

Chapter 4

SOIL CONSERVATION

4.1 INTRODUCTION

This chapter discusses TRPA's soil conservation thresholds. TRPA has two soil conservation threshold standards: The Land Coverage (Impervious Cover) Threshold Standard and the Stream Environment Zone (SEZ) Threshold Standard. The primary purpose of this report is to provide an update of the status of the soil conservation threshold program in terms of attainment of TRPA's standards pertaining to land coverage (impervious cover) and stream environment zones (SEZs).

4.1.1 LAND COVERAGE

Permanent land disturbance in the Lake Tahoe Basin is most commonly measured in terms of land coverage (e.g., impervious surfaces), but it also includes a significantly degraded soil condition that does not readily self-mitigate after the disturbance has ceased. TRPA defines two types of existing land coverage-- "hard land coverage" (i.e., impervious surfaces) and "soft land coverage" (i.e., compacted areas). TRPA also defines a third type of land coverage -- "potential land coverage" (i.e., allowable coverage in the future, but does not exist yet). At present, TRPA's definition of land disturbance in the Code of Ordinances, which is the "alteration of soil, vegetation, surface hydrology, or subsurface hydrology on a temporary or permanent basis, through action including, but not limited to, grading." This definition is supplemented by the definition of "significant soil disturbance" which is the "damage to soil structure, chemistry and biota through compaction, burning, removal of topsoil, soil contamination or other activities, to the degree that there may be reduced vegetation growth, increased surface runoff or erosion. Soil compaction and other disturbance potential can vary depending upon soil type, rooting depth, soil moisture content, surface litter thickness and compaction forces."

Hard Land Coverage (Impervious Cover)

As defined by TRPA Code, "hard land coverage" (also referred to as "hard coverage") is any created structure, improvement, or covering that prevents plant growth and prevents precipitation (rainfall, snowfall and snowmelt) from reaching the soil underlying the structure, improvement, or covering. Common impervious surfaces are asphalt, concrete, and roofing material -- all associated with development. A structure, improvement or covering is not considered land coverage by TRPA if it permits at least 75 percent of normal precipitation directly to reach the ground and permits growth of vegetation on the approved species list (TRPA Code Chapter 2).

In 1974, Robert G. Bailey wrote that impervious cover is "the most critical element in the land disturbance that has created the basic environmental problems facing the Lake Tahoe basin – water quality degradation, flooding, and soil erosion." Impervious surfaces affect natural hydrology and water quality by diverting subsurface flow to surface runoff. Impervious surfaces and compacted areas

prevent rainfall and snowmelt from infiltrating into the soil, and form a direct conduit for the delivery of water and nutrients to the drainage system and tributary streams, thereby short-circuiting the watershed's sediment and nutrient removal mechanisms (TRPA 2001). Numerous research investigations document the water quality impacts of impervious cover and "show a strong correlation between the imperviousness of a drainage basin and the health of its receiving stream" (USEPA 1997).

Soft Land Coverage (Soil Compaction)

"Soft land coverage" (also referred to as "soft coverage") comprises artificially denuded and/or compacted areas without created structures, where the soil has become sufficiently altered and/or compacted such as to prevent substantial infiltration. Soft coverage is created by the alteration of soils associated with uses such as the parking of vehicles and equipment on unpaved sites, vehicular traffic in unpaved areas (e.g., dirt roads, construction sites), the trampling of an area frequently used by livestock, and repeated pedestrian (foot) traffic over dirt trails, pathways and around buildings. Many of these uses occur over long periods of time and/or under tree cover, so soft land coverage is particularly difficult to map in contrast to hard coverage.

Soil compaction has a number of harmful effects because it inhibits natural water and soil-air storage by reducing the pore space in the soil. Soil compaction affects the soil's ability to function naturally as a medium for plant growth, as well as a reservoir for nutrients and water. Rain falling on compacted areas generally has significantly reduced soil water storage capacity, increased runoff, poor nutrient cycling, and sediment export. Remedial efforts, where soft coverage is present, are often equally difficult to restore soil functioning as hard coverage. Where soft coverage is more transitory (from one-time disturbance, for example), natural processes like freeze-thaw, seasonal shrink-swell and root penetration can effectively restore soil functioning within a decade or less (depending upon favorable weather conditions and degree of compaction, for example).

4.1.2 STREAM ENVIRONMENT ZONES (SEZs)

Stream Environment Zone (SEZ) is the term used by TRPA to denote the perennial, intermittent and ephemeral streams, meadows and marshes, and other areas of near surface water influence within the Lake Tahoe Basin. TRPA defines a "Stream Environment Zone" as "generally an area which owes its biological and physical characteristics to the presence of surface or ground water." SEZs, among numerous other functions, convey surface runoff from upland areas to watercourses and tributaries to the lake.

TRPA's Goals and Policies state that "the plant associations of SEZs constitute only a small portion of the Basin's total land area," yet they "are perhaps the single most valuable plant communities in terms of their role in providing for wildlife habitat, purification of water, and scenic enjoyment" (TRPA 1986). "The protection and restoration of stream environment zones are essential for improving and maintaining the environmental amenities of the Lake Tahoe Basin and for achieving environmental thresholds for water quality, vegetation preservation, and soil conservation" (TRPA 1986)

TRPA defines “SEZ Vegetation” as “Species of a plant community indigenous to the Lake Tahoe Region which are commonly associated with the landscape position and land form, soil type, hydrology, elevation, and climate of an SEZ type, such as a wet meadow, mesic meadow, or stream.” (TRPA Code of Ordinances, Amended 5/28/97)

4.2 BACKGROUND

4.2.1 BACKGROUND OF INDIVIDUAL THRESHOLD STANDARDS

SC-1 Land Coverage (Impervious Cover) Threshold Standard

TRPA adopted the following land coverage (impervious cover) management standard in 1982:

“Impervious cover shall comply with the Land Capability Classification of the Lake Tahoe Basin, California-Nevada, A Guide to Planning (Bailey 1974).”

The “Bailey Land Capability Classification System” is used to determine land capability on residential parcels developed before 1989 and on all non-residential parcels. Implementation of the “Bailey Land Capability System” is set forth in Chapter 20 (Land Coverage Standards) of TRPA’s Code of Ordinances.

The Individual Parcel Evaluation System (IPES) was adopted in 1987 as a more site-specific method of determining development eligibility and allowable coverage for residential parcels (1/3-acre or less). IPES is applied only on vacant residential parcels developed since the beginning of 1989. Implementation of IPES is set forth in Chapter 37 (Individual Parcel Evaluation System) of TRPA’s Code of Ordinances. The Land Coverage (Impervious Cover) Threshold Standard adopted in 1982 was not modified when IPES was adopted in 1987 and implemented in 1989.

Bailey Land Capability Classification System

The “Bailey Land Capability Classification System” was developed in 1970 by a multi-agency, interdisciplinary team of natural resource experts led by Dr. Robert G. Bailey, a hydrologist with the U.S. Forest Service, in cooperation with TRPA. Since 1971, TRPA has regulated land development through application of the Bailey Land Capability Classification System (herein the Bailey System).

