Threshold Update Initiative

STAKEHOLDERS WORKING GROUP MEETING
SEPTEMBER 16, 2020

TAHOE REGIONAL PLANNING AGENCY

A Voice for Lake Tahoe

Agenda

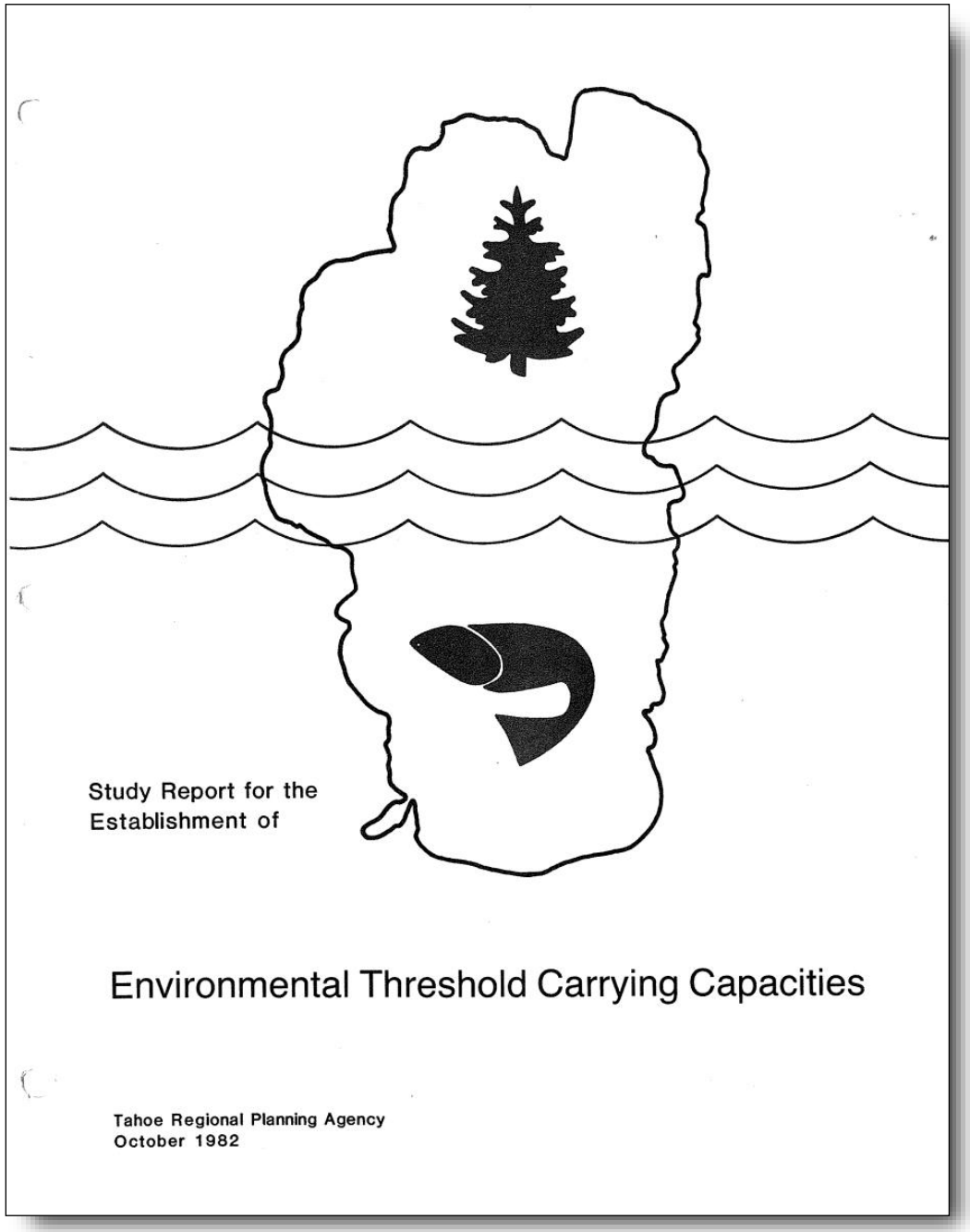
- Background / Context
- Stream Environment Zone: Baseline assessment
- Water Quality System Structure

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Threshold Categories

- Air Quality
- Water Quality
- Fisheries
- Soil Conservation
- Wildlife
- Vegetation
- Scenic Resources
- Recreation
- Noise

150 + standards



Workplan

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Its been a minute

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

1

Administrative: Overlap Assemsent

TRPA and Science Council presentations on overlap

3

Administrative: Structure

TRPA and Science Council presentations on organizing data for adaptive management

5

1) Administrative: Structure

Implementation of the structure.

2) Administrative: Clean-up

Policy Statements

March 2018 | August 2018 | February 2019

2

Administrative: clean-up

Endorsed technical corrections and reorganizations

4

Administrative: Structure

Implementation of the structure.

"Reviewers called for explicit, measurable objectives and a clear chain of logic that explains the rationale for the selected standards, and how the 2015 Threshold Evaluation standards allow TRPA to determine the effectiveness of their programs, and consequent improvement in status"

– 2015 Threshold Evaluation Peer Review Summary

What are we trying to accomplish?

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

WATER QUALITY

Deep Water (Pelagic) Lake Tahoe

NUMERICAL STANDARDS
Reduce fine sediment particles (inorganic particle size < 16 micrometers in diameter), total phosphorus, and total nitrogen in order to achieve the following long-term water quality standards for deep water (pelagic zone) Lake Tahoe:

- The annual average deep water transparency as measured by Secchi disk shall not be decreased below 29.7 meters (97.4 feet), the average levels recorded between 1967 and 1971 by the University of California, Davis.
- Maintain annual mean phytoplankton primary productivity at or below 52gmC/m^2/yr.

POLICY
These numeric threshold standards for Pelagic Lake Tahoe are currently being exceeded and will likely continue to be exceeded until full implementation of the pollutant loading reductions prescribed by the Lake Tahoe Total Maximum Daily Load program and implemented by the State of California and Nevada. The cooperation of the states of California and Nevada will be required to control sources of air pollution which contribute nitrogen loadings to the Lake Tahoe Region.

MANAGEMENT STANDARD
Reduce the loading of dissolved phosphorus, iron, and other algal nutrients from all sources as required to achieve ambient standards for primary productivity and transparency.

Reduce dissolved inorganic nitrogen loads from surface runoff by approximately 50 percent, from groundwater approximately 30 percent, and from atmospheric sources approximately 20 percent of the 1973-81 annual average. This threshold relies on predicted reductions in pollutant loadings from out-of-basin sources as part of the total pollutant loading reduction necessary to attain environmental standards, even though the Agency has no direct control over out-of-basin sources. The cooperation of the states of California and Nevada will be required to control sources of air pollution which contribute nitrogen loadings to the Lake Tahoe Region.

= ?

What are threshold standards?

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

- ARTICLE II. (i) “Environmental threshold carrying capacity” means an environmental standard necessary to maintain a significant scenic, recreational, educational, scientific or natural value of the region or to maintain public health and safety within the region.

- ARTICLE I. (b) In order to enhance the efficiency and governmental effectiveness of the region, it is imperative that there be established a Tahoe Regional Planning Agency with the powers conferred by this compact including the power to establish environmental threshold carrying capacities and to **adopt and enforce a regional plan and implementing ordinances which will achieve and maintain such capacities while** providing opportunities for orderly growth and development consistent with such capacities.

Who implements the Regional Plan?

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Threshold Standard Reorganization

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Threshold Update

NUMERICAL STANDARD
Decrease sediment load as required to attain turbidity values not to exceed three NTU. In addition, turbidity shall not exceed one NTU in shallow waters of the Lake not directly influenced by stream discharges.

Reduce the loading of dissolved inorganic nitrogen, dissolved phosphorus, iron, and other algal nutrients from all sources to meet the 1967-71 mean values for phytoplankton primary productivity and periphyton biomass in the littoral zone.

Nearshore Attached Algae
MANAGEMENT STANDARD
Support actions to reduce the extent and distribution of excessive periphyton (attached) algae in the nearshore (littoral zone) of Lake Tahoe.

LITTORAL LAKE TAHOE

NUMERICAL STANDARDS

WQ3) Attain turbidity values not to exceed three NTU.
WQ4) Turbidity shall not exceed one NTU in shallow waters of the Lake not directly influenced by stream discharges.
WQ5) Attain 1967-71 mean values for phytoplankton primary productivity in the littoral zone.
WQ6) Attain 1967-71 mean values for periphyton biomass in the littoral zone.

