Utah's Plan for Addressing Nitrogen and Phosphorous Pollution

Implementation of numeric nutrient criteria will have ramifications across most water quality programs. This document outlines a document that will ultimately describe how Utah envisions the development and implementation of numeric nutrient criteria and other related nutrient reduction programs.

Topics are presented as an outline to facilitate the incorporation of stakeholder comments and concerns into a final document that describes Utah's nutrient reduction strategy.

Modifications and the inclusion of additional detail to this outline are an anticipated outcome from Core Team stakeholder discussions.

Once completed, DWQ anticipates that this document will be among several related products associated with Utah's programs to address Nitrogen and Phosphorous pollution.

Document Organization

The document begins with a table that summarizes major documents and related products that will DWQ is in the process of developing in support of many of the elements of this nutrient reduction proposal (pp 3-4), followed by a table that provides direct linkages to EPA's implementation expectations (p. 5).

The *Introduction* (pp. 6-7) provides a placeholder for a discussion of the evidence that nitrogen and phosphorous pollution is a problem in some of Utah's streams and lakes. As outlined this section would also introduce the major considerations and challenges in developing a comprehensive strategy for addressing nitrogen and phosphorous pollution.

The Toolbox section (pp.7-20) describes proposed approaches for addressing waters with nutriuent-related problems, particularly:

- *Nutrient Management Categories* (pp. 7-9) describes a nutrient management classification scheme (see also Myers proposal pp. 22-27) wherein implementation numeric N&P indicators and biological responses could be phased. This section also provides a table (p. 9) that summarizes how these management would alter DWQ's approach to monitoring, assessment, standards and TMDL implementation.
- *Standards* describes DWQ's approach for the development of numeric indicators, which in some cases would be promoted to site-specific criteria as nutrient-related problems are identified (pp. 10-12). (*Note that specifics will be vetted with the Science Panel and captured in a separate document*)
- *Monitoring and Assessment* (pp. 13-14) provides a proposal for a nutrient-specific monitoring and assessment strategy that would allow DWQ to identify waters that have undergone deleterious effects with regard to nutrients.
- *Adaptive Management* (pp. 14-18) outlines an approach for collaboration among key stakeholders to achieve nutrient reductions in waters where problems have been identified. In particular, this framework provides an opportunity for developing watershed-specific nutrient reduction strategies that could describe iterative approaches to address important sources including NPSs and Stormwater.

Permit Considerations (p. 19) provides specific approaches related to point sources of nutrients. Of particular importance is the use of technology-based limits, variances, and antidegrdation.

Outreach (p. 20) is primarily a placeholder and should be more clearly defined as formal plans are developed, but do see the links to recent EPA outreach documents.

Appended to the outline (pp. 22-27) is a detailed proposal submitted by Leland Myers that outlines potential approaches, particularly with regard to implementation of technology-based PS limits and a proposal for funding any required NPS reductions.

Anticipated documents and products in support of Utah's nutrient reduction efforts. The list will likely be expanded following discussion with Core Team members. Other elements may also be added if specific implementation elements in the planning document (#1) require more extensive guidance or explanation.

Product or Document	***Notes***	***Status***
1. Utah Nutrient Reduction Program	- *Overview Document, outline follows* - *Demonstrate Need* - *Summarize Research* - *Describe Implementation Approaches* *Audience: EPA, Water Quality Board (WQB), & stakeholder groups potentially affected by these water quality programs* *Purpose: guidance document; summarize and describe how components fit together*	- *In Preparation* - *Est. Draft: Early 2013*
2. Technical Rationale: N, P & Response Thresholds	- *Technical basis behind N&P and ecological response thresholds* - *Classification Approaches (if needed)* - *Analyses of Utah Data: reference site distributions, functional thresholds, structural thresholds, etc.* - *Benchmarking: TMDL thresholds, other states* - ***Need to develop process for integrating multiple lines of evidence (EPA grant)*** *Audience: EPA and Scientists* *Purpose: Peer review of the technical approaches used to develop standards*	- *In Preparation* - *Est. Draft: Autumn 2012*
2. Potential Costs to POTWs	*http://www.waterquality.utah.gov/POTWnutrient/* *Audience: Municipalities, POTW managers* *Purpose: Quantify upgrade costs & Engineering Planning*	- ***Complete*** - *Revisions possible*
3. Potential Economic Benefits	- *Evaluate the potential economic benefits of reducing N&P pollution* *Audience: Decision makers & Municipalities* *Purpose: Quantify upgrade costs & Engineering Planning*	- *In Preparation* - *Est. Draft: September 2012*
4. Net Economic Costs and Benefits	- *Combine and Summarize 3 & 4* *Audience: Politicians and other decision makers* *Purpose: put economic consideration in a broad context*	- *Compiled once individual components are complete* - *Early 2013?* -
5. Site-Specific Economic Evaluation Tool	- *Allows for economic impacts to be evaluated for specific watersheds* - *Can be used to refine treatment expectations based on ability to*	