The Bailey System consists of seven classes distinguished according to the level of use (or disturbance) they can tolerate. Each of the capability classes have defined attributes, and land development practices are specified for each class. The system provides an objective basis for planning development so that soil and water resources are conserved more effectively than they had been in the past. In this context, land capability is defined as the level of use an area can tolerate without sustaining permanent damage through erosion and other causes (Bailey, 1974).

Typically, the principal factors used in distinguishing the seven ranks were soil type and geomorphic setting (Bailey, 1974). The seven levels of land capability also integrate the frequency and magnitude of hazards with the land sensitivity to

disturbance. For example, Class 1 represents areas that exhibit the greatest sensitivity to disturbance, greatest frequency, or highest magnitude of hazardous conditions. At the other end of the spectrum, Class 7 represents areas that have the most resilience to disturbance and almost negligible hazardous conditions. Among other criteria, geomorphic units were delineated on the following basis: 1) minimum size: 1 square mile, and 2) broad similarity in type of landform development (relief and drainage patterns, slope, texture of dissection, etc.).

To express the limitations associated with land disturbance, Bailey assigned numerical values (or coefficients) for each land capability class. These numeric values characterize the potential development capacity (percentage of each area that can be used for impervious cover) provided environmental balance is maintained within the same geomorphic unit. Table 4-1 shows the allowable land coverage by land capability class as recommended by Bailey.

To achieve the desired land coverage assigned for each soil type (for the land coverage threshold), Chapter 20 established the Land Coverage Transfer Program and Excess Land Coverage Mitigation Program. The Excess Land Coverage Mitigation Program helps reduce coverage and future coverage where overcoverage was “grandfathered.” This program is to be applied within designated hydrologic area boundaries. These programs are also intended to provide flexibility for reasonable development and mitigation of existing (non-conforming) excess coverage. Since the current (1982) impervious cover threshold standard was adopted prior to the 1987 Code of Ordinances (Chapter 20), the intent of threshold attainment within hydrologic areas was not written into the threshold statement.

Table 4-1: Coverage By Land Capability Class/District (Bailey 1974 and TRPA Code of Ordinances, Chapter 20)

Land Capability Class/District	Allowable Base Coverage (%)
1A, 1B & 1C	1
2	1
3	5
4	20
5	25
6	30
7	30

Individual Parcel Evaluation System (IPES)

The Bailey Land Capability Classification System was developed as a broad-scale planning tool and never intended for parcel-by-parcel application of land use. This limitation is evident by the scale at which the Land Capability System was developed. -- typically, a 40-acre Soil Conservation Service soil mapping unit (or similar unit). At this scale, application of the Bailey System proved difficult to apply on a lot-by-lot basis. In response to this shortcoming, TRPA created and adopted the Individual Parcel Evaluation System (IPES) in May 1987. IPES also determined the eligibility for development in addition to allowable land coverage for vacant single-family residential parcels (Gordon Barrett, pers. com). IPES became effective in January of 1989, as defined by Chapter 37 of the Code.

In 1987 and 1988, vacant residential parcels in the Lake Tahoe Basin were evaluated for eight elements: 1) relative erosion hazard, 2) runoff potential, 3) access, 4) stream environment zones, 5) condition of local watershed, 6) ability to revegetate, 7) need for capital improvements in vicinity of parcel, and 8) distance from Lake Tahoe. Each parcel was given an IPES score ranging from 0 to a potential high of 1000. Parcels with an IPES score of 726 (also known as the "IPES line") or higher were deemed to be equivalent to Bailey land capabilities Class 4 to 7, eligible for development of new single-family homes.

When certain progress on a county or city basis is made toward protecting environmental quality, a calculation allows TRPA to lower the IPES line, thus increasing the number of parcels that are eligible for development. These requirements include 1) a reduction in the inventory of parcels previously considered to be environmentally sensitive, 2) implementation of projects by the county or city to reduce runoff and control erosion, 3) satisfactory compliance with TRPA permit conditions within the jurisdiction, and 4) establishment of additional water quality monitoring.

Currently (2006), the "IPES line" determined by the TRPA Governing Board, is 726 for Placer County, 1 for El Dorado County, 1 for Washoe County, 1 for Douglas County, and 1 for City of South Lake Tahoe. Any parcels with an equal or higher respective score are eligible for a residential building permit, if the property owners obtain a residential allocation from the county or city government with jurisdiction over the parcel (TRPA website, 2006).

Base allowable coverage on IPES parcels is determined by two of the eight elements: the relative erosion hazard and the runoff potential. Base allowable coverage is generally applicable to the entire parcel of one-third acre or less, or to a one-third acre (14,520 square foot) building site designated by the IPES evaluation teams on parcels greater than one-third acre. Allowable coverage on parcels smaller than one-third acre can be determined by multiplying the percentage figure by the area of the parcel outside any designated stream environment zone.

Under IPES, "land coverage and disturbance for single family houses may be permitted in Land Capability Districts 1A, 1C, 2, and 3 when reviewed and approved pursuant to IPES in accordance with Chapter 37" (TRPA Code

Subsection 20.4.A (1)) contingent upon satisfaction of environmental objectives. Under IPES, only parcels designated as SEZ are “unbuildable” (these received a zero IPES score to indicate unsuitability for development).

Implementation of the Land Coverage (Impervious Cover) Threshold Standard

The intent of the Land Coverage (Impervious Cover) Threshold Standard is the application of the coefficients (i.e., percentages) of allowable land coverage assigned to specific land capability classes. The allowable base land coverage is determined by using the coefficients set forth in the Bailey System (Table 4.2.1).

In addition, TRPA Code (Subsection 20.3.A) specifies that the allowable base land coverage for lands located in Bailey’s Geomorphic Group I (High Hazard Lands) is restricted to one percent. Geomorphic Group I (High Hazard Lands) includes about 61 percent of the Tahoe Basin area (Bailey 1974).

The impervious cover threshold is intended to be achieved through implementation of the Regional Plan for the Lake Tahoe Basin, specifically TRPA’s Goals and Policies, TRPA’s Code of Ordinances and the Environmental Improvement Program.

SC-2 STREAM ENVIRONMENT ZONE THRESHOLD STANDARD

In 1982, TRPA adopted the following narrative and numeric Stream Environment Zones Numerical Standard:

“Preserve existing naturally functioning SEZ lands in their natural hydrologic condition, restore all disturbed SEZ lands in undeveloped, unsubdivided lands, and restore 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided to attain a five (5) percent increase in the area of naturally functioning SEZ lands.”

Although the term Stream Environment Zone was not used in “Land-Capability Classification of the Lake Tahoe Basin, California-Nevada: A Guide for Planning” (Bailey 1974), Robert Bailey designated certain high hazard lands as Class 1 lands (i.e., lands not suited for development, grazing, or forestry). Within that class, a Subclass 1B was designated for lands that are naturally wet and poorly drained (e.g., stream channels, marshes, flood plains, riparian areas, and meadows). These class 1B lands are identified as “critical areas for the management and protection of water resources” (Bailey 1974). Bailey recommended that policy for these lands “should reflect their value as floodwater and sediment storage areas, wildlife habitat, and fish spawning grounds” (Bailey 1974).