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Threshold Update

Stream Environment Zone

STREAM ENVIRONMENT ZONES

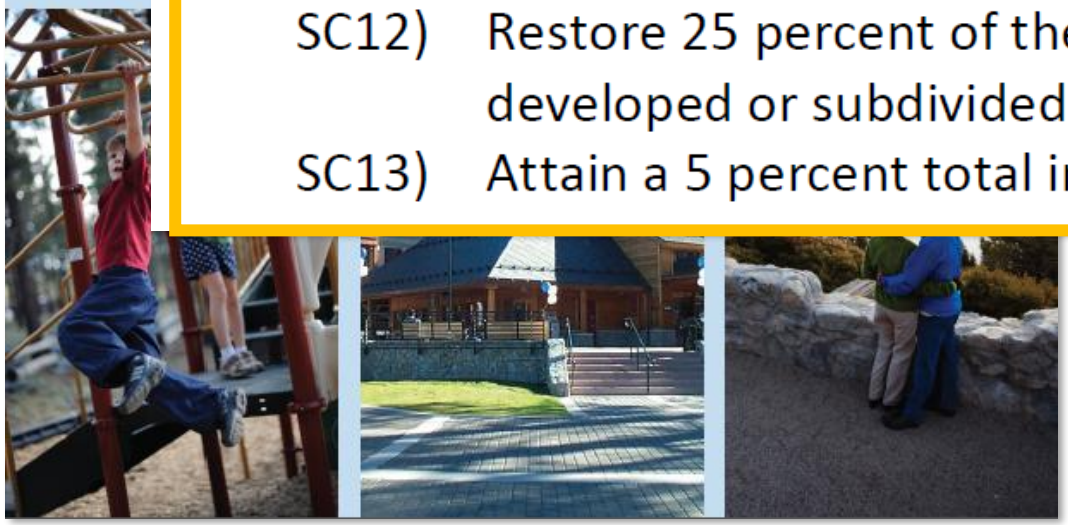
NUMERICAL STANDARDS

SC10) Preserve existing naturally functioning SEZ lands in their natural hydrologic condition.

SC11) Restore all disturbed SEZ lands in undeveloped, unsubdivided lands.

SC12) Restore 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided.

SC13) Attain a 5 percent total increase in the area of naturally functioning SEZ lands.



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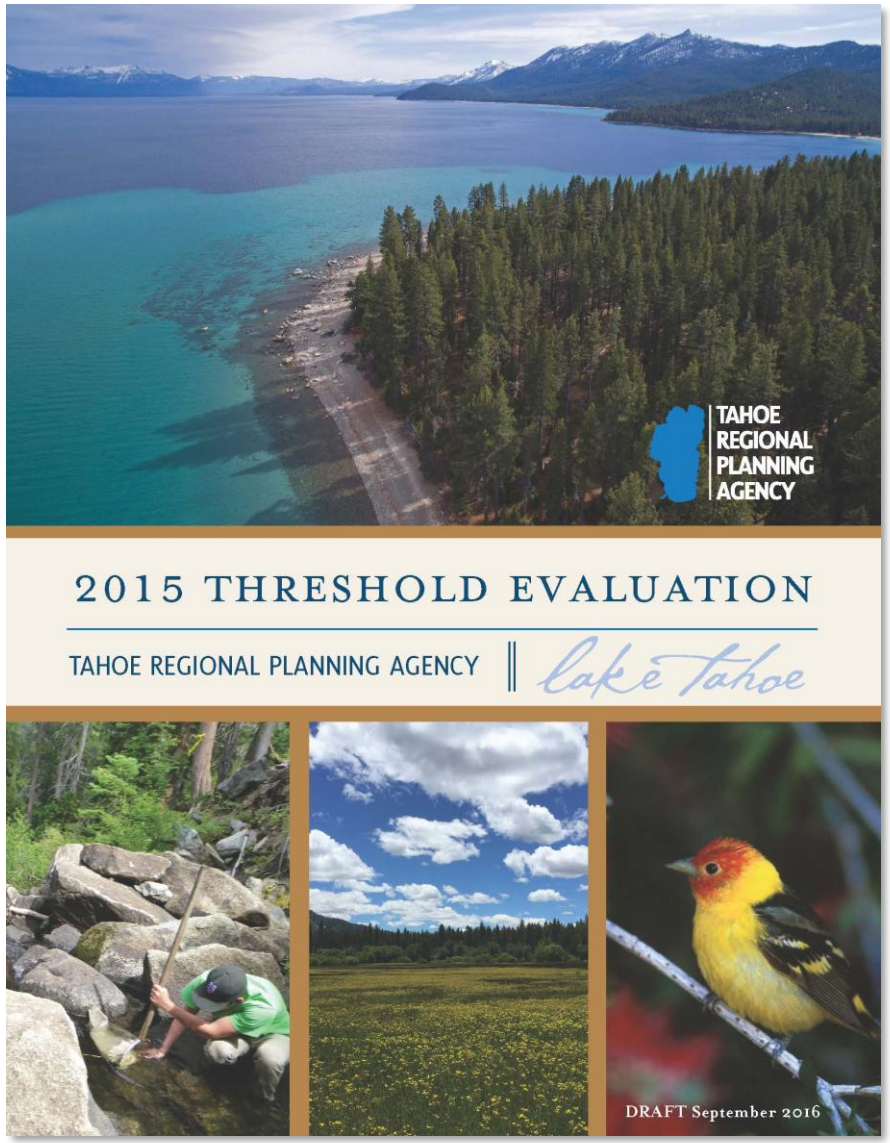
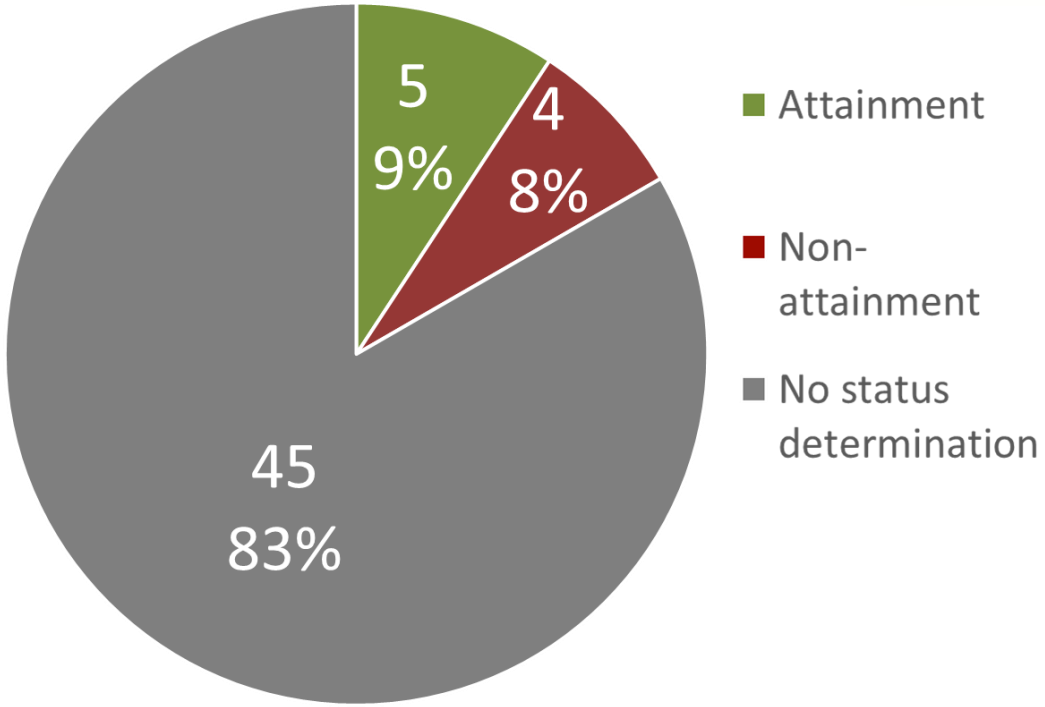
Threshold Update