	pay criteria *Audience: DWQ & Municipalities* *Purpose: refine treatment expectations based on "ability to pay" criteria*	
6. Site-Specific Standard Development Methods	- *Provide recommended approaches for modifying regional indicators to develop site-specific standards* - *Discuss advantages and disadvantages of different approaches* - *Estimates the level of effort required for potential components* *Audience: DWQ & Technical Collaborators* *Purpose: Provide approaches that can be explored to confirm or modify regional indicators on a site-specific basis*	- *Organic document: modified in concert with improved scientific understanding* - *Initial draft developed from Products 2 & 7*
7. Qual2K Implementation	- *Recommends field collection methods* - *Model calibration procedures* - *Describes linkages between numeric criteria and permit limits (waste load procedures)* - *Recommendations for the application of "mechanistic models" for setting site-specific criteria* *Audience: DWQ & Technical Collaborators* *Purpose: Provide Waste Load and Site-specific Standard Procedures (compliment empirical approaches)*	- *Draft Report Complete*
8. Prioritization Process	*- Develop a process for prioritization of addressing sites with nutrient-related water quality programs* *- Consideration of recovery potential procedures: http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/recovery/index.cfm* *Audience: DWQ & Technical Collaborators* *Purpose: Provide objective prioritization process*	- *EPA grant*
9. Miscellaneous Field and Analytical SOPs	*- Particularly needed for newer functional indicators* *Audience: DWQ and Technical Collaborators* *Purpose: QAQC documentation*	- *In Prep.* - *Ongoing modifications required*
10. Changes to Utah Administrative Code	*- Will need to be determined as other products are developed* *- Include numeric indicators and* *Audience: Water Quality Board* *Purpose: Provides regulatory certainty where needed*	- *TBD* - *Spring 2013*
11. Miscellaneous Outreach Materials	- *Needs to be developed* *Audience: DWQ & Technical Collaborators* *Purpose: Provide objective prioritization process*	- *Ongoing*

Relationship to EPA guidance and Requirements

Topics in relation to EPA's *Elements of a State Framework for Managing Nitrogen and Phosphorous Pollution* (2011 Memorandum from N. Stoner)

Framework Element	Outline Header and Location
1. Prioritize watersheds	Prioritization of Impaired Sites (pp. 14)
2. Set watershed load reduction goals	Develop Watershed Scale Nutrient Reduction Strategies (pp. 14-18)
3. Effectiveness of point source permits	Iterative, Technology-Based Point Source Limits & Permit Considerations (p. 19)
4. Opportunities in agricultural areas	Evaluation and Prioritization of Potential NPS Projects (p. 16)
5. Stormwater & septic	Stormwater Program Evaluation (p. 16)
6. Accountability and verification	Watershed Nutrient Reduction Programs (pp. 14-18)
7. Reporting of implementation and impacts	Accountability (pp. 10-11)
8. Develop work plan for numeric criteria development	Standards (pp. 10-12) and Site-specific Modifications (p. 18)

Introduction

What is the concern?

Excess nutrients Degrade Aquatic Life, Recreation and Drinking Water Uses

- Scope of the problem nationally and in Utah
- DWQ has already identified numerous watershed with nutrient-related water quality problems *(see attached maps)*

Regulatory and Legal Background

- EPA requirement for numeric criteria and surrounding lawsuits

Challenges with Addressing Nitrogen and Phosphorous Pollution

Socioeconomic Considerations

- Addressing nutrient-related problems is expensive, but so is doing nothing
- Completed and ongoing economic studies
    - Cost of reductions for POTWs (Status: complete see http://www.waterquality.utah.gov/POTWnutrient/)
    - Economic benefits of nutrient reductions (Status: ongoing completion expected in Autumn of 2012)
- Many stakeholders have a direct interest in the problem and can potentially be affected by proposed solutions

Addressing the Problem: Ecological Considerations

- Ecological responses to excess nutrients differ from place-to-place
    - Example of desert vs. mountain stream
        - Physical modifying factors: hydrology and temperature
        - Biological modifying factors: algae vs. plants
- Ecological responses are modified by both natural and human-caused site-specific conditions
    - Example: Channel shading and hydrological modification
- Importance of Both N&P
    - Cite published research
    - Utah investigation results

Addressing the Problem: Engineering Considerations

- Describe limits of technology
- Upgrades of existing plants are limited in the amount of N&P reductions possible
- Lagoons: less flexibility; but discharges are small and are typically during winter or spring when nutrient inputs may be less of a concern

Addressing the Problem: Non-Point Source Considerations

- Focus should be site-specific
    - Efforts should be limited to specific areas where evidence of problems exist

- At least initially, efforts should work through ongoing voluntary programs through DWQ (i.e., 319, NPS) and our collaborators (i.e., NRCS)
- Funding of any required BMPs (see Myers, p. 25)
    - WI model (pay for 90% of required costs)
    - Base cost-share on ability to pay?

Addressing the Problem: Outreach and Communication

- Existing Core Team and Technical Teams
- Plans for ongoing discussion to continue as the plan is implemented
- Plan to develop a strategy for unveiling the overall nutrient reduction plan to the legislature and other political bodies

The Toolbox: Comprehensive and Adaptable Solutions

- Call outs with **main tenets**:
    - A nutrient reduction program should be:
        - **Defensible**: grounded in the best-possible science and consistent with rules and regulations
        - **Effective**: at solving nutrient-related water quality problems
        - **Flexible**: account for unique site-specific ecological or economic considerations
        - **Reasonable**: efficient allocation of resources to where they are most needed
        - **Adaptive**: to allow progress despite ongoing uncertainty
        - **Collaborative**: developed and implemented in consultation with affected stakeholders
- Relationship to EPA's Nutrient Reduction Framework (Stoner memo, 2011)

Different Strategies in Different Places: Nutrient Management Categories

- Process for addressing nutrient-related problems is ultimately the same everywhere: TMDLs with load allocations to meet numeric criteria; however, the specific processes should depend on site-specific ecological and economic considerations
- ***A Summary Table (p. 9) provides details with regard to how implementation might differ among these nutrient reduction classes.***

Nutrient Management Categories

- DWQ proposes a minor modification of the approach advocated by Myers (pp. 22-27)

