April 25, 2018

To: Dan Segan, Tahoe Regional Planning Agency (TRPA)

From: Tahoe Science Advisory Council (TSAC)

RE: Work Order #007
Guidance on Technical Clean Up of Existing Threshold Standards

The Tahoe Science Advisory Council (TSAC) was tasked (March 2018) with attending a stakeholder meeting organized by TRPA to present the guidance document, answer questions about it, and collect feedback. Based on TSAC member comments and stakeholder feedback, the TSAC was then tasked with revising the document *Guidance Document on the Administrative/Technical Clean Up of Existing Thresholds Standards* (developed under Work Order #003, November 2017).

This document is the deliverable revised Guidance Document for that work order.

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Executive Summary

The TRPA 2017 Assessment of 173 existing threshold standards identified 46 standards as overlapping with other standards in the threshold system (TRPA, 2017). In addition to the 46 previously identified overlapping standards, further sources of overlap may exist that were not specifically noted by the Assessment as redundant. Redundancy in threshold standards has the potential to increase the cost of enforcement and monitoring, to confuse the process of implementing standards, and to add uncertainty around the intent of threshold standards and how they contribute to meeting the overall goals of the regulations. Through examination of the existing threshold standards, the Tahoe Science Advisory Council (TSAC) identified five types of overlap: (1) complete overlap, (2) wholly encompassing standards, (3) competing targets, (4), indirect overlap, and (5) policy and management statements that overlap existing standards. This document provides a description those identified types of overlap, and for each one discusses the sources of each, the relative harm caused by the various types, and potential strategies to avoid or resolve that type of overlap.

Overlap can be caused by imprecisely written standards, unclear numerical targets or baselines, efforts to regulate the same process from different standpoints, or the adoption of more generalized policy statements as standards. In many cases, the overlap is relatively harmless – resulting in duplicative oversight or documentation, with few other problems – but in some instances, overlapping standards have the potential to cause confusion or even conflict during implementation of the regulatory system. The development and application of objective strategies to avoid and eliminate overlap among threshold standards will help TRPA achieve two of its stated goals for the Threshold Update Initiative: (1) [to identify] relevant and scientifically rigorous threshold standards, and (2) [to develop] a cost-efficient, feasible, and informative monitoring and evaluation plan. These strategies can be applied to both the existing threshold standards and proposed standards considered for implementation in the future.

It is important to understand that interconnected processes make the appearance of overlap unavoidable, even when standards are not overlapping. The same management action may be required to meet multiple standards, or a particular process may be regulated for its impact on different aspects of the basin's health. The mere appearance of overlap does not necessarily cause problems if it contributes to a holistic approach that furthers the goals of the Threshold Update Initiative.

This assessment provides a comprehensive catalogue of the characteristics of existing threshold overlap within the set of 46 thresholds previously identified as overlapping. Ultimately, the full set of 173 standards will need to be evaluated similarly to identify and categorize any additional sources of overlap that were not considered in this initial assessment. The typology presented in this assessment can be used to iteratively work through the review and updating process for all threshold standards.

The TSAC provides this typology and these potential strategies to better describe different types of overlap with the aim of improving the clarity, intent, and effectiveness of threshold standards. This document does not make recommendations about adopting, eliminating or revising any specific TRPA threshold standards from a regulatory perspective.

Introduction

The TRPA 2017 Assessment of 173 existing threshold standards identified 46 standards as overlapping with other standards in the threshold system. Additional standards were noted as partially overlapping other standards but were not included in the above tally. Overlap in standards can cause confusion about intent and can increase monitoring costs. Overlap within the standards appears to originate from a number of sources (e.g. multiple benefits of an individual standard, lack of information). A critical evaluation of areas and sources of overlap, and options for addressing overlap and redundancy in the existing standard system is recommended as a useful exercise in the overall threshold update initiative.