System Structure: Water Quality

Water Quality

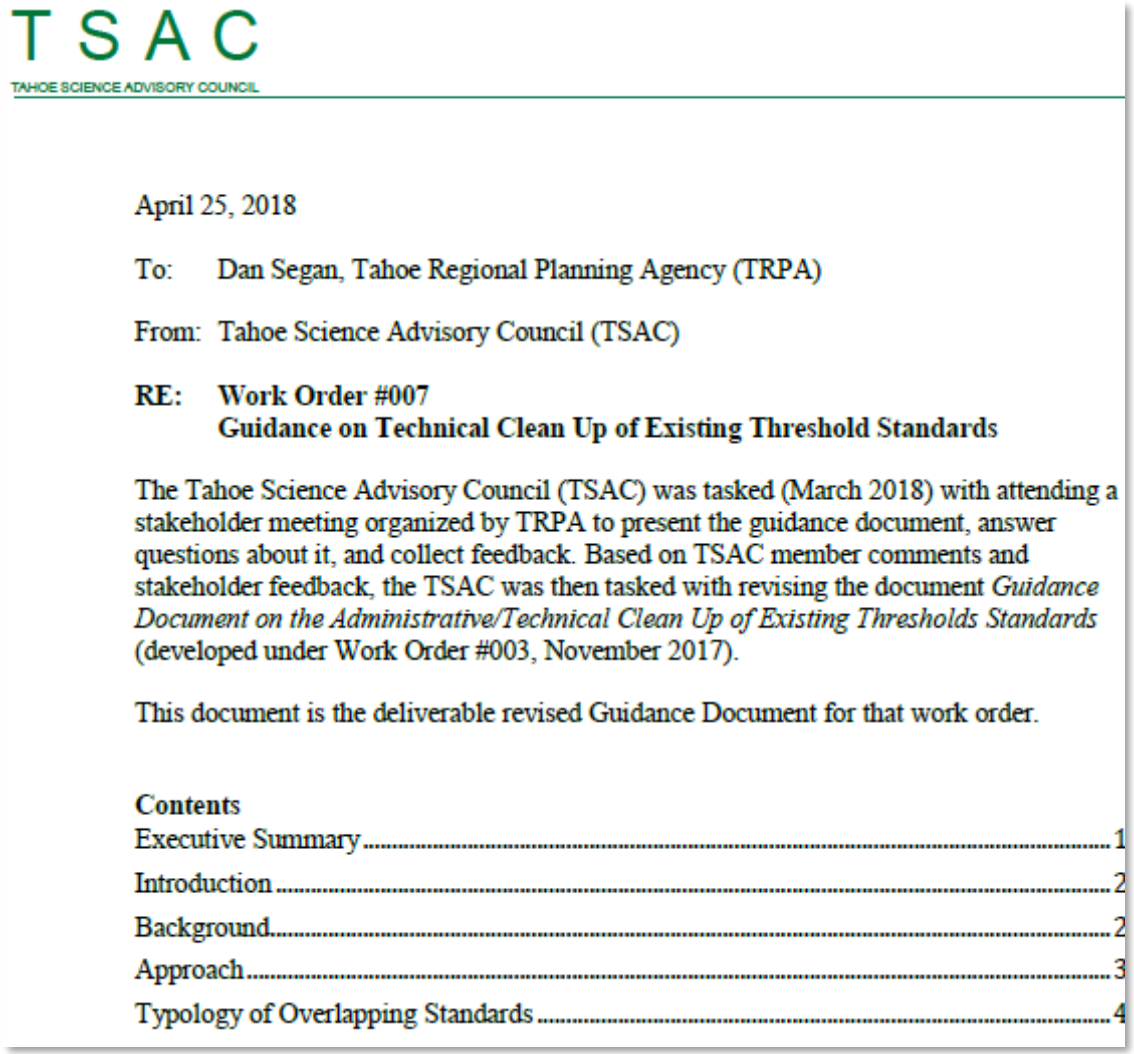




54 Standards

- 5 In attainment
- 4 Not in attainment
- 45 No status determination

Water Quality



TSAC

TAHOE SCIENCE ADVISORY COUNCIL

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).

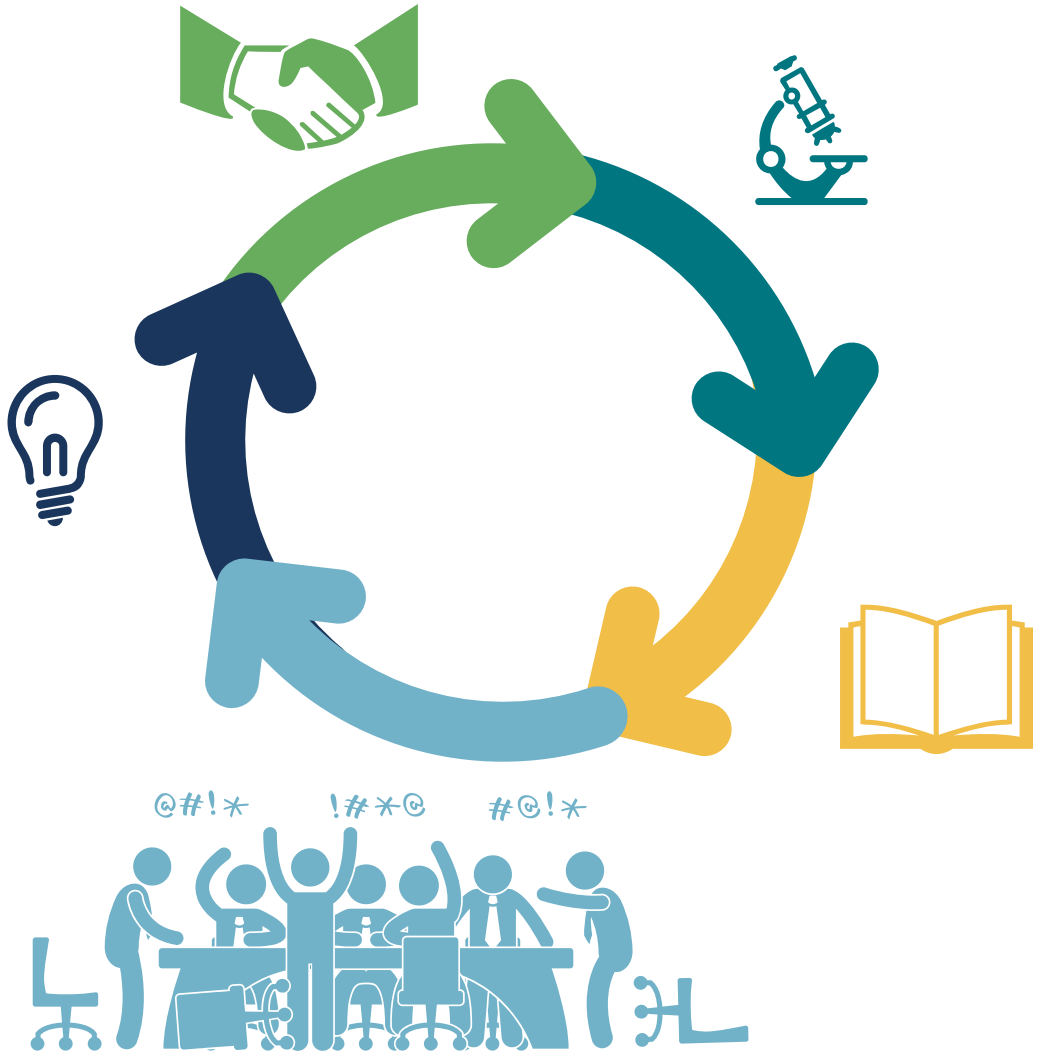
This document is the deliverable revised Guidance Document for that work order.

Contents

Executive Summary 1
Introduction 2
Background 2
Approach 3
Typology of Overlapping Standards 4

- "The corrosive influence of policy statements as standards"
- "inadequate specificity in the standards"
- "clarify ambiguities in the reason for the 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..."

Science Council Engagement



Adaptive Management Structure

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Threshold Standard Specifications

Standard formulation – whether long-term threshold standards or interim performance measures --should be consistent with best practice and should enable objective evaluation of conditions relative to the adopted standard. Standard formulation will include three qualities:

Specific - The standard establishes a specific numeric target, and benchmark/baseline values are documented where necessary.

Measurable – The standard has clearly defined indicator(s) that link to the standard, and there are practical ways to objectively and accurately measure progess towards attainment.

Outcome-based – Standards establish a desired condition for an environmental end state. Standards do not establish a means to achieve the desire outcome.

Role Assessment

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

TSAC WO-012 report; June 2020

Implementation of a System Structuring Approach for Water Quality Threshold Standards

From: Tahoe Science Advisory Council (TSAC)
TSAC subcommittee authors: Dr. Alan Heyvaert and Dr. Ramon Naranjo
TRPA collaboration co-author: Dan Segan

Executive Summary

The Tahoe Science Advisory Council (Council) has been working with the Tahoe Regional Planning Agency (TRPA) to develop specific recommendations for threshold standards and associated performance measures to ensure they formally link to appropriate metrics for the Environmental Improvement Program (EIP) and for thresholds progress reporting. This report summarizes progress toward that goal through diverse efforts over the last few years, including an updated set of recommendations for implementation of a system structuring approach, focused here on water quality threshold standards to serve as a model for similar reviews in other threshold categories. System structure in this context represents general organization of threshold standards and the reporting framework that supports decision-making on actions to promote standards attainment and maintenance.

Recommendations for structuring the threshold standards system comprise three key elements: first, to articulate program goals in clear language that communicates a collective purpose to a general audience; second, each goal statement should be supported by one or more specific objectives that explicitly define success, which are the threshold standards; third, objectives should be supported by result chains that link management actions (strategies and individual tactics) to objectives and clearly identify how implementation will be tracked and how the effectiveness of management actions will be evaluated.