Headwaters

- Consists of waters that water currently protected for domestic (drinking water, 1C) waters or waters classified as antidegradation (category 1) waters
- Most important water resources for many reasons
- Reference sites are easier to identify and more numerous, so regional numeric criteria are intrinsically more defensible
    - Better understanding of natural variation
    - Best attainable condition is almost always equivalent to unmodified conditions

- Socioeconomic impacts of TMDLs resulting from nutrient-related impairments are typically minimal

Habitat-Limited and Existing TMDL Waters

- Waters that currently have nutrient-related TMDLs completed or in progress (see attached map)
- Other waters could be added to this category based on a demonstration that any of the following conditions outlined in 40 CFR 131.10(g) are met:
    - Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met
    - Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place
    - Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use
    - Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses

Great Salt Lake

- Nutrient requirements and nutrient fluxes among bays is poorly understood
    - Nutrient reductions in Gilbert Bay could actually harm brine shrimp, which are a keystone species within Gilbert Bay and an important economic resource
- Unique ecology and biogeochemistry
    - Currently no defensible response indicators
- Currently a separate designated use category (Category 5), so separate criteria will ultimately be needed

Intermediate Waters

- Default classification (i.e., waters that do not fall within other classes)
- Petition to DWQ could be made to move waters from this classification to the habitat-limited category

Nutrient Mngmt. Category	Headwaters	Intermediate Waters	Habitat-Limited Waters & Existing TMDLs	Great Salt Lake
Classification Description	- Class 1C (Drinking Water) Antidegradation Tier 1	- Default Classification - All waters not specifically in other nutrient management Categories	- Waters with existing or pending nutrient-related TMDLs - *(g) factor* waters	Great Salt Lake and saline surrounding wetlands
Standards	Numeric Criteria :N & P	- Numeric Indicators : N & P - Ecological Response Indicators	Ecological Response Indicators	Narrative Criteria
Monitoring & Assessment	- Routine water quality collections - >10% exceedance = impairment	Identify nutrient-related problems with both criteria and responses	- Quantify loads - Determine Best Attainable Conditions (i.e., UAA)	- Research nutrients demands for *all bays* - Quantify internal and external loading
Immediate Actions (1-5 years)	TMDL with mandated load allocations	For waters with nutrient related problems: - Cap current PS loads - Fill data gaps	- Tech-based standards for mechanical plants (all waters) - Follow objective prioritization scheme	Identify nutrient requirements to maximize the overall beneficial uses of all bays
Mid-Term Actions (3-10 years)	Monitor implementation progress	- Create watershed-based nutrient management plans - Demonstrate progress - Site-specific standards for N &P	Develop site-specific standards &/or indicators to meet best attainable conditions	Develop site-specific standards
Long-term Actions (if necessary)	Delist or revisit TMDL allocations and goals	TMDL with mandated load allocations	Watershed-based reductions, then TMDL (if necessary).	TMDL with mandated load allocations

Standards: Numeric N&P Indicators/Standards and Bioconfirmation

- Numeric criteria for N&P will ultimately be established for all of Utah's waters, but these will be established in phases depending on the nutrient management category of the waterbody.

Introduction

- Numeric indicators vs. numeric criteria vs. narrative criteria
  - Numeric Criteria
    - CWA requirement: backbone of regulatory programs
    - Provides regulatory certainty
    - Simplifies implementation of WQ programs
      - Timely response to regulated community
      - Minimizes staff time for permitting actions
    - However: less flexibility & difficult to change
  - Numeric Indicators
    - Could be chemical (i.e,, N, P) or ecological responses (i.e., functional indicators)
    - identify sites with Nutrient-related problems
    - resource prioritization
  - Narrative Criteria
    - Narrative statements of undesirable (deleterious) water quality conditions that are not permitted
    - Need to develop nutrient-specific language once ecological responses indicators have been developed
    - Incorporate into new narratives into Utah's Water Quality Standards
- Indicators and Criteria can be Chemical concentrations or empirical measures of ecological responses

The Importance of Regional Indicators

- DWQ must address all of Utah's waters
- It is not possible to address nutrient-related problems on a site-specific basis
- Water bodies respond to excess nutrients differently

Establishing Appropriate Regions

- Could be state-wide or smaller regions
- Key, in a standards setting context, is minimizing natural variation
  - Increases confidence in indicators
  - Minimizes assessment errors
- May need to be different for different indicators
- Additional regions could be established that determine how chemical and ecological indicators can be applied

Developing Indicators: Multiple Lines of Evidence

- WQ indicators can be chemical or measures of ecological responses
    - DWQ believes that for non-toxics such as nutrients that some level of bioconfirmation is needed
        - Brief discussion to justify the departure from traditional "Independent Applicability" concepts
- Introduction of regulatory requirements
    - Criteria must be fully-protective of uses
    - Mention the "g factors" of existing use exceptions (possible call out)
- Need to develop an approach to incorporate both into standards and associated implementation methods in a way that is approvable by EPA
- All regional numeric and response indicators will ultimately be subjected to peer review and public comment
    - Note: Need to discuss with the Core Team how this should be approached.