The purpose of this evaluation is to develop and enumerate a set of criteria, or typology, that can be applied to categorize the various types of overlap between standards, the potential impacts of those different types, and potential solutions for those types of overlap. The 46 standards previously identified by the TRPA were used as an example set to establish the framework for evaluating overlap. It is expected that the approach represented by this framework will contribute to the TRPA's administrative clean-up of all existing standards, as well as to review of proposed modifications to ensure that any modifications do not introduce unnecessary overlap or confusion.

Background

Following adoption of Public Law 96-551, the TRPA established nine environmental threshold carrying capacities (thresholds) that set environmental standards for the Lake Tahoe basin in 1982. These thresholds were defined at that time given the best available science to protect environmental degradation in nine categories: air quality, water quality, soil conservation, vegetation, fisheries, wildlife, scenic resources, noise, and recreation. The thresholds contain a mix of numerical, management, and policy statements that reflect the varying degrees of quantification used in describing the standard. Whereas numerical standards are quantifiable to avoid exceedances, management standards are non-quantifiable statements that typically target a given level of environmental quality. Policy statements are specific statements committing to a chosen course of action to achieve TRPAs management goals. As more information becomes available, policy statements may become management standards, and management standards may be quantified to become numerical standards.

Environmental thresholds were loosely defined to accommodate direct interactions between atmospheric, landscape, hydrological, and biological processes. The interrelationships among thresholds were tabulated in the 1982 threshold report to outline

the importance relative to other environmental thresholds. The interconnected processes that contribute to threshold impacts must be recognized during evaluations or proposed modifications to individual standards so as to maintain the protections of existing standards that may result in environmental degradation. TRPA Resolution 82-11 directs that threshold standards shall be reviewed to insure that Regional Plan and environmental threshold carrying capacities are consistent.

A threshold evaluation is completed as part of the Agency's adaptive management cycle every four years. The re-evaluation ensures that the regional plan and projects of the Environmental Improvement Program (EIP) partners are sufficient to attain and maintain threshold standards. In the 2015 threshold evaluation, overlap was identified in 46 standards. Threshold overlap is broadly defined as functional equivalence from a regulatory perspective, where the protection conferred by one standard is also conferred by another standard. The functional equivalence is created by the type of overlap, and may result from:

- the same numerical target specified by multiple standards
- standards written such that the achievement of one standard ensures the achievement of another
- standards that call for different numerical targets to be applied to the same constituent,
- standards that regulate the same process differently in different locations, or
- policy statements that are adopted as standards.

Thresholds that overlap with non-numeric (management and policy) goals pose the greatest challenge in this typology and were not directly tabulated in the 2015 threshold evaluation. The objectives of this threshold overlap evaluation are to describe a generalized typology for the different types of overlap, provide examples of how overlap was defined, assess the relative harm that may arise from each type of overlap, and propose potential strategies to reduce or eliminate each type of overlap.

The TSAC provides this typology to better describe different types of overlap and to improve the clarity and intent of threshold standards. The TSAC does not make any recommendations about the TRPA Threshold Standards.

Approach

Following the 2015 Threshold Evaluation Report (TRPA 2016), the TRPA developed a Threshold Assessment Methodology (TAM) as part of its Threshold Update Initiative (TRPA 2017 draft document). The objective of the TAM was stated as (TRPA 2017):

> *Compare each of the existing threshold standards against best practice for the formulation of goals and standards, to highlight the aspects of the current system that are well designed and identify where improvements may be considered.*

As part of that process, TRPA examined the existing standards for redundancy and generated a list of 46 standards that were, in part or in whole, redundant. Those standards

and the specific incidences of overlap identified by the 2017 Standards Assessment were used as the basis for the typology of overlap described here.

Here we describe five different types of overlap that are encountered in the TRPA standards. Any redundancy in threshold standards will result in duplicative effort in oversight, but some types of overlap create further issues. For each identified type of overlap, we present:

1. a description of the overlap itself,
2. an example from the 46 redundant standards previously identified by TRPA
3. a brief assessment of the potential relative harm that may be caused by that type of overlap, and
4. one or more potential solutions to reduce or eliminate the type of overlap.

