Nutrient Management Categories

Revisions and Discussion
Why different categories?

Scientific Rationale

- Less known about “natural” conditions among valley sites and Great Salt Lake
  - Interpretation of indicators potentially differs
  - Greater uncertainty for numeric indicators

- Unalterable conditions modify nutrient responses
  - Need site-specific endpoints among sites with extensive habitat modification
Why different categories?

**Socioeconomic Rationale**

- Significant economic costs should require greater scientific certainty
  - *Limited resources, so efficiency is important*

- Different sources of nutrients require different management solutions

- Headwaters warrant greater protection

- Iterative progress!
Numeric Standards and Indicators: Purpose

- Optimize monitoring resources
  - *Tiered Monitoring*

- Identify sites with nutrient-related problems
  - *Assessment*

- Establish Clear and Objective Endpoints
  - *Water Quality Based Effluent Limits (WQBELs)*
  - *TMDL goals and objectives*
  - *More efficient resource management*
Tiered Monitoring

**Start With**
- less resource-intensive data
- From many places

**Then**
- Follow-up with more difficult or expensive monitoring efforts

**Before**
- Making more expensive and costly management decisions

**Which leads to**
- Better Science
- More defensible management decisions
Tiered Monitoring: Different Immediate Goals

**Headwaters**
- Maintain high water quality
- Easily and inexpensively identify sites with nutrient-related problems

**Intermediate Waters**
- Maximize limited resources
- Account for site-specific modifications to nutrient responses

**Habitat-Limited Waters**
- Identify best attainable conditions
- Develop site-specific interpretations of indicators

**TMDL Waters**
- Accurately quantify sources and loads

**Great Salt Lake**
- Basic research
Tiered Monitoring

What have we accomplished?
- Developed new and innovative approaches
  - Field SOPs
  - Analytical Methods

What remains?
- Logistics
  - What specifically to collect in each tier?
  - How should this vary among nutrient management categories?
- Ongoing Investigations
  - What additional methods should be evaluated?
Assessment: Different Approaches

**Headwaters**
- Focus on water chemistry
- Modify criteria with indicators, if appropriate, via TMDL process

**Intermediate Waters**
- Use both chemistry and ecological responses to make assessment decisions
- Permit limited based on readily achievable technology, unless site-specific standards or TMDLs suggest otherwise

**Habitat-Limited Waters**
- Regional N&P indicators are not applied until confirmed
- List cause as “unknown” until all causes are quantified
- Permit limited based on readily achievable technology, unless site-specific standards or TMDLs suggest otherwise

**TMDL Waters**
- Regional N&P indicators are not applied until confirmed
- Phased implementation schedules, with “Straight to Implementation” approaches
- Establish appropriate ecological goals with site-specific
Prioritization

- Preliminary analyses suggest that many sites will indicate the potential nutrient-related problems.

- Site-specific modifications are both technically challenging and resource intensive.

- Prioritization schemes are needed to ensure continual progress toward solving anthropogenic eutrophication problems.
Adaptive Management

- Central Tenet: Management and Science involves continual learning, therefore uncertainty is inevitable.
- Process allows progress toward solutions despite scientific uncertainty.
Straight to Implementation: Common to all Categories

- **Convene Stakeholders**
  - Establishes *Cooperation* and *Collaboration*

- **Immediately Implement Easiest Nutrient Reductions**
  - *Proactive* and *Adaptive*

- **Establish Ecological Goals**
  - Provides *flexibility* toward solutions

- **Monitor Progress**
  - *Accountability*

- **Address Scientific Uncertainty**
  - Improves technical *defensibility*
  - Ensures *efficient* allocation of resources (the expensive stuff comes later)