Chemical (N&P) Indicators (sometimes numeric criteria)

- Traditional approach for water quality regulation
- Easier to deal with programmatically (e.g., TMDL endpoints, permit limits)
- How are they developed for non-toxics?
    - Chemical indicators were developed by identifying thresholds of TN and TP where, above that value, there was
        - Loss of sensitive species (structural, TITAN analyses)
        - Likely biologic impairment (structural, O/E ratio)
        - Likely to exceed min DO standards (functional, stream metabolism)
        - Algal growth likely not limited by nutrients (functional, nutrient limitation)
    - Summarize SAB discussion
    - Summarize EPA's stressor response document
- Status: defensible numeric N&P indicators anticipated autumn 2012; although they may not be applicable for all waters in Utah

Ecological Reponses: Structural Indicators

- Empirical measures of alteration to stream biota: bugs, algae and fish
- Can be used to modify regional criteria on a site-specific basis
- Indicators linked to nutrient responses(threshold responses:
    - Macroinvertebrate O/E ratios (not nutrient specific)
    - Fish IBI (not nutrient specific)
    - Macroinvertebrate TITAN analyses (TN and TP specific)
    - Diatom TITAN analyses (TP specific)
    - Lakes – TSI values (includes chl a, secchi depth and TP)
- Status: Mostly complete, final report autumn 2012

Ecological Responses: Functional Indicators

- Empirical measure of changes to stream processes
- Include figure with nuts-to-use linkages: highlight those that we would measure (Erica suggestion)
- DWQ has developed SOPs and piloted the use of the following indicators:
    - Whole stream metabolism
    - Nutrient Limitation (benthic primary production and BOD)
    - Characterization of organic matter standing stock
    - Leaf pack decomposition
- Status: Complete in Fall 2012

The Importance of Site-Specific Criteria

- Regional indicators may be over- or under-protective
    - A process that provides a framework for the development and adoption of site-specific modifications to regional N&P indicators and criteria is integral to Utah's strategy
- Site-specific indicators allow:
    - considerations of important modifying factors that are impossible to account for regionally
    - for the regional indicators to be confirmed or modified based on more rigorous analyses (i.e., mechanistic models, nutrient spiraling) that are not possible to conduct at a regional scale
    - Adjustments to account for atypical background conditions
    - Consideration of the appropriates use and best attainable conditions

Phased Implementation of Indicators (see summary table p. 9)

Monitoring and Assessment

- One important use of regional indicators is the ability to conduct statewide monitoring to identify sites where excessive, human-caused nutrient additional have caused deleterious responses to existing, beneficial uses
- These approaches are designed to integrate within DWQ's comprehensive monitoring strategy

Maximizing Limited Resources: Tiered Monitoring

- Tie to existing monitoring approach (see Utah Strategic Monitoring Plan):
    - start with easier and less expensive monitoring then follow-up with more time-consuming approaches if potential nutrient-related problems are identified
- Tier 1, screening-level assessment: use "single sample" screening values for N, P and responses to ID sites with potential nutrient problems
    - Value(s) could be lower WQ indicators(from Multiple Lines of Evidence approaches) to be conservative because the consequence of Type II errors (false positive) assessments is minimal
    - Schedule follow-up monitoring within 5-years
        - Typically would be two years later if identified from Tier 1 (probabilistic) monitoring
- Tier-2, 303(d) Monitoring
    - 10-sample minimum for chemical data
    - Collect biological and feasible functional indicators
    - Not all measures are required but these should include measure of both chemical composition and biological response
- Tier 3, Programmatic Monitoring
    - Follows impairment designation
    - Goals: identify nutrient reduction options, modify N&P numeric endpoints,
        - Quantify background concentrations
        - Quantify all nutrient sources and identify reduction options
        - Detailed habitat assessments
        - Evaluate whether site-specific modifications to nutrient endpoints are necessary
        - Fill indicator data gaps

Developing Nutrient-Specific Monitoring Approaches

- Identifying deleterious nutrient responses requires both routine and nutrient-specific monitoring
- Summarize DWQ work and reference existing SOPs for:
    - Functional indicators (see above)
    - Biological indicators (nutrient-specific)
    - Mechanistic modeling sampling and analysis plan

Assessment: Identifying Water Bodies with Nutrient-Related Problems

- Develop weight of evidence approach for considering both nutrients and responses before making impairment decisions

- Create a single index (*sensu* Ohio) **OR**
- Decision rules to interpret multiple lines of evidence, i.e., hypothetic example
    - If high N or P, but generally no nutrient-responses then do not list
        - Develop higher site-specific numeric criteria
    - If high N and/or P and many deleterious nutrient-related responses then list as nutrient-related impairment
    - If high N and/or P and mix of positive, neutral and negative responses, then
        - List as impaired, cause unknown if biological assessments indicate impairment
            - Collect additional data to estimate the relative influence of nutrients versus other sources in subsequent assessments
        - List as "insufficient data and information" (3A) and collect additional data to resolve
- Report impaired and degraded sites in Utah's Integrated Report

Prioritization of Impaired Sites

- Need to identify watersheds where remediation efforts and resources will be focused.
    - An associated timeline with key benchmarks should be created
    - Includes Adaptive Management reduction framework (below)
- Develop a state-wide Recovery Potential Framework (http://water.epa.gov/lawsregs/lawsguidance/cwa/tmdl/recovery/index.cfm):
    - Use existing watershed delineations and GIS characteristics for ecological and stressor scores
    - Develop approaches for measuring social scores
- Other considerations:
    - Downstream (far field) impacts
    - NPS funding rotation
    - Complexity of the problem (i.e., confidence that impairment is appropriate)
- Watersheds with existing and ongoing nutrient-related TMDLs would be addressed via pre-established processes (e.g., East Canyon, Jordan River)

Adaptive Management: Development Watershed-Specific Nutrient Action Plans

Introduction

- Adaptive management is a process that involves iterative decision making in the face of uncertainty
- Provides more flexibility that traditional TMDLs
    - Endpoints based on ecological responses vs. specific loads
- Action oriented: focus on feasible and immediate nutrient reductions while developing a longer-term approach
    - Don't let uncertainty of the lack of endpoints cause inaction