Typology of Overlapping Standards

1. Complete Overlap

Complete overlap occurs when two different standards regulate the same constituent with the same numerical target. This is the most obviously apparent category of overlap, with a clear link between standards. Atmospheric deposition of dissolved inorganic nitrogen, for example, is controlled by different standards in the littoral and pelagic zones of the lake, although both numeric targets are the same and it is a deposition limit that is intended, wherever it occurs. Because atmospheric deposition is not expected to vary between the pelagic and littoral zones, there is no reason to regulate the process with two separate standards.

Although this type of overlap results in little harm. There is some duplication of oversight and recordkeeping, but it is unlikely to cause conflicts between regulating and regulated parties. However, the potential for harm exists if one of the standards is revised without revising the other; maintaining completely overlapping standards requires the oversight to ensure that no conflict is created between the standards (i.e., that the overlap does not move into another type). Elimination of complete overlap involves eliminating one of the overlapping standards, or combining them into one standard statement.

2. Wholly Encompassing Standards

This occurs when the achievement of one standard (the encompassing standard) would necessarily entail the achievement of another (the encompassed standard). For example, the Deer Disturbance-Free Zone standard prohibits activity that may cause disturbances to deer in areas mapped as “meadows,” but those mapped areas are wholly contained within the defined Stream Environment Zones (SEZ) and are also protected by the existing standard to preserve SEZ function. The SEZ functions that support wildlife and plant communities are intricately linked to – and often the same as – the functions that cycle nutrients and provide the aesthetic quality of SEZ communities. Preventing the degradation of these functions (i.e.,

achieving the Non-Degradation of SEZ function standard) would necessarily achieve the Deer Disturbance-Free Zone standard.

There are two ways to reduce the overlap inherent in wholly encompassing standards. Obviously, the wholly encompassed standard could be eliminated. However, it is frequently the case that the wholly encompassed standard is regulating a different environmental threshold than the encompassing standard – in the example above, the two standards stem from the wildlife and soil conservation thresholds. In these cases, a re-evaluation of the encompassed standard may be appropriate to ensure that it is specifically regulating the appropriate target. If it is important to provide more protection than the encompassing standard does, it may be necessary to increase the level of protection in the encompassed standard.

3. Competing Targets

Competing targets occur when two or more standards address the same constituent in different ways. In addition to obviously different numerical targets (e.g., one standard to maintain NOx emissions at or below the 1981 level; and another standard to reduce NOx produced in the basin consistent with the water quality thresholds), it may also occur due to differences in the baseline (e.g., maintain NOx emissions at or below the 1981 level; reduce dissolved inorganic nitrogen (DIN) loading from all sources by 25 percent of the 1973-81 annual average; reduce DIN from atmospheric sources by 20% of the 1973-81 baseline average) or target (reduce loading of algal nutrients from all sources as required to achieve ambient standards for primary productivity and transparency).

The relative harm caused by this category of overlap is greater than any of the other categories. In addition to difficulties in oversight and recordkeeping, it is likely to cause conflict between regulating and regulated parties.

Competing targets result largely from inadequate specificity in the standards, and can be resolved by amending the competing standards to numerically specify the appropriate target(s). This target may be an annual load, a flux, a concentration, or other metric. The more specific the standard and the more direct and consistent its measurement the better.

To maintain equivalent protection in the case of standards that refer to different baselines, the amended targets should be calculated from the currently specified baselines in both standards. This calculation maintains the rationale for the baseline provided by the original threshold standard while at the same time clarifying the details of implementation. Typically, the more stringent of the competing targets should be cited as the new target.

4. Indirect Overlap

Indirect overlap occurs when one standard regulates an overarching category and additional standards regulate constituents of that category. For example, the Pelagic Nitrogen Loading standard calls for a 25% reduction in dissolved inorganic nitrogen (DIN) from all sources (1973-81 baseline), while further standards call for specified reductions in DIN loading from groundwater sources (30%), from surface runoff (50%), and from atmospheric sources (20%), as well as reductions in algal nutrients as required to achieve the ambient standards for primary productivity and transparency.