The value of buffers adjacent to streams was identified in the 1971 TRPA report entitled “Hydrology and Water Resources of the Lake Tahoe Region.” This report stated that “stream quality can be protected by preserving buffers of undeveloped land adjacent to streams” (TRPA 1988). In 1977, a TRPA report entitled “Stream Environment Zones and Related Hydrologic Areas of the Lake Tahoe Basin” (TRPA 1977) outlined the value of SEZs and the importance of preserving and restoring SEZs. This report identified the following SEZ identification factors: 1) major rivers, streams, creeks, lakes, ponds, marshes, and wetlands, 2) 100-year

floodplains, 3) areas of topographic depression, 4) riparian vegetation, 5) alluvial soils, and 6) buffer strip.

Guidelines for the identification and delineation of SEZs were originally established in Chapter III of the “Handbook of Best Management Practices” (TRPA 1978). The BMP Handbook also addressed restrictions on disturbance within SEZs. In 1976, the area of “disturbed, developed, or subdivided SEZ lands” was delineated on the maps for the 1977 TRPA Lake Tahoe Basin Water Quality Management Plan (208 Plan).

When the Individual Parcel Evaluation System was developed between 1986 and 1988, the IPES Technical Committee, composed of professional hydrologists, soil scientists, engineers, and planners, developed a comprehensive procedure for the identification of SEZs based on the presence of key indicators and secondary indicators. These criteria and procedures became the established methodology for the determination of SEZs on January 1, 1989.

Although TRPA did not set forth any vision statements for SEZs in the ETCC (TRPA 1982), the preservation of SEZs was recommended for consideration as a threshold in the ETCC. To protect water quality and maintain natural hydrology in the Tahoe Basin, TRPA adopted a Stream Environment Zones standard.

TRPA’s SEZ Threshold Standard involves a three-pronged approach to the preservation and restoration of SEZs in the Tahoe Basin: (1) preservation of existing naturally functioning SEZ lands in their natural hydrologic condition, (2) restoration of all disturbed SEZ lands in undeveloped, unsubdivided lands, and (3) restoration of 25 percent of the SEZ lands that have been identified as disturbed, developed or subdivided to attain a five (5) percent increase in the area of naturally functioning SEZ lands.

A number of other TRPA threshold standards also pertain to the protection, restoration and management of SEZs. For example, the Land Coverage (Impervious Cover) Management Standard specifies one percent allowable impervious cover within SEZs in accordance with the Bailey System. Other standards in the vegetation, wildlife, and fisheries threshold categories that relate to the protection, restoration and management of SEZs include: Common Vegetation Management Standard; Uncommon Plant Communities Numerical Standard; Habitats of Special Significance Management Standard; Stream Habitat Numerical Standard; and, In-stream Flows Management Standard.

Implementation of the SEZ Threshold Standard

TRPA has also adopted policies for the protection, restoration and management of SEZs in the Conservation Element of the Regional Plan for the Lake Tahoe Basin – Goals and Policies. TRPA’s policies for the protection, restoration and management of SEZs are included in multiple sections of the Conservation Element including soils, SEZ, shorezone, vegetation, wildlife, fisheries, open space, as well as the Environmental Improvement Program (EIP).

Specifically, the SEZ Threshold Standard is implemented at several levels, based on its “tiered” structure. For example, the preservation of existing naturally functioning lands in unsubdivided lands is achieved with conservation/recreation

zoning, existing public ownership, and land acquisition programs, using grant monies and/or mitigation-type fees. Such funding occurs at the federal, state and local level. Provisions in TRPA Chapters 20 and 37 also provide administrative protections and opportunities for SEZ restoration. The implementation for SEZ in disturbed, subdivided lands is also part of the same acquisition programs, as well mitigation fee programs that improve water quality and SEZ functions. In addition, environmental improvement programs (EIP) provide direction and funding, especially where degraded SEZ conditions can be restored to reduce sediment transport and improve nutrient cycling.

4.2.2 MEASUREMENT AND MONITORING OF INDICATORS AND STANDARDS

SC-1 Land Coverage (Impervious Cover)

The allowable land coverage coefficients set forth in the Bailey report (1974) serve as the threshold indicators for the level of use an area can tolerate without sustaining permanent damage (erosion, runoff, etc.). The amount of land coverage (both hard and soft cover) serves as the indicator units (square feet of hard land coverage) by which this threshold standard is evaluated for attainment status. Hard coverage is determined by field measurements and remote sensing, while there lacks a good method for determining the amount of soft coverage.

Bailey intended for these land coverage coefficients to be applied using broad areas, such as geomorphic units (personal communication, Robert Bailey). Since the boundaries of the mapped land capability classes vary in size depending on the geology, geomorphology, soils, and climate of different parts of the Basin, the primary means of determining if the Land Coverage Threshold Standard is in attainment is a comparison of the amount of existing land coverage in each land capability class basin-wide.

Evaluation Criteria

Chapters 32 and 38 of TRPA's Code of Ordinances requires TRPA to maintain cumulative accounts of additional land coverage. TRPA has utilized the following means of measuring (and evaluating) the amount of hard land coverage in the Tahoe Basin and tracking the amount of new land coverage added and/or retired each year:

- Tracking of the amount of new permitted land coverage (sq. ft.) through the Parcel Tracking System (PTS; complete data not available). Note: Although the Parcel Tracking System database was intended to track impervious cover (following the 2001 Threshold Evaluation), the application data and verified coverage information was never transferred into the database.
- Calculation of the amount of new land coverage based on the water quality mitigation fee paid for new land coverage.
- Calculation of the amount of land coverage to be retired by the California Tahoe Conservancy (CTC) and Nevada Division of State Lands (NDSL) based on the Excess Land Coverage Mitigation Fees paid for new projects on project areas where existing land coverage exceeds the base

land coverage for the project area. CTC and NDSL restore areas formerly having hard or soft coverage, as well as purchase potential (future) coverage as means of retiring land coverage.

- Obtaining data from the CTC and NDSL mitigation land banks on the amount of land coverage that has been retired (i.e., removed and restored).
- Analysis of the amount of hard land coverage in each land capability class based on Desert Research Institute's GIS coverage of impervious surfaces developed from 2002 IKONOS satellite imagery.

Land Coverage Data and Analysis

To evaluate the status of the adopted Land Coverage (Impervious Cover) Threshold, the amount of impervious cover for the land capability classifications must be quantified. Given past limitations of PTS and lack of complete coverage data, TRPA acquired satellite imagery and contracted with The Desert Research Institute (DRI) in 2002 to identify and map hard impervious cover throughout the Lake Tahoe Basin using advanced remote sensing techniques.

High resolution, one-meter panchromatic and four meter multispectral IKONOSTM image data were acquired for the entire Basin from Space Imaging Corporation. Such image data was compatible with TRPA's existing GIS database and DRI's existing spatial data sets to ensure spatial compatibility and integration (Minor and Cablk, 2004). DRI developed image processing methods that used masking and transformation techniques to accurately identify impervious cover, regardless of canopy or other interference (Minor and Cablk, 2004). This work was compiled in their study report entitled, "Estimation of Hard Impervious Cover in the Lake Tahoe Basin Using Remote Sensing and Geographic Information Systems" (January 2004).