- Provides Specific Goals
    - Plans would be developed that provide specific, iterative goals
    - Focus could be different depending on the specific sources in a watershed
        - For instance the relative focus of PS vs. NPS. Reduction elements could differ depending on the extent of urbanization
        - Integrates well with existing NPS and stormwater programs
- Accountable: Requires demonstration of ongoing improvements
- Adaptive to allow the plan to be modified as more is understood about causal linkages between nutrients and deleterious responses to uses within the waterbody
- Collaborative
    - Provides a mechanism to work with key stakeholders for both planning and implementation
    - All of the people who are part of the problem would work collaboratively toward solutions
- Initial focus would be on watersheds where nutrient-related problems have been identified

Planning: Develop Watershed-Scale Nutrient Reduction Strategies

- Develop a comprehensive and site-specific nutrient reduction water quality strategy for sites were nutrient-related problems have been identified through numeric indicators and/or biological responses
- Allows for site-specific considerations and a tailored approach aimed at the specific reduction strategies that improve conditions and/or refine indicators
    - Hinges on iterative implementation, starting with easier, lower cost projects on continuing with higher cost alternatives as they are justified by evidence that additional improvements are needed ***or*** by a better understanding of the problems (i.e., confidence in numeric indicators)
- Focus on iterative implementation of nutrient reductions that are immediately feasible, while simultaneously filling data gaps
- Plans would continue to be refined as they are implemented
- Phased implementation would continue until either:
    - Response measures, functional and structural, indicate support of existing uses
        - May initiate promulgation of site-specific numeric criteria to set appropriately protective concentrations
        - Fact that endpoints are response not pre-defined nutrient concentrations is important and allows for more comprehensive restoration efforts
    - **OR**, continued improvement cannot be demonstrated
        - Would initiate a formal TMDL and associated load allocations

How would these plans be developed?

1. Convene Steering Committee
    - Interested Stakeholders (i.e., watershed groups, municipal planning agencies)
    - UPDES permit holders
    - Land Owners

    - Technical Experts
2. Evaluate available resources and potential sources of new resources
3. Identify and prioritize phased nutrient reduction projects
    - Revisited on a regular basis
    - Include a monitoring strategy to document effectiveness
4. Identify important data gaps
5. Develop a schedule for progress reports
6. Identify important elements to include in the long-term strategy (see below)

What would be included in watershed nutrient reduction programs?

- Depends on the specific circumstances, the strategy could include any of the elements in this section
- Plans for revisions as the over program progresses

Evaluation and Prioritization of Potential NPS Projects

- Make a required element of all nutrient reduction strategies?
- Could include habitat restoration or other projects that aim to minimize nutrient-related deleterious effects via proximate pathways (i.e., reduce algae growth by increasing channel shading)

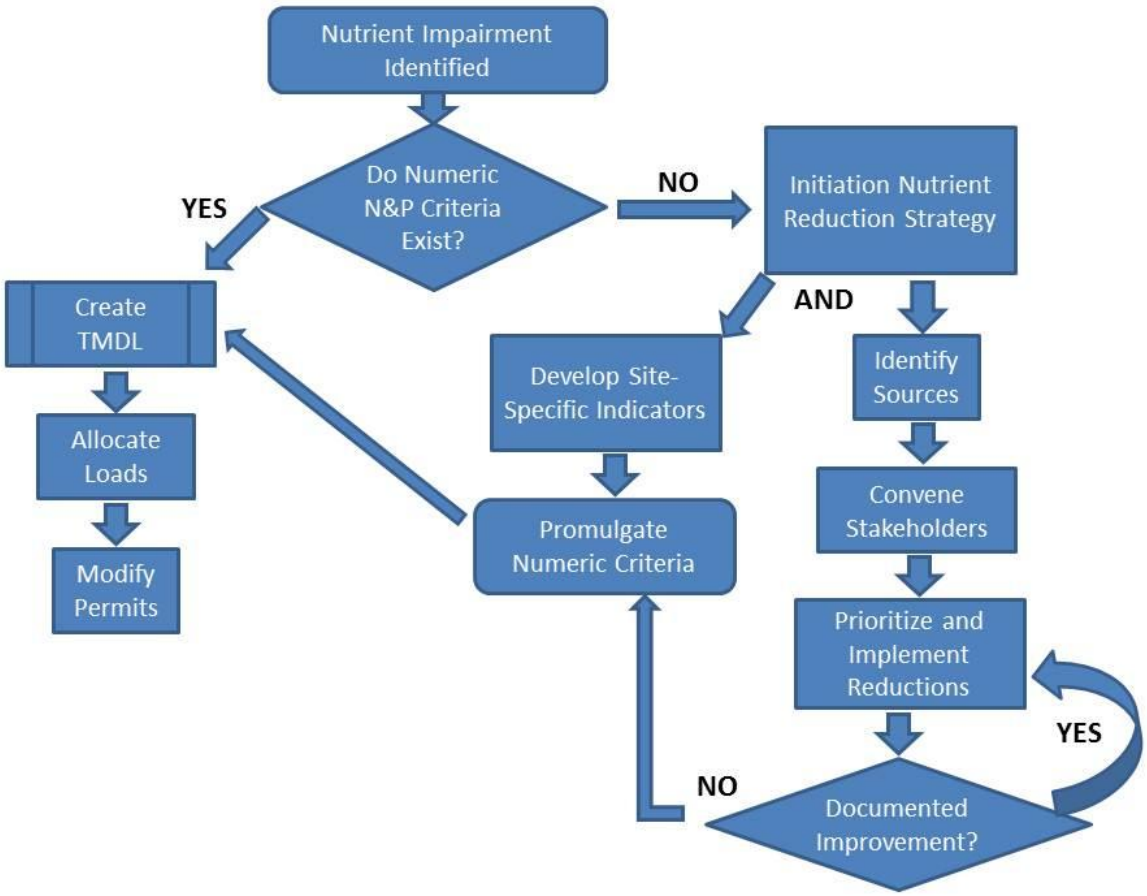
Stormwater Program Evaluation (also see Myers' comments in attached proposal)

Work with the stormwater program stakeholders to develop a plan that describes how stormwater programs should be modified in watersheds where nutrient-related programs have been indentified:

- When should existing stormwater programs be modified?
- How should programs be "ramped up" when existing programs are not working?
- How to demonstrate progress and success?

