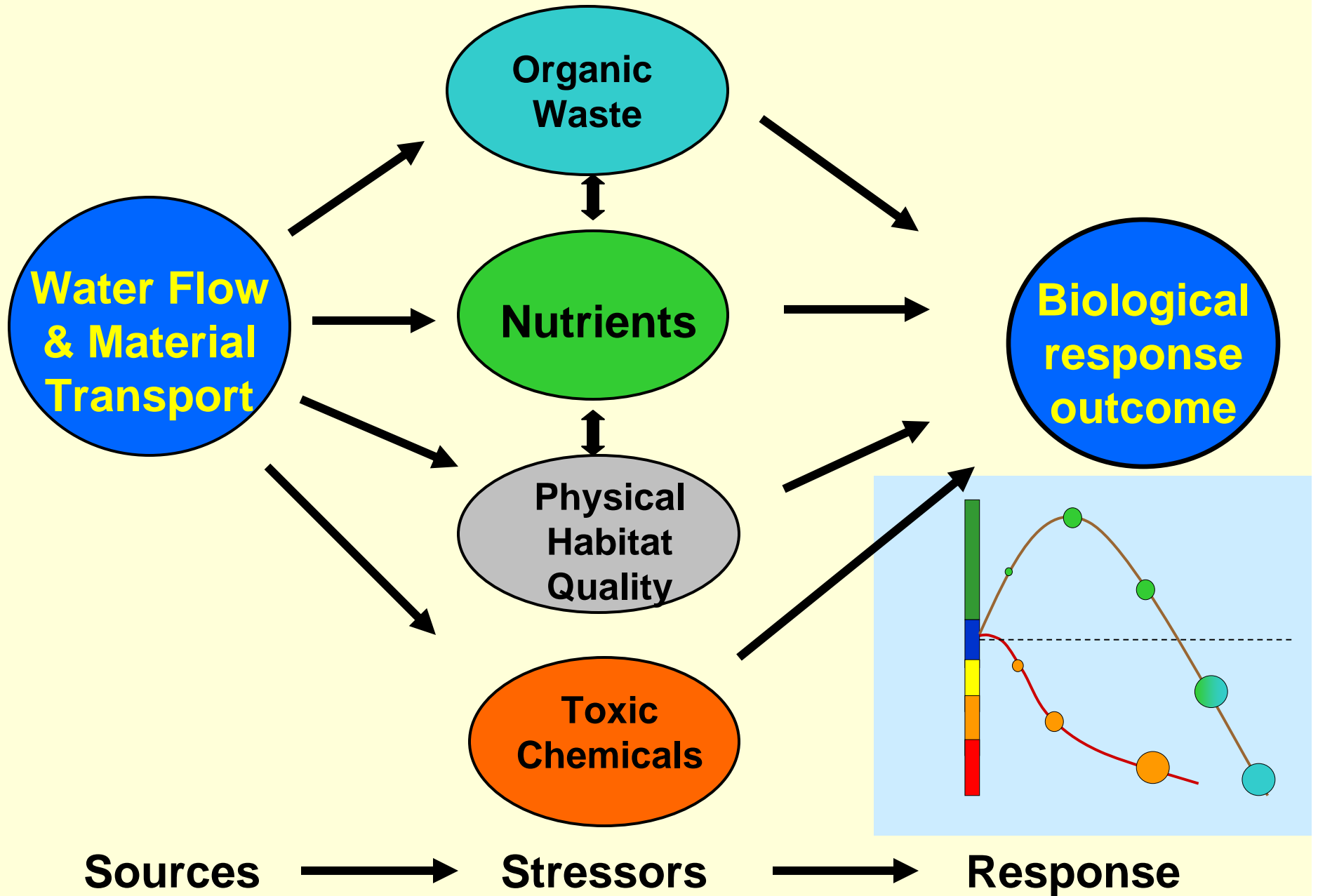
Response Indicators

- Secchi disk depth
- Water column chlorophyll *a*
- % substrate covered by algae
- Patches of bacteria and fungi
- Dissolved oxygen concentration (WQS)
- pH (WQS)
- Aquatic life (WQS- numeric biocriteria)

Proposed EPA's Response Framework

	Concentration of TP is BELOW criterion	Concentration of TP is ABOVE criterion
All measured response criteria are met	A. Not Impaired	B. Not Impaired <i>downstream effects?</i>
One or more response criteria are NOT met	C. Impaired with Indeterminate Cause	D. Impaired

Characterizing the Nutrient Stressor Axis



Maine Restoration Approaches

1. Restoration Plan only – **(No TMDL)**
 - Long Creek Restoration Project (**biocriteria** impairment; RDA stormwater mgmnt)
 - Penobscot River **TP**-model for permitting
2. Statewide TMDL Approach (“**The Middle Way**”)
 - Statewide Bacteria TMDL
 - Statewide % Imperv Cover TMDL (**biocriteria** or DO)
 - Statewide AVGWLF model for ag impair streams (future)
3. Individual Waterbody TMDLs (**Traditional**)
 - Lake W/S **TP** TMDLs (Listing cause ↑ trophic state)
 - Stream W/S TMDLs (**biocriteria** impairment from Ag & Urban sources; %IC approach & AVGWLF model)
 - Both usually include W/S Mgmt or Restoration Plans
 - River **TP** TMDLs for NPDES permits