Reporting Category	Name of Standard	Role
Deep Water (Pelagic) Lake Tahoe	Vertical Extinction Coefficient (VEC)	Objective
Deep Water (Pelagic) Lake Tahoe	Secchi Disk	Objective
Deep Water (Pelagic) Lake Tahoe	Phytoplankton Primary Productivity	Objective
Nearshore (Littoral) Lake Tahoe	Nearshore Turbidity (Stream Influence)	Objective
Nearshore (Littoral) Lake Tahoe	Nearshore Turbidity (No Stream Influence)	Objective
Nearshore (Littoral) Lake Tahoe	Nearshore Phytoplankton Primary Productivity	Objective
Nearshore (Littoral) Lake Tahoe	Nearshore Periphyton Biomass	Objective
Nearshore (Littoral) Lake Tahoe	Nearshore Attached Algae	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Prevention	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Abundance	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Distribution	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Ecological Impacts	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Social Impacts	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Economic Impacts	Goal
Aquatic Invasive Species (AIS)	Aquatic Invasive Species Public Health Impacts	Goal
Tributaries	Nitrogen Concentration (Tributaries)	Strategy
Tributaries	Phosphorus Concentration (Tributaries)	Strategy
Tributaries	Iron Concentration (Tributaries)	Strategy
Tributaries	Suspended Sediment Concentration (Tributaries)	Strategy
Surface Runoff	Nitrogen Concentration (Surface Runoff)	Strategy
Surface Runoff	Phosphorus Concentration (Surface Runoff)	Strategy

Goals, Objectives, Strategies, Tactics

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Role	Description	Purpose	Water Quality Example	Link to EIP Program
Goal	High-level "what"	Broad, high-level ultimate outcome that supports a collective vision.	Restore the historic clarity and exceptional water quality of Lake Tahoe.	EIP focus area goals
Objective	Detailed "what"	Specific (SMART) result representing desired conditions for a goal or an intermediate outcome.	Restore lake clarity to a depth of 97.4 feet by 2076 (Lake Tahoe Clarity Commitment).	Threshold standard
Strategy	High-level "how"	An overall approach or actionable plan taken to achieve the objectives linked to primary goals.	Reduce urban fine sediment particle loading. The TMDL jurisdictional pollutant load reduction plan.	EIP Action Priority (output performance measure, FSP load reduced)
Tactic	Detailed "how"	A discrete set of actions taken to execute the strategy.	Street sweeping.	EIP action performance measure (miles of street swept)

Recommendation Summary

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

DEEP WATER (PELAGIC) LAKE TAHOE

WQ1) The annual average deep water transparency as measured by Secchi disk shall not be decreased below 29.7 meters (97.4 feet), the average levels recorded between 1967 and 1971 by the University of California, Davis.

WQ2) Maintain annual mean phytoplankton primary productivity at or below 52gmC/m2/yr.

LITTORAL LAKE TAHOE

WQ3) Attain turbidity values not to exceed three NTU.

WQ4) Turbidity shall not exceed one NTU in shallow waters of the Lake not directly influenced by stream discharges.

WQ5) Attain 1967-71 mean values for phytoplankton primary productivity in the littoral zone.

WQ6) Attain 1967-71 mean values for periphyton biomass in the littoral zone.

AQUATIC INVASIVE SPECIES

WQ7) Prevent the introduction of new aquatic invasive species into the region's waters.

WQ8) Reduce the abundance of known aquatic invasive species.

WQ9) Reduce the distribution of known aquatic invasive species.

OTHER LAKES

WQ10) Attain existing water quality standards.

Summary Recommendations

1. Strategies - Track performance
2. Tactics - Retain in TRPA Code of Ordinances
3. Goals - Statements of purpose

Strategies - Assess performance

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

LOAD REDUCTIONS

MANAGEMENT STANDARDS

WQ34) Reduce fine sediment particle (inorganic particle size < 16 micrometers in diameter) load to achieve long-term pelagic water quality standards (WQ1 and WQ2).

WQ35) Reduce total annual phosphorus load to achieve long-term pelagic water quality standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).

WQ36) Reduce total annual nitrogen load to achieve long-term pelagic water quality standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).

WQ37) Decrease total annual suspended sediment load to achieve littoral turbidity standards (WQ3 and WQ4).

WQ38) Reduce the loading of dissolved phosphorus to achieve pelagic water standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).

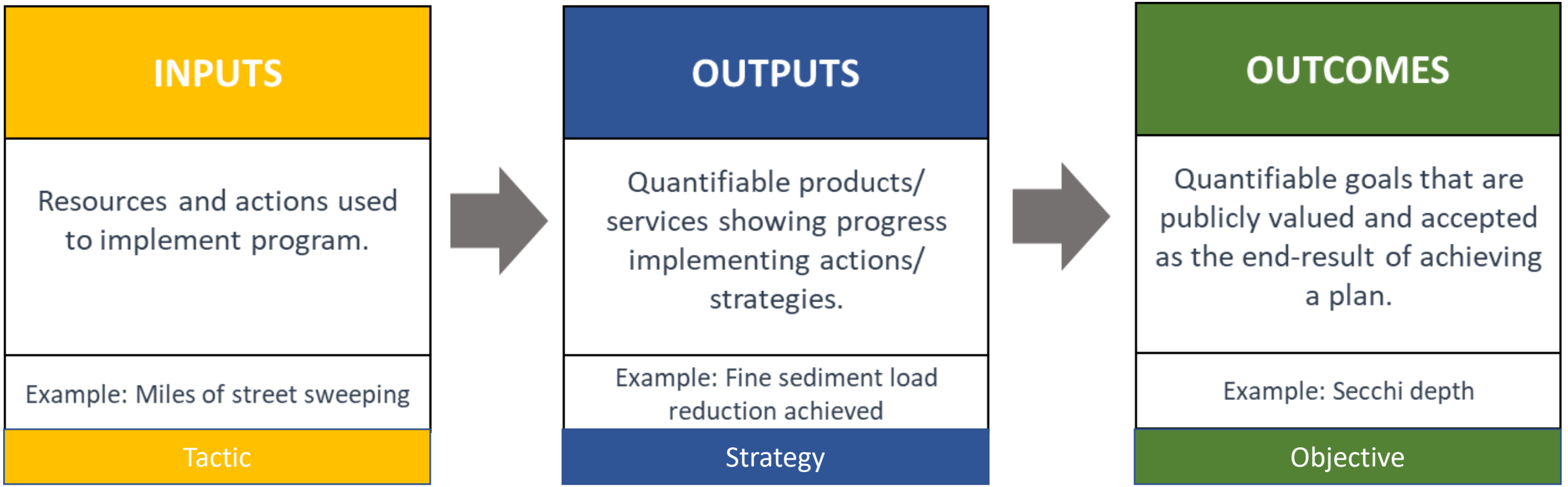
WQ39) Reduce the loading of iron to achieve pelagic water standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).

WQ40) Reduce the loading of other algal nutrients to achieve pelagic water standards (WQ1 and WQ2) and littoral quality standards (WQ5 and WQ6).

WQ41) The most stringent of the three dissolved inorganic nitrogen load reduction targets shall apply:

Adaptive Management Structure

TAHOE REGIONAL PLANNING AGENCY
Threshold Update



"Identify performance measures that track implementation and assess the effectiveness of strategies and tactics. Where current threshold standards identify strategies or tactics they should be recast as performance measures"

- Science Council

Tactics - TRPA Code of Ordinances

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

SURFACE RUNOFF

NUMERICAL STANDARDS

WQ19) Achieve a 90 percentile concentration value for dissolved inorganic nitrogen of 0.5 mg/1 in surface runoff directly discharged to a surface water body in the Basin.

WQ20) Achieve a 90 percentile concentration value for dissolved phosphorus of 0.1 mg/1 in surface runoff directly discharged to a surface water body in the Basin.

WQ21) Achieve a 90 percentile concentration value for dissolved iron of 0.5 mg/1 in surface runoff directly discharged to a surface water body in the Basin.

WQ22) Achieve a 90 percentile concentration value for suspended sediment of 250 mg/1 in surface runoff directly discharged to a surface water body in the Basin.

GROUNDWATER

MANAGEMENT STANDARDS

WQ23 - WQ32) Surface runoff infiltration into the groundwater shall comply with the uniform Regional Runoff Quality Guidelines as set forth in Table 4-12 of the Draft Environmental Threshold Carrying Capacity Study Report, May, 1982. Where there is a direct and immediate hydraulic connection between ground and surface waters, discharges to groundwater shall meet the guidelines for surface discharges, and the Uniform Regional Runoff Quality Guide lines shall be amended accordingly.[1]

Tactics - TRPA Code of Ordinances

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Threshold Update

60.1.3. Discharge Limits

Discharges shall not exceed the following standards:

A. Surface Runoff

Pollutant concentrations in surface runoff shall not exceed the readings in Table 60.1.3-1 at the 90th percentile.