Iterative, Technology-Based Point Source Limits (also see Permit Considerations below)

- Couple with a variance so that assurances are in place that additional reductions would not be required until pre-defined dates?
- Could potentially identify expectations regarding what constitutes a good faith effort depending upon the current configuration, ability to pay, etc.



This proposed process above describes actions that would be taken following identification of a nutrient-related impairment for Intermediate Class waters. In the case of situations where numeric criteria already exist, the impairment would be addressed via traditional TMDL processes. If numeric criteria have not been promulgated, then DWQ proposes following an adaptive and collaborative, nutrient reduction process. The adaptive process encourages immediately implementing the most feasible reductions during ongoing site-specific ongoing investigations. This process could conceivably continue until the ecological indicators indicate that uses have fully recovered. Once numeric criteria have been promulgated then the traditional TMDL process could be followed if additional load allocations are needed to meet numeric targets.

Potential Impacts to Downstream Uses

- Based on evidence that downstream reservoirs have deleterious nutrient-related problems
- Evaluate the relative magnitude of all sources and allocate reductions via TMDL program

Accountability

Monitoring and Reporting Plan

- Data required to define site-specific endpoints
- Data to document iterative water quality improvements
- Define a regular schedule for progress reports
- Specific goals for each of the

Memoranda of Understanding

- Identify roles and responsibilities of key parties to maximize the likelihood of implementation success

Refine Endpoints and Indicators

- Process would proceed parallel to the development and implementation of nutrient reduction plans
- Results could be used to "adapt" plans to new circumstances

Develop Site-Specific Numeric Criteria

- A plan for developing site-specific numeric criteria is required if regional N & P indicators are not promulgated
- DWQ will provide a document that describes data and analytical requirements for site-specific standards
- Identify potentially important site-specific condition that are potentially modifying nutrient-related responses
- Develop mechanistic models to identify appropriate endpoints to support DO and other related parameters
- Identify other studies, depending on specific circumstances, that could be used to determine appropriate numeric criteria:
    - e.g., Experimental nutrient additions upstream of the site, evaluate internal nutrient process, reach-scale assimilative capacity
    - Evaluation of whether seasonal criteria would be sufficiently protective of near field or downstream uses

Develop Site-Specific Response Indicators

- What are appropriate water quality goals?
- Are there irreversible conditions that would preclude attainment of regional response indicators?
- Are the designated uses existing uses? Is a Use Attainability Analysis (UAA) needed to modify the uses?

Permit Considerations

(Does this fit better elsewhere in the document?)

Addressing Criteria that are too Low for Existing Facilities to Reasonably Meet

- Central Issue: in many cases, fully protective numeric criteria will not be possible or feasible to meet, especially if there is not assimilative capacity
- Reasonable implementation procedures are needed

Scaling Expectations

- Expectations of what is required
- Not necessarily "one size fits all"
- Lagoons vs. mechanical plants? Different for major vs. minor mechanical plants?
- What about the sensitivity of the receiving water? Severity of the problem?

Technology-Based Nutrient Reductions (see Myers proposal pp.22-27)

- More immediate for P, slightly longer for N unless it can be demonstrated that N reductions are unneccesary
- Develop minimum statewide expectations for all mechanical plants or just larger plants?
- Consider immediate, possibly more restrictive, limits for new facilities (see Antidegradation below)
- Couple with variance policy for sites with numeric N&P criteria in place