Indirect overlap can cause confusion over how to document and/or improve compliance, as well as confusion over when the target is achieved. Indirect overlap is best resolved by amending the standards to more precisely define the regulated constituent (e.g., sampling and analysis methods) and the numerical target (e.g., concentration or annual flux) of the standard.

5. Policy and Management Statements as Standards

A number of policy and management statements have been adopted by TRPA as standards. Often, these standards simply call for other standards to be achieved. For example, there are standards that simply state, "it is the policy of the TRPA Governing Board in the development of the Regional Plan to reduce fumes from diesel engines to the extent possible," and "attain existing water quality standards." While these can sometimes be considered a part of the "wholly encompassing standards" category, they are different enough to merit their own category.

The corrosive influence of policy statements as standards is in the vagueness of those statements. The statements more often describe broad and aspirational goals than they do measurable and achievable standards. The negative impact of policy statements as standards can be resolved by separating the overarching goals from the threshold standards. Management standards reflect the strategies designed to meet those goals, and can be addressed by amending those management-based standards to include both numerical targets and timeframes for the enactment of those policies.

There are two possible ways to resolve the issues that arise from management standards and policy statements without specific targets. First, the standards could be specifically identified as broad statements of a goal provided for guidance or context only, with no enforceability. Second, the ambiguity could be resolved by adding specific details to the standard that reformulate it to something that is quantifiable and measurable, and that can be objectively evaluated. For example, the standard "attain existing water quality standards" could be amended to require a numerical reduction in the incidences of water quality violations over the next five years.

Discussion

Here we discuss the areas of overlap identified above and the options that TRPA has to attempt to resolve various types of overlap and to minimize the impact of that overlap. In considering the effects of overlapping standards and the available options to address those effects, we assume that any revision would have the following priorities:

1. Must maintain equivalent levels of protection.
2. Reduce uncertainty and potential conflict during implementation of the threshold evaluation.
3. Reduce uncertainty and duplication of effort in TRPA's oversight and documentation processes.

In some cases, the identified overlap could be reduced or eliminated by revising the existing standards to better comply with the SMART (specific, measurable, achievable, relevant, and time-based) criteria. The SMART framework is designed to enable objective and informative evaluation of the effectiveness of programs and actions. Goals that are SMART enable the development of evaluation and reporting structures that:

1. Promote accountability for the achievement of objectives through the assessment of outcomes and the effectiveness of activities and policies.
2. Accelerate attainment through improved resource allocation and decision making and promotion of learning and knowledge sharing among partners.

Evaluation of redundant standards with the SMART criteria could help to clarify ambiguities in the reason for the standards, and potential revisions or updates to the standard could ensure that evaluation of the goal will provide decision makers with the information they need to track progress towards attainment. When standards are amended to resolve the types of overlap described in the typology, applying the SMART criteria can contribute significantly to the resolution of overlap. For example, a desired outcome (e.g., the attainment of existing water quality standards) may be defined to be more specific and measurable by focusing on the number of incidences in which the outcome is not achieved (e.g., reduce annual incidences of exceedance of existing water quality standards from year to year). The outcome-based standard then becomes more than a simple restatement of the existing standards, while still serving the goal it was intended to serve.

In addition to the 46 previously identified overlapping standards, some further sources of overlap may exist that were not specifically noted by the Assessment as redundant. Some standards reference one another. For example, the Phytoplankton Primary Productivity standard calls for an annual mean phytoplankton primary productivity at or below 52 $gmC/m^2/yr$ and the annual average Secchi disk transparency standard requires an annual average Secchi depth of 29.7 m. At the same time, the separate pelagic phosphorus loading standard requires a reduction in the loading of dissolved phosphorus as required to achieve the ambient standards for primary productivity and transparency. This type of overlap, which would fall into Type 4 (indirect overlap) defined above, was not consistently highlighted in the Assessment as redundant. Neither the phytoplankton primary productivity standard nor the annual average Secchi disk transparency standard was identified in the Assessment as redundant, although the pelagic phosphorus loading

standards were. Following an examination of the 46 already identified overlapping standards, it may be necessary to perform a wider-ranging assessment of redundancy in the full set of 173 existing standards with this typology as a guide.