TABLE 60.1.3-1: SURFACE RUNOFF

Constituent	Maximum Concentration
Dissolved Inorganic Nitrogen as N	0.5 mg/l
Dissolved Phosphorus as P	0.1 mg/l
Dissolved Iron as Fe	0.5 mg/l
Grease and Oil	2.0 mg/l
Suspended Sediment	250 mg/l

AIS Standards

AQUATIC INVASIVE SPECIES

MANAGEMENT STANDARDS

Prevention

WQ8) Prevent the introduction of new aquatic invasive species into the region's waters.

Control

WQ9) Reduce the abundance of known aquatic invasive species.

WQ10) Reduce the distribution of known aquatic invasive species.

WQ11) Abate harmful ecological impacts resulting from aquatic invasive species.

WQ12) Abate harmful economic impacts resulting from aquatic invasive species.

WQ13) Abate harmful social impacts resulting from aquatic invasive species.

WQ14) Abate harmful public health impacts resulting from aquatic invasive species.

AIS Standards

AQUATIC INVASIVE SPECIES

MANAGEMENT STANDARDS

Thresholds

WQ8) Prevent the introduction of new aquatic invasive species into the region's waters.

WQ9) Reduce the abundance of known aquatic invasive species.

WQ10) Reduce the distribution of known aquatic invasive species.

WQ11) Abate harmful ecological impacts resulting from aquatic invasive species.

WQ12) Abate harmful economic impacts resulting from aquatic invasive species.

WQ13) Abate harmful social impacts resulting from aquatic invasive species.

WQ14) Abate harmful public health impacts resulting from aquatic invasive species.

Purpose Statement

Focus

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

DEEP WATER (PELAGIC) LAKE TAHOE

WQ1) The annual average deep water transparency as measured by Secchi disk shall not be decreased below 29.7 meters (97.4 feet), the average levels recorded between 1967 and 1971 by the University of California, Davis.

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LITTORAL LAKE TAHOE

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AQUATIC INVASIVE SPECIES

WQ7) Prevent the introduction of new aquatic invasive species into the region's waters.

WQ8) Reduce the abundance of known aquatic invasive species.

WQ9) Reduce the distribution of known aquatic invasive species.

OTHER LAKES

WQ10) Attain existing water quality standards.

1. Improve clarity

2. Control algae

3. Prevent new AIS

4. Remove existing AIS

5. Maintain quality

Science-Based Adaptive Management Structure

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Conceptual Model

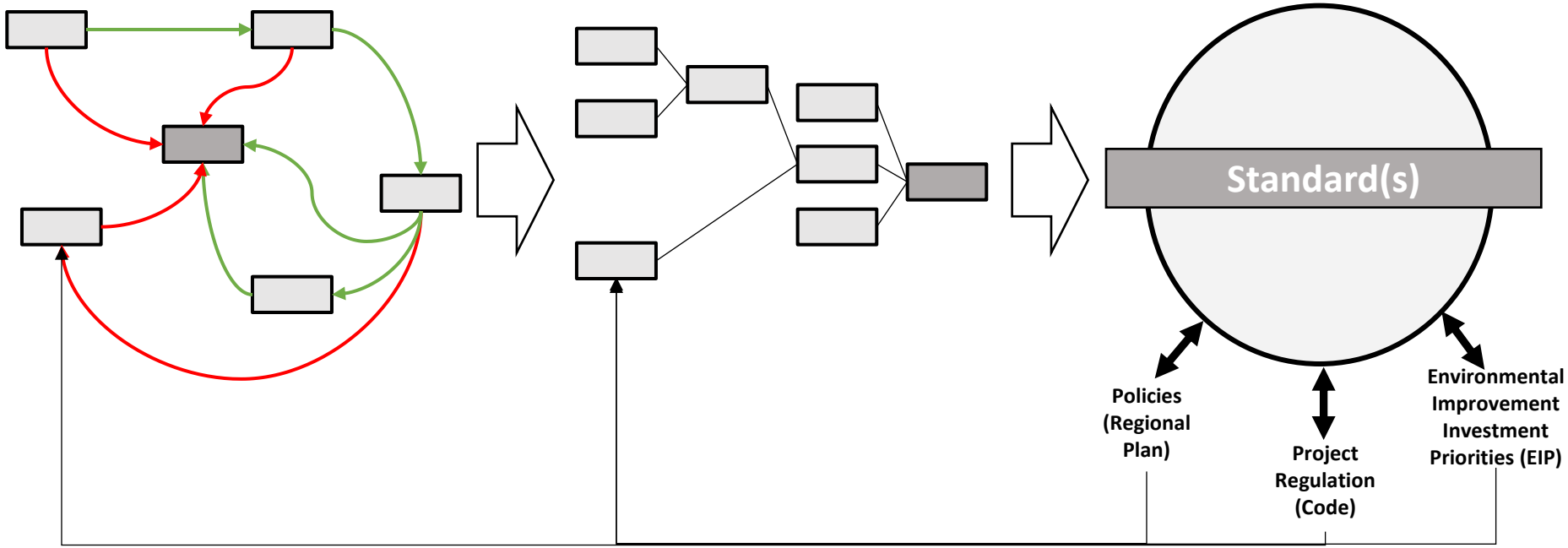
Scientific understanding of the processes and drivers that influence the state of the system (Science Groups)

Results Chains

Explanation of management actions and their expected influence on the processes and drivers of the system, and ultimately the desired outcome (Policy Groups)

Management Actions

Management of system to achieve desired outcomes through standards expressed in policy, regulations, and investment priorities (Stakeholders)



Monitoring, Evaluation, and Learning

lake tahoe INFO

Goal – Standard Background

Threshold Sub-category:
Water Quality – Aquatic Invasive Species

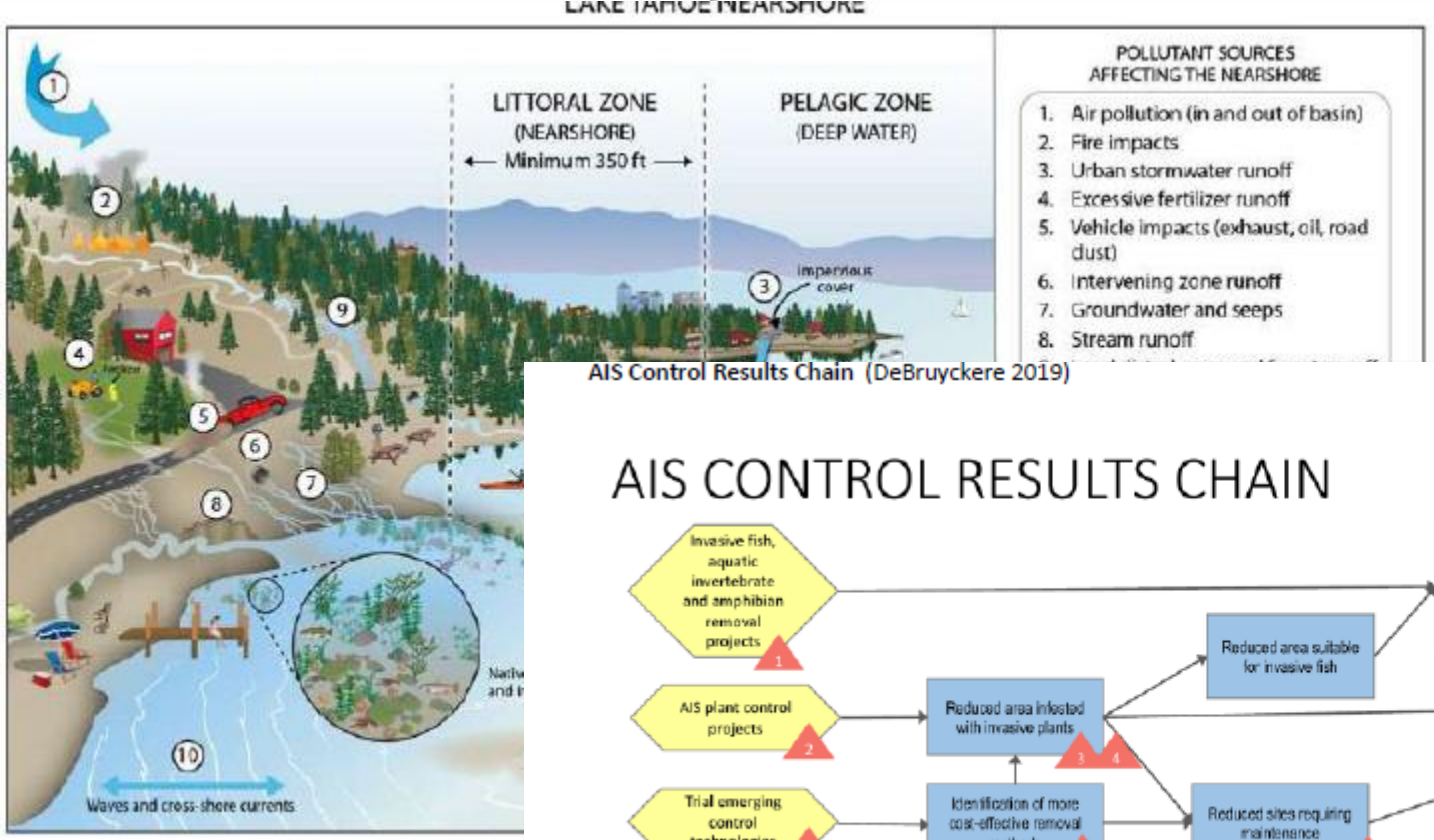
Threshold Standard:
WQ7) Prevent the introduction of new aquatic invasive species into the region's waters.