Variance Policy

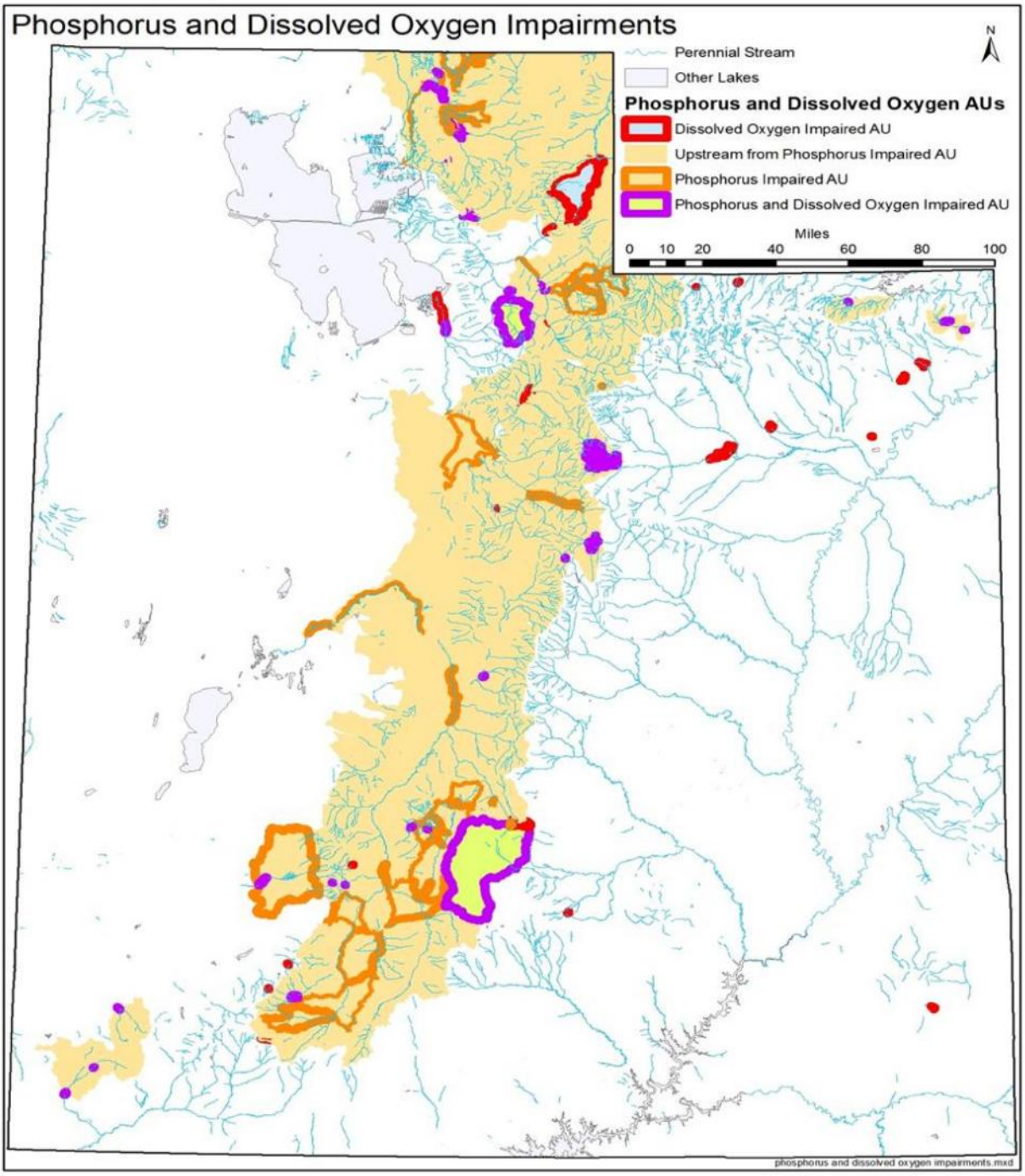
- Allow longer periods of time if good-faith technology-based limits are met and numeric criteria are in place? How long?
- Needs to scale with ability to pay
- Appropriate time period between iterative evaluations
- Status: A stakeholder group is developing language for a variance policy for Utah's standards

Antidegradation

- Different expectations for new facilities or facilities undergoing major upgrades
- Construction is the best time to minimize inputs
- Level II reviews are required for new permits or major expansions
    - Require lowest feasible pollution inputs
    - Include nutrients as major pollutants of concern
- Ideally we would establish predefined expectations based on:
    - Type of facility
        - i.e., Industry vs. POTW
    - Size of facility
    - Modifications to general specification would need to be considered for upgrades to existing facilities

Outreach

- Specific approach for involving legislature and locally elected officials is necessary
- Need to build the case in language that the public can understand
    - See recent EPA materials: http://water.epa.gov/polwaste/nutrientoutreach.cfm
- Incorporate economic benefit information



This map depicts watersheds where nutrient related problems have already been identified. Shaded areas encompass watershed areas that would ultimately be evaluated in the TMDL process.

Core Nutrient Team Proposal – Myers

Introduction:

This document refines previous proposals submitted by Leland Myers to the Core Nutrient Team. My intent with this proposal is to identify a strategy which can be implemented quickly, maximizes benefit while limiting impacts and resistance from multiple stakeholders, and move the process forward toward a Utah solution. In addition, it is similar to directions being taken in other states. While EPA may not see this as an ideal solution, until they make the decision to usurp State authority, I see this as a means of making progress on a complex problem.

Numeric Criteria/Indicators:

The Utah DWQ should continue making progress toward a Utah based numeric criteria/indicator value for nitrogen and phosphorus. Once values have been determined they should be subjected to rigorous technical review and public scrutiny. Ultimately these will probably be similar to numbers from other states and if they deviate, there should be substantial verification that they are appropriate.

Implementation of Criteria/Indicators:

The state should be divided into three regions for implementation of numeric criteria/indicators. The map below may be referred for this discussion. This map is from the prior discussion on categories of water and was handed out to the core team showing the Category 1 and 2 waters. In addition, an area around the Wasatch front has been highlighted and will be discussed in the following paragraphs.

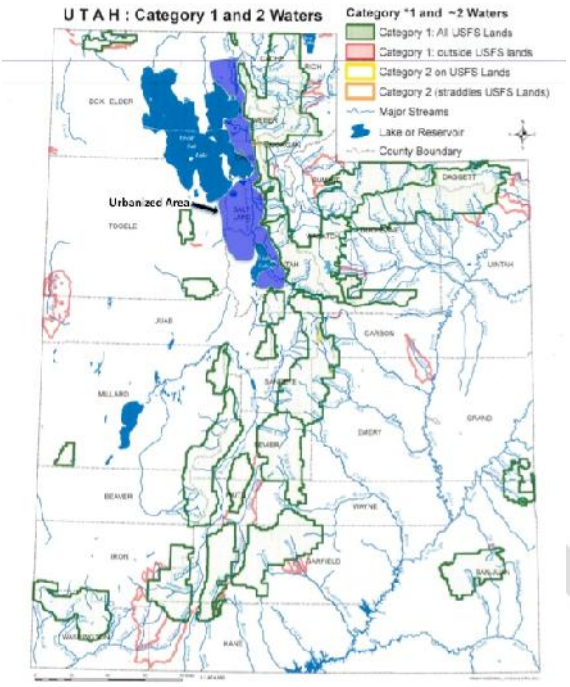


Figure 1 – Nutrient Categories

Region 1 – Drinking Water Supply Anti-degradation Category 1 Waters

This Region is critical to drinking water quality and is currently the highest quality water in the State. This region should be offered the highest level of protection. Once state-wide nutrient criteria/indicator values are determined, the appropriate values should be added as criteria to water bodies that are located in this Region. Water bodies that are tested which exceed the state wide criteria should be listed on the 303(d) list and TMDL's performed. The outcome of the TMDL process could be load reductions or the setting of site specific criteria. This first step begins the process and demonstrates the willingness of the State to move forward with criteria, when appropriate.