In accordance with best practices, TSAC has recommended that TRPA move toward standards based on outcomes rather than activities or intermediate results (TSAC, 2017). The outcomes are frequently the result of a number of interconnected environmental processes, such that attaining an outcome standard (e.g., Secchi depth of 29.7 m) will necessarily depend on controlling the inputs or the intermediate products of those processes. For example, street sweeping and stormwater best management practices (inputs) can help reduce sediment and nutrient loads (intermediate products), which ultimately leads to increased lake clarity (outcome).

There is an ongoing effort to develop conceptual models for processes within the Tahoe basin for which threshold standards exist. Overlapping thresholds could be evaluated within the context of conceptual models to better understand the level of protection, identify weakness, gaps, or confusion in existing standards and guide the review and development of future standards. It is important to recognize that the interconnectedness of processes will make some level of apparent overlap unavoidable if goals are to be achieved. For example, stream restoration activities may contribute to achieving multiple standards (nutrients, suspended sediments, water temperature); stream restoration alone, though, is likely not sufficient to achieve the numerical targets of all of those standards. Multiple standards may in fact be needed to motivate a diversity of projects or types of protections that work together to achieve the goals for the Tahoe Basin.

In other cases, two competing standards may be intended to address different environmental thresholds within the basin. An example of this would be the multiple nitrogen standards identified above as competing targets (type 3). Two different oxides of nitrogen (NOx) standard were enacted to maintain air quality within the Tahoe Basin, while the DIN standard was motivated by lake clarity. In this case, these competing standards are aimed at achieving different outcomes, and the redundancy offers protection from two different sources of pollution.

A third standard, however, calls for the reduction of "[NOx] produced within the basin consistent with the water quality thresholds." This standard is aimed at reducing the impact of atmospheric deposition of nitrogen on water clarity – the same goal as the various water quality standards that call for specific reductions in DIN. The overlap of this third standard does not serve to impart any environmental protection not already offered by the other water quality standards, and is therefore unnecessarily redundant.

Summary of Findings

Overlap in standards can cause confusion about intent and can increase monitoring costs. The overlap typology presented herein provide a path forward in defining and understanding the types and sources of overlap. The resolution strategies presented here, especially in conjunction with the implementation of the SMART criteria, can provide a

path towards reducing the confusion and financial burden associated with monitoring redundant standards.

In addition to developing the typology of overlap, we discussed a number of technical and administrative issues stemming from redundancy, summarized below.

1. There are likely additional overlapping standards not identified during TRPA's initial assessment of overlap.
2. Different types of overlap result in different levels of harm, enabling TRPA to prioritize efforts to resolve overlap.
3. Application of SMART criteria to existing overlapping standards is a powerful tool to resolve overlap.
4. Because of interconnected environmental processes, some level of apparent overlap in standards is unavoidable. This apparent overlap, though, may not rise to the level of functional overlap described here.

The aim of this assessment was to document a comprehensive typology of threshold overlap to contribute to the TRPA's administrative clean-up of all existing standards. This effort provides the fundamental framework for further evaluations that will help guide the TRPA in improving existing standards and ensuring that any future modifications do not introduce unnecessary overlap or confusion.

References

Tahoe Regional Planning Agency (TRPA). 2017. Threshold Initiative Update: Threshold Assessment Methodology, Version 1.7. Stateline, NV.

Tahoe Science Advisory Council (TSAC). 2017. Natural Resource Evaluation Systems: Assessment of Best Practices for the Tahoe Regional Planning Agency. TSAC Technical Report #2017-01. Incline Village, NV.