Purpose:

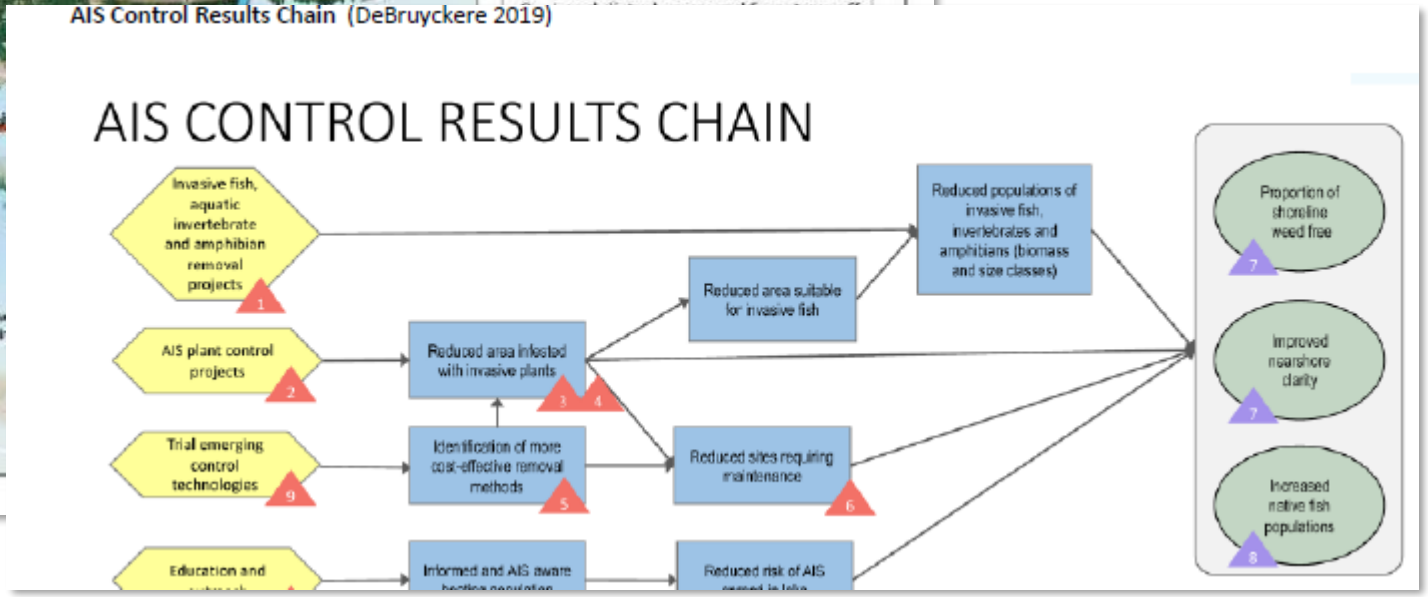
Prevent the introduction of new aquatic i
abundance and distribution of known aqu
social and public health impacts resulting

Conceptual Models:

General Conceptual Model of AIS impact



AIS Control Results Chain (DeBruyckere 2019)



TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Working Group Discussion

Recommendations

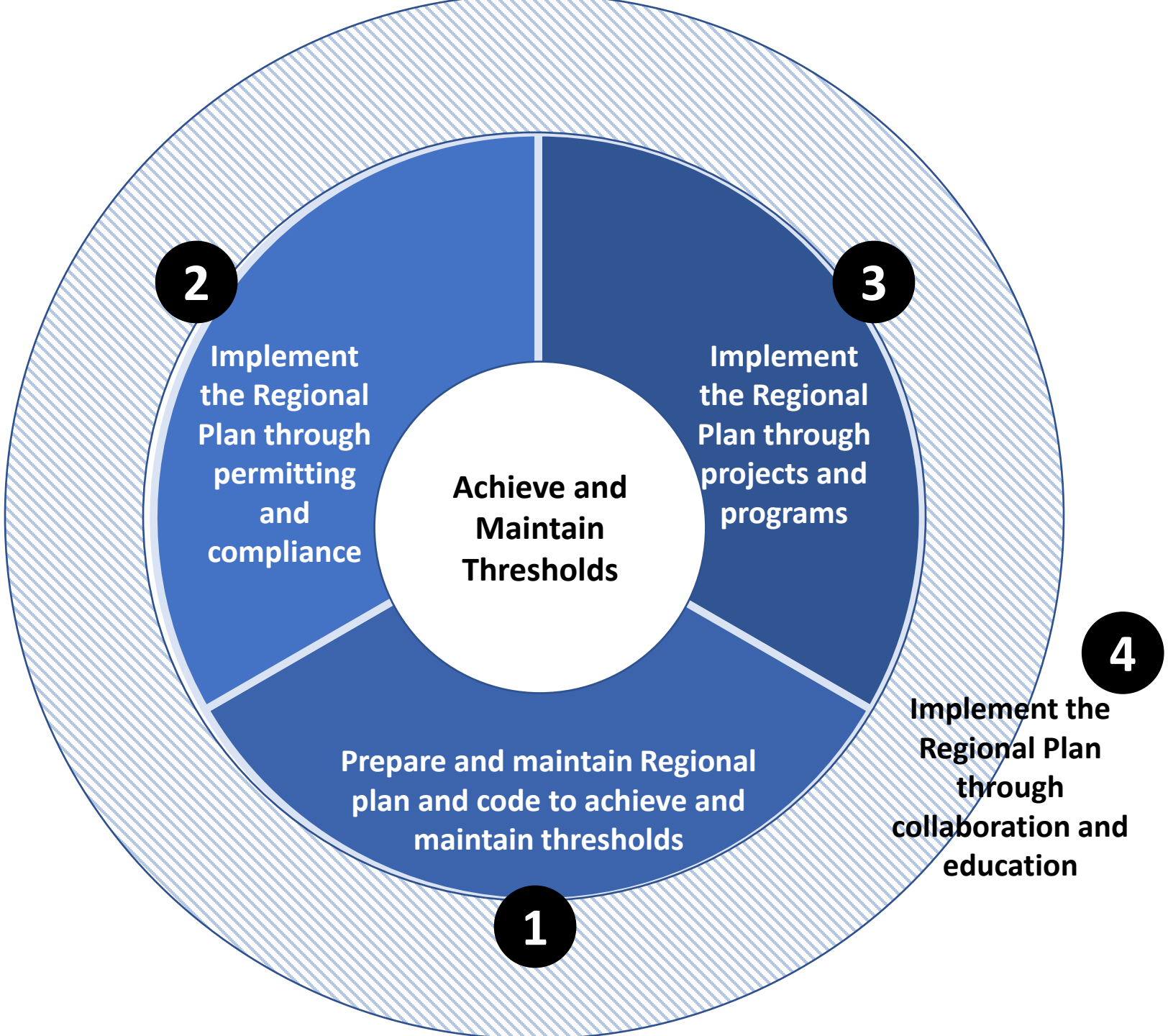
1) Implement the recommendations and modify the Threshold Standards and Regional Plan as presented in Attachment B.

2) Direct staff to develop background documentation for all water quality threshold standard categories, consistent with the example presented in Attachment D.