Region 2 – Highly Urbanized Areas (Wasatch Front)

This area shown in blue on the map is the area of the State that has the greatest degree of complexity and anthropogenic impact. No state-wide criteria or indicators will be applied to this area at the present time. It is understood that water bodies in this area may have significant degradation as compared to pre-settlement conditions, including significant habitat problems, and that "human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use." [40 CFR 131.10(g)] This does not mean that we would cease working on these ecosystems, quite the contrary. Both Utah Lake and Jordan River have active TMDL's. At present, these TMDL's do not indicate nutrient reduction as a means of improving water quality. Yet, Jordan River is actively being evaluated to determine how to best reduce organic matter and Utah Lake has an active carp removal program; both activities aimed at water quality improvements. The State has begun the implementation of a Great Salt Lake Water Quality Strategy. Numerous studies are being conducted by multiple organizations relating to water quality on Great Salt Lake (i.e. the fifty pond study, Willard Spur studies, continuing impounded and sheetflow wetland studies, etc.) The creation of this region is admission that state-wide nutrient criteria may not be applicable to water bodies in highly urbanized areas. Additional science based characterizations of the problems are needed.

In addition, for watershed area Region 2 it is suggested that a technically based water quality standard is imposed on point source dischargers. This will effectively reduce existing pollutant loads and "dial back" the clock while the ecosystem can be better understood and correct criteria/indicators developed. The suggested criteria would be a 1 mg/L phosphorus standard. For those who can't tolerate phosphorus only technically based standard, an alternative would be 1 mg/L for phosphorus and a 20 mg/L for total nitrogen (TN). An alternative to the 20 mg/L TN could be the imposition of 15 mg/L total inorganic nitrogen (TIN). This approach is similar to Colorado and like Colorado, it is suggested that the requirement be implemented external to the water quality standard,

thus removing the need for EPA approval. Also, all technically based standards should be annual averages for permit compliance.

Region 3 – All of Utah Excluding Regions 1 & 2

This last region contains the remainder of the State of Utah. Areas in this region have little to some anthropogenic impacts. In this region it is suggested that the state-wide criteria/indicators developed by DWQ be included in the water quality standards as indicators. DWQ is required to develop a basin by basin priority system for nutrient reduction. This priority system would be used to direct technical evaluation of individual basins. During the drainage basin review, DWQ staff can develop and use various biological and physical/chemical indicators for the evaluation. The indicators need to be evaluated to insure they are appropriate for that basin, and that other factors such as use attainability do not dictate the need for site specific criteria. Once a basin has been evaluated and the indicators vetted, the applicable criteria for the basin can be established.

In Region 3, a variance procedure should be developed to off ramp point sources if significant or wide spread economic harm to the community is caused by compliance with approved numeric nutrient criteria. This could be done on a case-by-case basis, or as in Montana could be done by statute enacted by the legislature. Other off ramps to a stringent nutrient criteria could be developed as needed. Like in Montana, when a point source is off ramped, they would be required to meet a technically based standard. A starting point for this standard would be 1 mg/L phosphorus and 10 mg/L TIN. Also, like Montana, lagoons could be capped at their current or design waste load for nutrients.

Agricultural Non-Point Source Nutrient Management

A Wisconsin model for dealing with agricultural non-point source pollutants should be adopted to insure farmers are not financially irreparably harmed by nutrient load

reduction. DWQ would be given explicit powers to require the use of best management practices on farms and ranches but the exercise of these powers would be limited to circumstances where grants reimburse 90% of a project's cost through federal or state funding sources. Existing federal funds could be used as well as new state funds being solicited. Generally, vitally important Utah farming and ranching operations would get a pass until we could allocate the funds from identified sources.

In addition to state and local funding sources, DWQ could also implement a nutrient trading program to provide new sources of funding. Where it is cost effective, point sources could elect to provide on-farm reduction in nutrient loading as an alternative to additional treatment. An effective program would have to be established. Nutrient reductions would have to be measurable, achievable, and point sources should not be looked as an endless source of money.

Stormwater System Improvements and Additional Requirements

Stormwater systems would be evaluated whenever a TMDL is developed or implemented or when the basin by basin evaluation occurs for that specific area. The basin or TMDL approach should indicate a pollutant(s) of concern and specific load reductions required. The allocation of such load reduction could be presented to a stormwater utility and specific BMP's identified or required to reduce the load. Most likely this would be a negotiated process with the stormwater utility.

Conclusion:

The procedure outlined in this proposal could form the basis for a unifying path forward on nutrient management. Some folks may believe that the imposition of technology based standards are inappropriate until significant science and policy (read UAA) have demonstrated a need and benefit from the expenditures required by point sources and their rate payers. Others will argue that this approach is an attempt to side step the need for drastic nutrient reduction

from all point and non-point sources. In addition, we should base our actions on the precautionary principal. Both of these arguments have some truth, but the Core Team is tasked with developing a path forward that can be implemented. By providing a logical and cost effective goal for nutrient reduction accomplished through adequate biological and physical habitat studies where necessary, I suggest this proposal is a major step forward and this step can be taken without significant political upheaval. This step will represent significant progress in protecting State waters.