Next, Tetra Tech conducted an analysis using the GIS layer of impervious cover developed by DRI (May 2002) and the Lake Tahoe TMDL watershed model to quantify the amount of impervious cover by land capability class. The watershed model allowed their analysis to itemize the impervious cover by watershed boundaries (and subwatersheds, too). The analyses of impervious cover by land capability class compares actual coverage amounts to those allowed by the Bailey System and IPES. Such comparisons, when coupled with watershed boundaries, identify adverse amounts of impervious surfaces in the context of natural hydrologic boundaries.

Within the Basin there are 63 watersheds which drain directly to Lake Tahoe. (Note: There are 64 watersheds within TRPA's jurisdiction one being downstream of the Lake's outlet.) For the purposes of the Lake Tahoe TMDL model and for land capability analysis, these have been further divided into 184 subwatersheds. There are also more than 50 intervening zones, areas not part of a watershed and lacking a water course, that contribute sheet flow directly into Lake Tahoe. These are grouped into nine aggregate intervening zones and are analyzed in the same manner as the watersheds and subwatersheds.

The Tetra Tech analysis established Year 2002 as the baseline for the amount of impervious cover within the land capability classifications for the 63 watersheds, 184 subwatersheds, and nine intervening areas of the Basin. Some changes to this baseline are expected in forthcoming years as remote sensing technology improves; therefore, these data serve as a preliminary analysis.

SC-2 Stream Environment Zones (SEZs)

The number of acres of SEZ restored serve as the SEZ threshold indicator for the evaluation of threshold attainment. SEZ restoration project data are tracked through the EIP database. Additionally, TRPA's Soil Conservation Program has compiled a more complete database of SEZ restoration projects performed by various agencies within the Tahoe Basin. Project data include the restoration site location, project proponent, date implemented, overall size of the project site and the number of acres of SEZ restored. This SEZ restoration project database can be sorted based on whether each restoration project is located within or outside the urban boundary. Since the 2001 Threshold Evaluation, additional SEZ restoration data has been collected from 2001 to 2006 for this evaluation.

At the present time this inventory of SEZ restoration projects does not include any collective assessment of the functionality of SEZ restoration projects, however, monitoring programs are being or have been conducted at some of the larger SEZ restoration project sites.

Preservation of Existing Naturally Functioning SEZ Lands

Currently there is no indicator being applied to verify the "preservation of existing naturally functioning SEZ lands in their natural hydrologic condition." TRPA has not defined "preservation" in the Code of Ordinances; thus, it is assumed that "preservation" means that no new development should be allowed in existing naturally functioning SEZ lands, except where specified by the Code of Ordinances. This preservation applies equally to naturally functioning SEZs within and outside of the urban boundary. TRPA's threshold standard statement made clear that preservation includes preventing any disruption of the "natural hydrologic condition" of these existing "naturally functioning" SEZ lands. Acquisition of naturally functioning SEZ lands is one means of preservation; however, mere acquisition of SEZ lands does not mean that they are naturally functioning. Preservation can be both private and public acquisition of SEZ lands. Moreover, TRPA does not maintain any database of acquisition of naturally functioning SEZ lands. Agencies involved in SEZ acquisition (LTBMU, CTC, NDSL) have records of land acquisition; however, their reporting does not differentiate the acreage of SEZ acquired from the total size of parcels acquired. Also, their recordkeeping does not indicate the functioning of the SEZs (or lack thereof).

Restoration of Disturbed SEZ in Undeveloped, Unsubdivided Lands

The restoration of disturbed SEZ in undeveloped, unsubdivided lands involves the restoration of SEZs outside of the urban boundary. This is often facilitated by the acquisition of these disturbed SEZs and subsequent restoration (including the removal of historic and ongoing perturbations). Restoration can be accomplished on disturbed SEZs that remain in private ownership. Agencies involved in SEZ restoration maintain records of individual restoration projects. TRPA's database of

SEZ restoration projects includes SEZ restoration project sites inside of the urban boundary, however, it is not complete for SEZ restoration projects outside the urban boundary (i.e., in “undeveloped, unsubdivided lands”).

Restoration of 25 Percent of the SEZ Lands that have been Identified as Disturbed, Developed or Subdivided

TRPA’s threshold standard calls for restoration of 25 percent of the 4,400 acres, or about 1,100 acres of “disturbed, developed, and subdivided SEZ lands” within the urban boundary. TRPA has tracked the acreage of SEZ land restored within disturbed, developed or subdivided areas since 1980.

In general, “disturbed, developed, or subdivided SEZ lands” are those disturbed SEZs or man-modified SEZs that lie within the urban boundary. This urbanized area includes all areas with Residential, Tourist, and Commercial/Public Service Plan Area Statements. In 1996 TRPA added two Recreation Mitigation Plan Areas (i.e., Plan Area #119 – Country Club Meadow, and Plan Area #127 – Camp Richardson). The restoration of SEZ lands within Conservation Plan Areas and the remaining Recreation Plan Areas are excluded from this calculation.

In the Study Report for the Establishment of Environmental Threshold Carrying Capacities (ETCC report) (TRPA 1982), it was estimated that there were 4,376 acres of “developed or subdivided SEZ lands which could be preserved or restored to a natural state.” When the SEZ Threshold Standard was adopted in 1982 there was no mention of preservation acreage under this component of the standard, just the restoration of 25 percent of the SEZ lands identified as “disturbed, developed or subdivided.” In subsequent threshold evaluations, the adopted standard was interpreted to mean that there were approximately 4,400 acres of “disturbed, developed, or subdivided” SEZ lands within the urban boundary (and the additional plan areas identified above) of which 25 percent should be restored.

Attain a 5 Percent Increase in the Area of Naturally Functioning SEZ Lands.

In the Water Quality Management Plan for the Lake Tahoe Region (AKA 208 Plan , TRPA 1988), it was estimated there were approximately 17,700 acres of SEZ in the Tahoe Region. The 1996 Threshold Evaluation, (TRPA 1996) presented a revised estimated total of 21,944 acres of SEZ in the Tahoe Basin. The increase in SEZ acreage is due to newer, more accurate mapping techniques, as well as revised SEZ identification criteria (which broadened SEZ boundaries in some cases). This represents 10.4 percent of the total land area within the Basin. Five (5) percent of 21,944 acres equals 1,097 acres. This figure is consistent with the threshold target of restoring 25 percent of the SEZ lands identified as disturbed, developed or subdivided (1,100 ac.).

TRPA is currently updating the SEZ map layer using SEZ boundaries mapped in the field on a parcel base map along with updated soils data and shoals data; however, the 1996 estimate of 21,944 acres of SEZ lands in the Tahoe Region is being used for the purposes of this 2006 threshold evaluation.

4.3 THRESHOLD STATUS

4.3.1 SC-1 LAND COVERAGE (IMPERVIOUS COVER)

Status of Indicators

Non Attainment, but Near Attainment

Application of allowed land coverage, in accordance with the Bailey System, is determined on the basis of an area of a given land capability class, and its percentage of allowed impermeable coverage. The Bailey document (1974), upon which this threshold is based, did not present any guidelines or criteria for the evaluation of threshold attainment. Past evaluations have relied upon project decisions, record-keeping, and regulatory compliance to assess threshold attainment.