TAHOE REGIONAL PLANNING AGENCY

Threshold Update

Thank You



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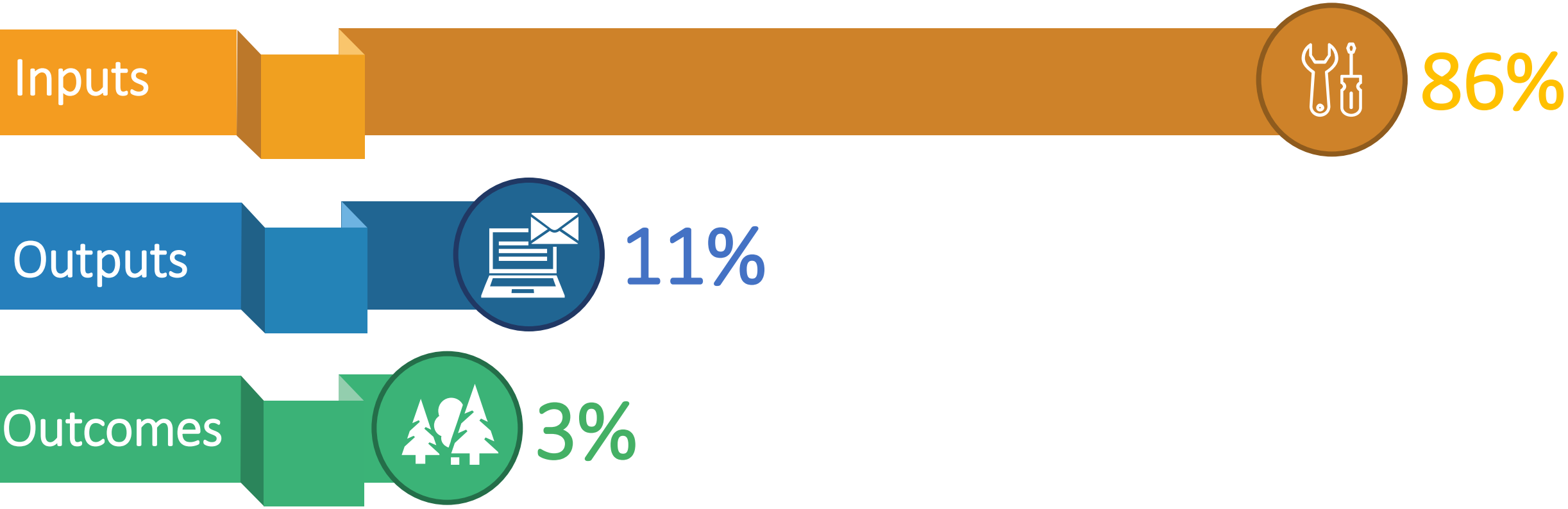
Implement the Regional Plan through collaboration and education

"**A goal without a plan is just a wish.**"

— Antoine de Saint-Exupéry

What are we Reporting on Today?



Long-term Vision

2013-2018

Laketahoeinfo.org

2018-2019

System Structure

2020

Water quality/ Transportation

2021

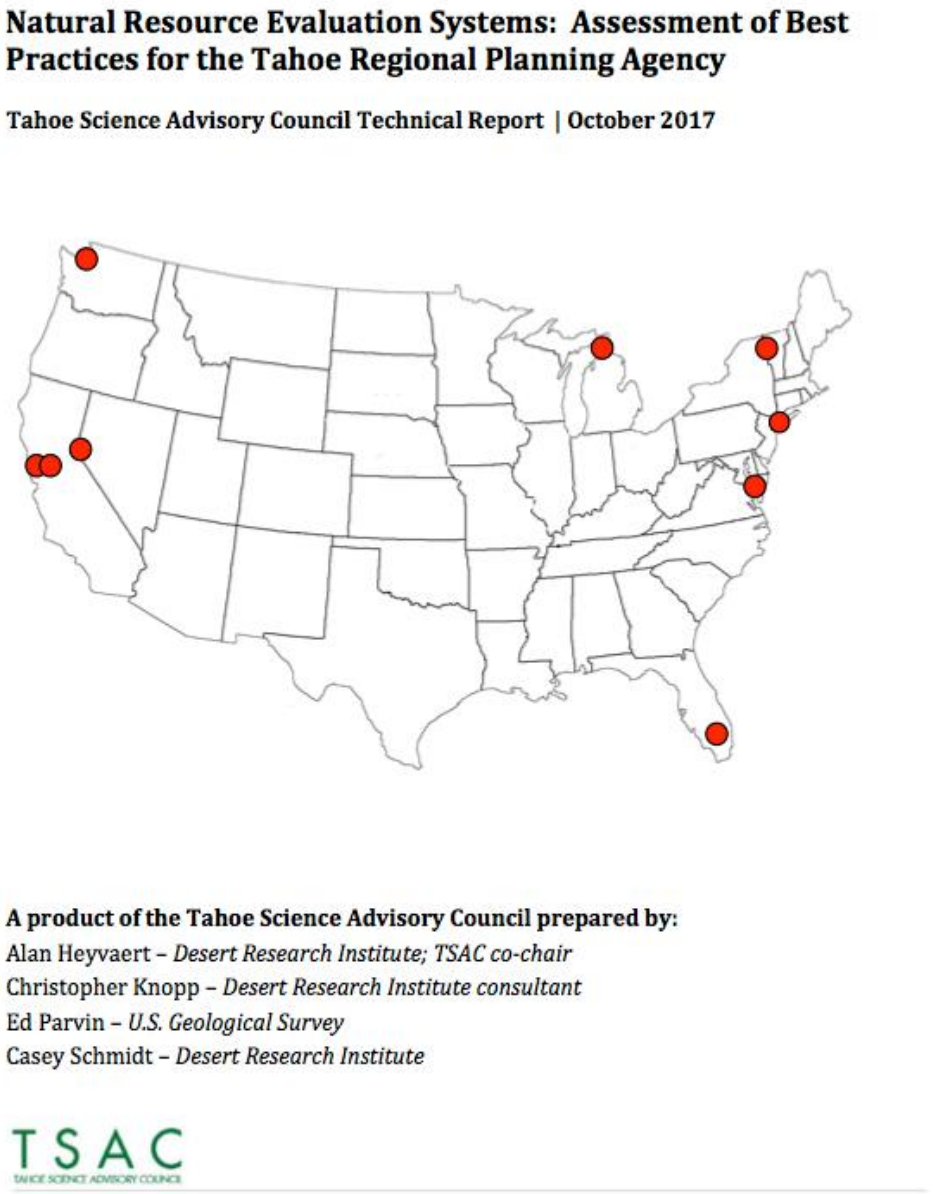
Forest Health / Stream Zones

2022-beyond

Fully integrate EIP & Threshold Standards

Builds on the 2017 Review of Natural Resource Management Programs

- Chesapeake Bay Program
- Delta Stewardship Council
- Everglades Restoration Program
- Great Barrier Reef Plan
- Great Lakes Water Quality Agreement
- Lake Champlain Basin Program
- Long Island Sound Study
- Puget Sound Partnership
- San Francisco Bay Estuary Partnership
- Conservation Measures Partnership



Natural Resource Evaluation Systems: Assessment of Best Practices for the Tahoe Regional Planning Agency

Tahoe Science Advisory Council Technical Report | October 2017

A product of the Tahoe Science Advisory Council prepared by:

Alan Heyvaert – *Desert Research Institute; TSAC co-chair*
Christopher Knopp – *Desert Research Institute consultant*
Ed Parvin – *U.S. Geological Survey*
Casey Schmidt – *Desert Research Institute*

TSAC
TAHOE SCIENCE ADVISORY COUNCIL

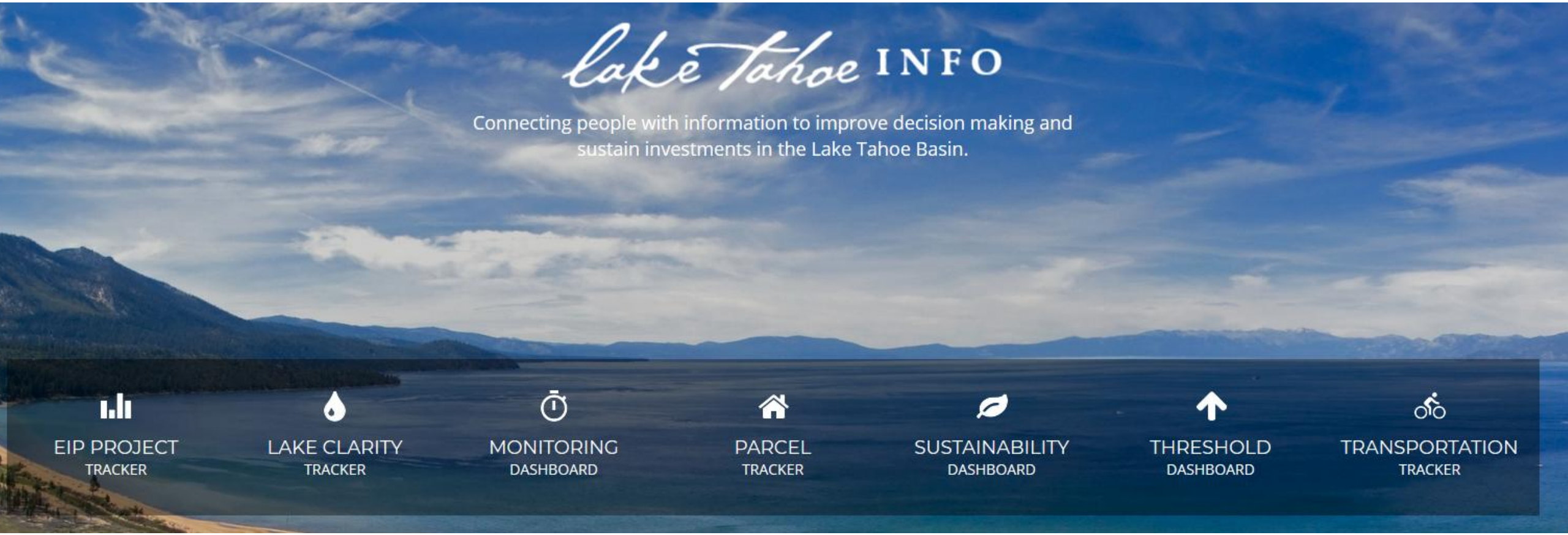
Progress

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

- Modified more standards in the last two years than in the previous 40
- Reduced number of standards from 173 to 146 without compromising quality
- Improved clarity of system with no change in environmental protection
- New adaptive management structure