In 2005, TRPA, with the assistance of Tetra Tech, quantified the amount of hard land coverage in the Basin using Tetra Tech's Watershed Model and the DRI GIS layer of impervious cover (Table 4-2). The analysis defined the amount of existing hard coverage by land capability to derive an estimated baseline for the amount of impervious cover within each of the land capability classifications for 1) the entire Tahoe Basin, 2) the nine hydrologic transfer areas, 3) the 64 watersheds (63 watersheds within the Tahoe Basin and one additional watershed within TRPA's jurisdiction) and the nine aggregate intervening areas, and 4) the 184 subwatersheds defined in the watershed model.

The following paragraphs detail where attainment exists/does not exist on a land capability class basis for the entire watershed of the Basin, on the basis of the Hydrologic Transfer Areas, on the basis of the watersheds and intervening areas, and on the basis of subwatersheds.

Table 4-2: Hard Coverage by Land Capability Classes for the Tahoe Basin.

Land Capability Class	Existing Cov. (Acres)	Cum. Land Cap. Area (Acres)	Percent Coverage	Percent Allowed Coverage	Percent Difference	Area of Difference (Acres)
1A	766	75,657	1%	1%	0%	9
1B	1,211	27,987	4%	1%	3%	931
1C	147	51,854	0%	1%	-1%	-371
2	185	5,203	4%	1%	3%	133
3	411	9,119	5%	5%	0%	-45
4	632	6,716	9%	20%	-11%	-711
5	1,484	14,364	10%	25%	-15%	-2,107

Land Capability Class	Existing Cov. (Acres)	Cum. Land Cap. Area (Acres)	Percent Coverage	Percent Allowed Coverage	Percent Difference	Area of Difference (Acres)
6	872	7,838	11%	30%	-19%	-1,479
7	1,130	3,377	33%	30%	3%	117
WB	11	2,838	0%	0%	0%	11
Total	6,849	204,954	3%			

Positive numbers (+) exceed the allowed coverage, and negative numbers (-) are below the allowed coverage. WB = water body, including lakes, ponds and rivers.

Hard Land Coverage by Land Capability Class for the Entire Lake Tahoe Basin

Tetra Tech's analysis of impervious cover by land capability class within the overall area of the Lake Tahoe Basin indicates that five of the land capability classes are within attainment of allowable cover, while three land capability classes exceed the allowable coverage coefficients. Specifically, land capability classes 1C, 3, 4, 5 and 6 are within the limits of allowable coverage. Class 1A lands are at the impervious cover limit of 1 percent allowable coverage. In contrast, existing hard coverage within land capability classes 1B, 2, and 7 is currently exceeding the allowable coverage coefficients of the Bailey Land Capability Classification System within the overall area of the Lake Tahoe Basin.

Hard Land Coverage by Land Capability Class Within Hydrologic Transfer Areas

Since the land coverage threshold is intended to be attained within each of the designated hydrologic transfer areas within the Basin (personal communication Gordon Barrett, personal communication), the impervious cover data were evaluated by land capability class within the hydrologic areas. In general, the Hydrologic Transfer Areas of Incline and South Stateline exceed allowable coverage in most of the land capability classes. These areas could be characterized as having a significant amount of "grandfathered" land coverage. Conversely, the Hydrologic Transfer Areas of Marlette, Cave Rock, Upper Truckee, Emerald Bay, McKinney Bay, Tahoe City and Agate Bay predominantly have less than the allowed coverage in most of the land capability classes. In contrast, these areas have experienced growth predominately after land coverage regulations were implemented. All hydrologic transfer areas exceed allowable coverage in at least one land capability class. The mostly undeveloped Marlette and Emerald Bay hydrologic transfer areas are the only areas that do not exceed the allowable coverage coefficients for 1B land capability class.

Hard Land Coverage by Land Capability Class within the Watersheds of the Lake Tahoe Basin

The data indicate that 49 of the 63 watersheds and the aggregate 9 intervening zones of the Basin have at least one land capability class exceeding the allowable coverage coefficients. Of these 49 watersheds, 43 exceed the allowable coverage coefficient for land capability class 1B. (Note: Those watersheds and intervening

zones that exceed the allowable coverage coefficient for land capability class 1B may also exceed the allowable coverage coefficient for one or more additional land capability class.) Five watersheds, namely Bijou Creek, Bijou Park, Edgewood Creek, South Zephyr Creek and Upper Truckee River, also exceed the allowable coverage for land capability class 7.

Percentage of Hard Land Coverage for Watersheds of the Lake Tahoe Basin

Although TRPA does not currently have an adopted threshold for a maximum percentage of land coverage for each watershed in the Basin, such an analysis is worthwhile since scientific literature indicates that most stream quality indicators decline when watershed impervious cover exceeds 10 percent, with severe degradation expected beyond 25 percent impervious cover (Center for Watershed Protection, 2003). The data analysis indicates that four out of the 64 watersheds and seven out of the nine aggregate intervening areas have equal to or greater than 10 percent hard coverage. Four of these watersheds/ intervening areas have greater than 15 percent coverage, three of these watersheds/ intervening areas have greater than 20 percent coverage and two watersheds/ intervening areas exceed 25 percent hard coverage.

Hard Land Coverage by Land Capability Class Within the Subwatersheds of the Lake Tahoe Basin

The data indicate that 90 of the 184 subwatersheds in the Basin have at least one land capability class exceeding the allowable coverage coefficients. Again, the majority of these 90 subwatersheds exceed coverage limitations for 1B land capability class. These results could be skewed (i.e., high) if the mapping of SEZ (1B) is in error since. (Note: Those subwatersheds that exceed the allowable coverage coefficient for land capability class 1B may also exceed the allowable coverage coefficient for one or more additional land capability class.)

Percentage of Hard Land Coverage for Subwatersheds of the Lake Tahoe Basin

A subwatershed is a smaller segment of a watershed that is predominately drained by 1 to 4 tributaries. The data analysis indicates that 27 subwatersheds (out of a total of 184) have greater than 10 percent hard coverage. These subwatersheds primarily coincide with urban centers, such as Tahoe City, Kings Beach, Incline Village, Stateline, South Lake Tahoe, and Myers. Twelve of these subwatersheds have greater than 15 percent coverage, nine of these subwatersheds have greater than 20 percent coverage. Three subwatersheds and one intervening zone exceed 25 percent hard coverage (Burnt Cedar Creek, Incline Creek, Intervening Zone 1000 and Wood Creek).

Impervious Cover on National Forest Lands in the Lake Tahoe Basin

Overall, impervious cover on Forest Service lands is well within the allowable coverage coefficients. Impervious cover in land capability class 1B exceeds the allowable coefficient in two hydrologic transfer areas by less than 1 percent and in land capability class 2 existing cover exceeds the allowable coefficient in three hydrologic transfer areas by only 1.5 percent.

Impervious Cover in Plan Area Statement (PAS) Lands in the Lake Tahoe Basin

In general, impervious cover within urban zones amounts to 42 percent of hard coverage on commercial and public service lands; 43 percent on tourist accommodation and related lands; and 23 percent on residential lands. When examined by PAS units, excess coverage is apparent for 1B, 2 and 7 land capability classes. Also, 125 of 182 PAS units have greater than 10 percent hard cover; and 60 have greater than 25 percent hard cover.

Progress Towards Achieving Threshold

The compliance measures in effect since 2001 demonstrate a continued progression of land coverage management and reduction. These measures range from reducing (or mitigating) excess land coverage to minimization of coverage impacts on sensitive lands to limitations on new subdivisions. The current land use regulations and land capability system that restrict that amount of coverage based on soil type provide a solid framework for compliance and threshold attainment. These regulations and land capability system have effectively stopped encroachment on SEZs and have greatly limited development on poorly drained soils and steep slopes (low capability lands). Where impervious cover is not in attainment for some of the higher capability lands, it is usually where pre-TRPA development occurred (such as Bijou Park area or the casino core in South Lake Tahoe). As redevelopment occurs, the excess coverage (often referred as “grandfathered” coverage) is at least partially mitigated when those properties seek permits for redevelopment or other regulated site changes. The fees collected for excess land coverage, typically \$200,000 to \$300,000 per year, are dispersed to two state mitigation banks to retire potential coverage and/or remove existing coverage. Indirectly, the installation of Best Management Practices (BMPs) to control erosion, reduce runoff, and trap sediments are also a means toward achieving the impervious coverage threshold. While the BMPs frequently involve removal of coverage, these practices and features help to passively infiltrate runoff, dissipate rainfall/runoff energy, and capture sediments washing off impervious cover (roads, roofs, sidewalks, driveways, etc.). BMP installation (retrofitting) is occurring throughout the Lake Tahoe Basin, for residential and commercial/industrial parcels, roads and driveways, parks, and other developed land uses. For new construction, BMPs are integrated with site designs and building plans.

2006 status evaluation relative to threshold attainment schedules

The contribution of compliance measures to threshold attainment and the achievement of interim targets are summarized in the Compliance Forms at the end of this chapter and Appendix A.

Threshold Interim Target Status

As indicated in the preceding paragraphs, the land coverage threshold is near-attainment. On a basin-wide basis, Bailey land capability groups are in compliance for classes 1A, 1C, 3, 4, 5, and 6. Only classes 1B, 2 and 7 are not in attainment. The interim targets for land coverage include distribution of 80 percent of the excess land coverage mitigation fees. From 2001 to 2006, \$7,355,823 was collected by TRPA for excess coverage. During the same period, \$2,635,056 was disbursed to the California Tahoe Conservancy and Nevada Division of State Lands to purchase potential coverage and hard coverage (to be removed). This

set of numbers indicates the 80 percent disbursement target was not met; however, the actual coverage reduction requirements were met. The disbursements to the Conservancy had not occurred until after 2006, which then met this target. The second interim target goal for land coverage was a minimum of 60 acres of land coverage that was to be removed and restored, plus 5 acres of coverage mitigated by fee. Given this information, it can be estimated that the 7 million dollars should have restored approximately 20 acres. As to the 60 acres, TRPA cannot determine if this interim target goal was met. The third (and final) interim target goal of amending the excess land coverage mitigation program regulations was not accomplished. Specifically, TRPA did not modify existing regulations to emphasize the retirement of hard coverage due to time constraints. While an emphasis on retirement of hard coverage would be beneficial (especially classes 1B and 2), it is evident that the various programs to purchase urban lands (or development rights) have positively contributed to the threshold attainment status for classes 3, 4, 5 and 6. As documented by the "Updated Appraisal of the Market Value of Land Coverage in the Lake Tahoe Basin Appraisal" (Johnson-Perkins and Associates 2006), removal of hard coverage on class 1B and 2 (low capability) lands can be five to six times higher than for potential coverage costs and four to five times higher for hard coverage on high capability lands. Consequently, it would be a substantial financial burden to mitigation banks to focus on hard coverage removal for low capability lands (like 1B and 2).

Threshold Target Dates

It is expected that land coverage for land capability classes 1A, 1C, 3, 4, 5 and 6 will remain within the limits of allowable coverage (in attainment). It is expected that land coverage for land capability classes 1B, 2, and 7 will decrease to allowable coverage coefficients of the Bailey Land Capability Classification System within the next 20 years. Given the high degree of historic impacts to 1B and 2 lands, an extremely proactive land acquisition program will be necessary to attain this threshold by 2026.

4.3.2 SC-2 STREAM ENVIRONMENT ZONES (SEZs)

Status of SC-2 Indicators

Non Attainment

Preservation of Existing Naturally Functioning SEZ Lands

Currently there is no indicator being applied to verify the "preservation of existing naturally functioning SEZ lands in their natural hydrologic condition". Therefore, it is not presently possible to determine the existing condition and trend for the preservation of existing naturally functioning SEZ lands. Past evaluations have not previously reported attainment for this component of the SEZ threshold due to the lack of appropriate indicators. Nonetheless, it is believed this component of the SEZ threshold is at or near attainment due to regulations that severely restrict new development and mitigate SEZ impacts on a 1.5 to 1 basis.

Restoration of Disturbed SEZ in Undeveloped, Unsubdivided Lands

To date no indicator has been applied by TRPA to document the “restoration of disturbed SEZ in undeveloped, unsubdivided lands.” Although it is not possible at present to determine existing the condition and trend for the restoration of disturbed SEZ in undeveloped, unsubdivided lands, it should be possible to do so in the future when the SEZ restoration project database is complete. Past evaluations have not reported attainment for this component of the SEZ threshold due to the lack of appropriate indicators and definitions for quantifying SEZ restoration outside of the urban boundary. Nonetheless, it is believed this component of the SEZ threshold is in non-attainment due to historical disturbances (logging, ditching, channelization, grazing, etc.) that have not yet been addressed. Table 4.3.1 shows the cumulative SEZ restoration from 1980 to 2004.

Restoration of 25 Percent of the SEZ Lands that have been Identified as Disturbed, Developed or Subdivided to Attain a 5 Percent Increase in the Area of Naturally Functioning SEZ Lands

TRPA’s threshold standard calls for the restoration of 25 percent of an estimated 4,400 acres of SEZ lands that were identified as “*disturbed, developed, or subdivided*” in the 1982 ETCC. Thus, TRPA’s SEZ threshold standard is to restore 1,100 acres of SEZ within the “*disturbed, developed, or subdivided SEZ lands.*” TRPA tracks the acreage of SEZ land restored within “*disturbed, developed, or subdivided SEZ lands*” using the EIP project database and the SEZ restoration project database. TRPA updated its SEZ restoration project database in 2006 to include all SEZ restoration projects within the urban boundary (and certain additional Plan Areas) through 2006.

Since 1980, approximately 378.9 acres of SEZ lands have been restored within the urban boundary (Table 4.1, including the additional plan areas). This leaves a balance of 721.1 acres of SEZ restoration needed to attain the 1,100-acre threshold.

Note: The total of 378.9 acres of SEZ restored is not consistent with Table 16 of Appendix C of the 2001 Threshold Evaluation – Cumulative Accounting which presents a total of 474.7 acres of SEZ restored between 1981 and 2000. This discrepancy in the data is the result of the inclusion of restoration projects within Conservation Plan areas in the calculation of SEZ acres restored in the 2001 Threshold Evaluation. These restoration projects within a Conservation Plan area by definition are excluded from the calculation because they occur on unsubdivided land.