Achieving our Goals

TAHOE REGIONAL PLANNING AGENCY
Threshold Update



Bi-State Compact

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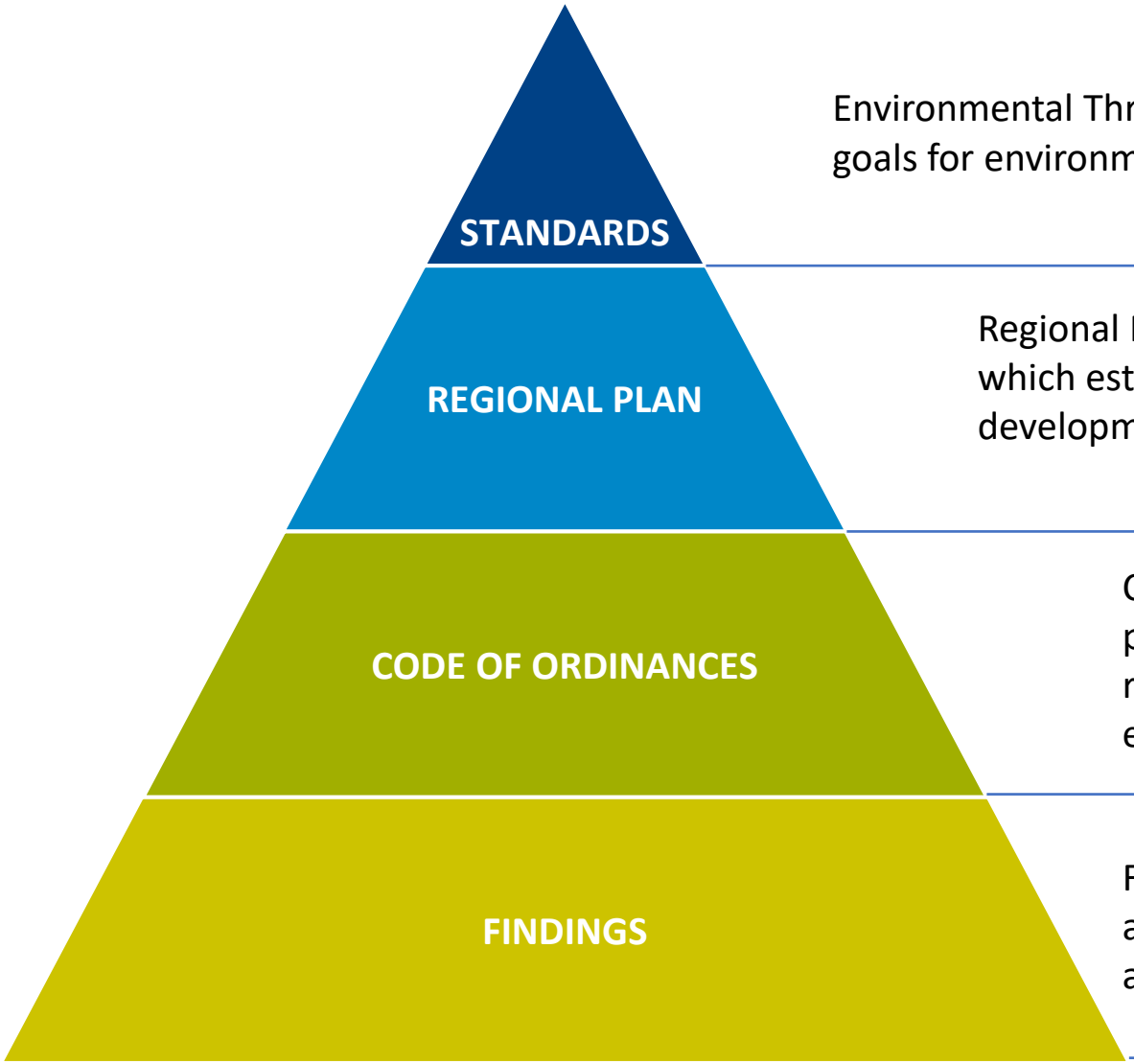
Threshold Update



Environmental Threshold Carrying Capacities (Standards): Establish the goals for environmental quality and restoration in the Lake Tahoe basin.

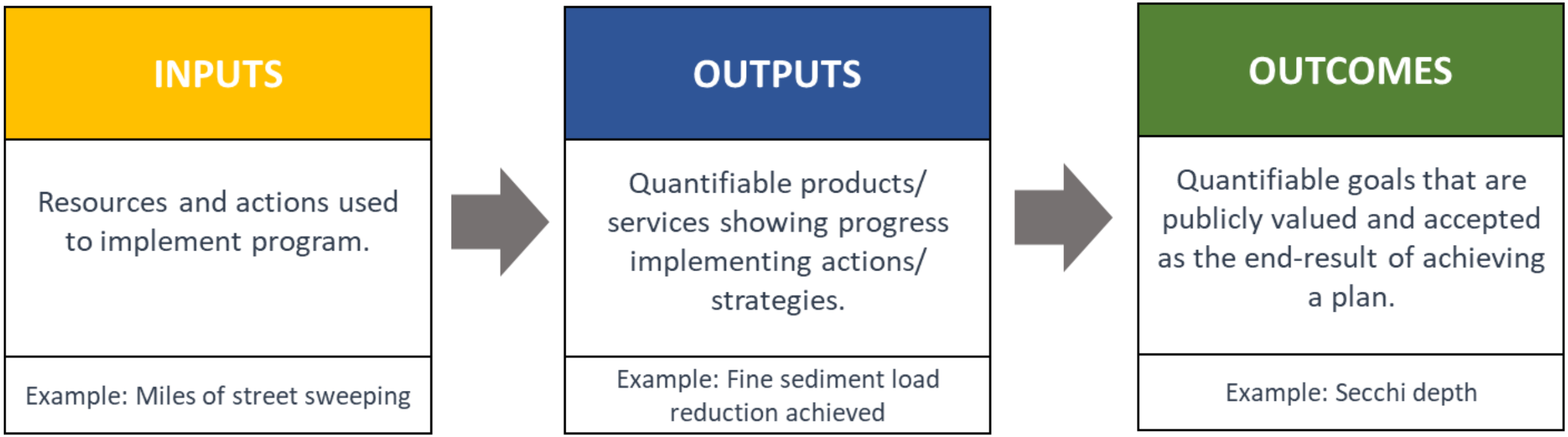
Regional Plan: General plan for development of the region, which establishes the guides for orderly growth and ensures development is consistent with the standards.

Code: Implements the regional plan and goals and policies and ensure the ordinances, rules, and regulations, achieve and maintain the adopted environmental threshold carrying capacities.

Findings: Ensures that development does not adversely impact implementation of the regional plan and will not cause the standards to be exceeded.

Organization

TAHOE REGIONAL PLANNING AGENCY
Threshold Update



Today's Discussion

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

System	
• Reorganization and Technical Corrections	✓
• System Structure	←

Focus Areas	
• Vegetation Preservation	←
• Soil Conservation: Restoration of Stream Environment Zones	
• Air Quality: Vehicle Miles Travelled	
• Recreation	

2011 Peer Review

TAHOE REGIONAL PLANNING AGENCY
Threshold Update

Recommendation A. Consider adopting enhanced relational data base management methodologies to support ongoing environmental measurement programs, and to improve the analytical tools available for use in future threshold assessment reports

Recommendation B. Expand the use of a landscape perspective for analysis of Tahoe region ecosystem measurements and data analyses

Recommendation C. Increase the consideration of the impacts of climate change upon observed Tahoe basin ecosystem behavior,

Recommendation D. Increase the focus on achieving balance between environmental and socioeconomic parameters in the Tahoe basin region

Recommendation F. Increase the analyses of the influences of air quality and local human activity on water quality, vegetation and soils