Figure 4-1: Four (4) Year Trend Analysis of SEZ Acres Restored Within Disturbed, Developed, and Subdivided Lands 1980-2004.

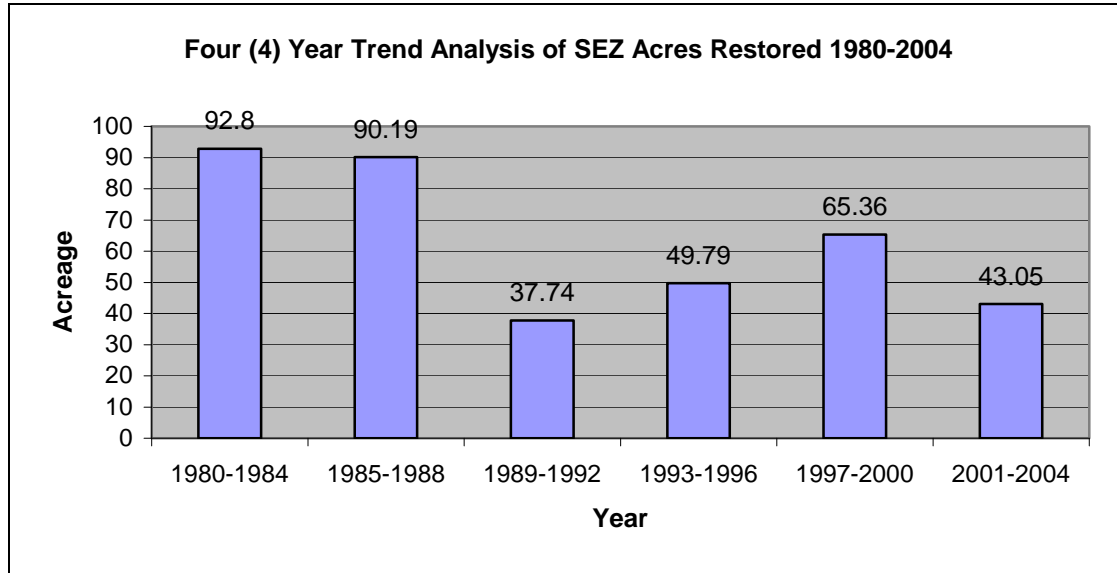


Table 4-3: Completed SEZ Restoration Projects Within Disturbed, Developed, and Subdivided Lands 2001-2006.

Project Name	Jurisdiction	Watershed	Lead Agency	Completed	Acres Restored
South Y Industrial Tract SEZ Restoration Project	CSLT, CTC ¹ , CAL-Trans	Upper Truckee R.	CTC	2001	5.80
Washoe Meadows Phase IV Angora Creek Sewer Line Project # 949	CA State Park	Upper Truckee R.	CTC	2003	23.00
Lonely Gulch	El Dorado Co. & USFS	Lonely Gulch Ck.	USFS	2003	0.50
Lower Kingsbury Phase II	Douglas Co.	Burke Creek	NV Division State Lands	2004	0.32

Project Name	Jurisdiction	Watershed	Lead Agency	Completed	Acres Restored
Upper Truckee-Lower West Side, # 560.1	CSLT	Upper Truckee R.	CTC	2003	12
Rosewood Creek SEZ, # 562.1	Washoe	Third Creek	Washoe County	2004	1.43
Total					43.05
¹ California Tahoe Conservancy					

Progress Towards Achieving Threshold

Since 2001, all of the compliance measures have been implemented or are in progress. These measures include an SEZ restoration program that utilizes one-quarter of the water quality fees collected for new impervious cover. These SEZ restoration funds are dispersed to local jurisdictions when they propose SEZ restoration work, such as removal of bridge/culvert constrictions and creek bank stabilization. Another SEZ compliance measure is the 1.5:1 mitigation requirement for unavoidable impacts to SEZs. This measure functions to discourage new impacts and also captures historical SEZ impacts (albeit slowly). For example, existing regulations have been effectively enforced that SEZ impacts are mitigated on a 1.5:1 basis. The Code of Ordinances, in Chapter 37, specifies SEZ setbacks to reduce potential encroachment and protect existing SEZ functions. Lastly, the shorezone regulations reduce impacts to the shorezone SEZs, which include beaches, deltas, and lagoons. As indicated for the impervious cover discussion, BMPs also provide an indirect means of achieving the SEZ threshold standard. BMPs, when properly designed and installed, reduce the volume of water directly discharged to the SEZ systems, plus they also intercept some of the suspended sediments. The reduction of both of these water quality constituents reduces the hydraulic and physical pressures (impacts) on SEZs; hence, they incrementally reverse the effects of impervious cover. The BMP influence on SEZ systems are largely unrealized because the number of BMP installations is still relatively low (but increasing each year). Said differently, basin-wide compliance with BMP retrofitting requirements could greatly slow ongoing degradation in SEZs attributed to increased runoff and sediment delivery to streams.

SC-2 2006 status evaluation relative to threshold attainment schedules

The contribution of compliance measures to threshold attainment and the achievement of interim targets are summarized in the Compliance Forms at the end of this chapter and Appendix A.

Threshold Interim Target Status

TRPA established an interim target to increase the area of naturally functioning SEZ (within the “*disturbed, developed, or subdivided SEZ lands*”) by 400 acres by the end of 1996. The restoration by 1996 amounted to 270.52 acres; thus, this target was not met. A new interim target was not established for SEZ restoration in the 1996 Threshold Evaluation. In the 2001 Threshold Evaluation, TRPA set an interim target to restore an additional 721 acres of SEZ by October 2006. With less than 500 acres restored, this interim target has not been met.

Threshold Target Dates

2026 for entire threshold.

4.4 EIP IMPLEMENTATION STATUS

4.4.1 COMPLETED EIP PROJECTS AND CONTRIBUTION TO THRESHOLDS

Approximately 54 capital improvement projects focused on soil conservation, SEZ restoration and creation, and erosion control have been identified in the Environmental Improvement Program. TRPA Records indicate that 25 of these capital improvement projects have been completed to date (Table 4.4.1). The 2001 report listed 16 environmental improvement projects that affect impervious cover. These EIP project numbers are 23, 250, 268, 319, 321, 373, 560, 640, 938, 944, 948, 963, 964, 991 and 10162. These EIP projects frequently involve removal of coverage from sensitive lands (1B lands), road decommissioning and/or re-alignment, land acquisition (especially sensitive lands), and BMP implementation. In general, each of these projects contributes to attainment of the soil conservation threshold; however, coverage reduction and land acquisition have the greatest benefit for the threshold. Two of seven research and evaluation projects have also been completed and have resulted in an overall benefit to the soil conservation program.

The 2001 report also listed 39 EIP SEZ restoration projects (EIP no. 23, 24, 27, 118, 161, 250, 262, 266, 319, 321, 351, 352, 373, 385, 391, 412, 414, 421, 556, 562, 640, 651, 652, 935, 936, 938, 940, 944, 945, 948, 950, 952, 953, 985, 986, 988, 989, 990, and 991). The majority of these projects involve restoration of SEZ functions, such as reversal of historic dewatering, removal of old fill material, revegetation with native species, relocation of trails and roads, pre-treatment of storm water, creek channel stabilization, and enhancement of other floodplain/riparian areas. All of these EIP projects facilitate SEZ restoration; however, only those projects involving disturbed, developed or subdivided SEZs count towards the 25 percent restoration goal.

The EIP program is currently in the process of being updated. Therefore, recommendations for projects directed toward meeting attainment of the soil conservation and SEZ thresholds will be made through that process.

Table 4-4: Completed EIP Capital Improvement Projects

EIP Number	Title	Project Description	Status
7	Highway 50 Water Quality Improvements	The Nevada Department of Transportation will provide slope stabilization, scenic enhancements, and water quality improvements within US 50 right-of-way in a two-phased project from Douglas mile post 7 to 11.	Partially complete
22	Trout Creek – Pioneer to Black Bart SEZ Restoration	The City of South Lake Tahoe will restore naturally functioning SEZ and stream channel which provides water quality benefits, wildlife enhancements and scenic enhancements. Approximately 100 acres in entire site. Project being done in three Phases (I-III).	Completed
24	Ward Creek SEZ Restoration	USDA Forest Service and the California Tahoe Conservancy will restore naturally functioning SEZ, stabilize stream channel, and control gullies which provides water quality, scenic, and wildlife benefits.	Partially complete
25	Snow Creek SEZ Restoration	Placer County will remove and bioremediate earthen fill material within an SEZ, re-create a naturally functioning wetland area, and enhance fisheries by replacing existing culvert with bottomless culvert under SR 28.	Partially complete
27	Blackwood Creek SEZ/Fishery Restoration	The USDA Forest Service will restore naturally functioning SEZ and stream channel which provides water quality, scenic and wildlife benefits. Approximately 45 acres will be restored.	Partially complete
123	Incline Creek SEZ/Fisheries – Hyatt	Restore more natural channel and floodplain, relocate fields and some parking, revegetate with approved SEZ vegetation, and provide for fish passage. Approximately 1.5 acres of SEZ function will be restored.	Completed
250	Edgewood Creek Restoration	Restore Edgewood Creek through National Forest lands.	Partially complete

EIP Number	Title	Project Description	Status
262	Fairview Boulevard SEZ Restoration	This project includes partial road removal, restoration of hydrology, and meadow strengthening.	Completed
263	Second Creek SEZ Restoration	BMP roads and homes and treat runoff.	Completed
264	Third Creek – Village Boulevard SEZ Restoration	Remove fill, revegetate, roadside BMPs, and runoff treatment.	Completed
318	Wildwood (B/W, Ski Run and Pine Grove Park) WILDWOOD	The City of South Lake Tahoe will acquire and remove structures, restore SEZ and construct a passive and active park for the neighborhood (if feasible). Approximately 1 acre of SEZ restoration will be completed.	Completed
351	California State Parks Upper Camploop Removal	California Parks will restore 1 acre of SEZ in conjunction with the improvement of the Tahoe State Recreation Area.	Completed
390	Tahoe Vista Beach Area SEZ Restoration	North Tahoe Public Utility District will restore 1 acre of SEZ in conjunction with the creation of public beaches.	Completed
446	Coverage – North Shore Ecosystem Management Project	Obliteration of 47 acres of USDA Forest Service roads within the project area.	Completed
447	East Shore – Land Coverage Restoration	USDA Forest Service will obliterate 22.7 acres of roads within the project area when funded.	Completed
559	Angora Creek SEZ Restoration	California State Parks will restore a section of Angora Creek to its original channel adjacent to its golf course. Approximately 10 acres will be restored.	Completed
560	Upper Truckee Cove East SEZ Restoration	The California Tahoe Conservancy will restore the mouth of the upper Truckee River and floodplain adjacent to the Tahoe Keys from Hwy 50 to the lake. Will include the mouth of Trout Creek.	Completed

EIP Number	Title	Project Description	Status
561	Upper Truckee – Highway 50 to Airport SEZ Restoration	Create riparian pasture through fencing to protect river channel from direct impacts of cattle, revegetate channel banks and develop alternative sites to water cattle outside of Upper Truckee channel.	Completed
562	Third Creek – Lower Reach SEZ Restoration	From State Route 28 to Lakeshore Blvd the creek needs to be brought out of its incised channel and the floodplain restored where possible.	Partially complete
640	SEZ Restoration on Public Lands	If found feasible, restore 40 acres of SEZ on lands that have been acquired by the public within the subdivided, developed, and disturbed areas of the city.	Partially complete
10128	Lonely Gulch	Restore reach of stream on National Forest urban lots. This reach serves approximately as property boundary between NF lots and private property. A restoration project will require cooperation with property owners, possibly through Natural Resource Conservation Service.	Partially complete
10129	Page Meadows	Improve, relocate and remove trails through Page Meadows in the Ward Creek watershed.	Completed
10139	Sensitive Land Acquisitions Program Phase II	This California Tahoe Conservancy program involves the acquisition of environmentally sensitive parcels from willing sellers.	Ongoing
10151	Land Coverage Restoration	Nevada Division of State Lands shall implement a program designed to remove land coverage and restore disturbed lands to natural function. Activities may include land acquisition, slope stabilization, revegetation, and stream restoration.	Partially complete

4.5 THRESHOLD NEED FOR CHANGE

A major conclusion of this evaluation is that several of the soil conservation quality threshold standards, management standards and policies require extensive re-evaluations for either recalibration or amendment. These changes also relate to updating the management system itself and the coordination needed with other agencies. It is the recommendation of this report that TRPA should pursue the proposed amendments to the environmental threshold carrying capacities. . The sections below summarize the proposed amendments. As noted, amendments are scheduled for action with adoption of the Regional Plan package in 2008, while others will require further development and analysis by TRPA. The proposed changes include replacing the current value statements with the statement of a vision for Soil Conservation and a vision for Stream Environmental Zones and more specific threshold goal statements for soil conservation and stream environment zones.

Overall, these changes reflect the need for an integrated management approach to achieve the desired future conditions of resources in the Lake Tahoe Basin that have been expressed by the Pathway 2007 agencies, state and local governments, and other stakeholders in the Basin.

4.5.1 SC-1 LAND COVERAGE (IMPERVIOUS COVER)

The following proposed Vision Statement and Threshold Goal Statement reflect the recommended basis for changing the existing threshold standard.

Soil Conservation Vision: Soil resources are conserved for the betterment of the environment and public. Soils function naturally, and land-use activities are assigned to suitable soils and landscape settings. Risks to life and property from natural hazards are reduced to acceptable levels.

Threshold Goal 1. Land Coverage and Disturbance: Land coverage does not exceed the capacity of the soil resources to offset the effects of impervious cover. The effects of impervious cover and disturbance are fully mitigated on a storm water zone basis.

The effects on soil disturbance, generally in the form of impervious land coverage, (SC-1) fall under this threshold goal.

Threshold Recommended Changes

The primary recommendation is to expand the land coverage threshold to include human disturbance that significantly affects soil functioning, as well as address the effects of land coverage. The threshold goal for soil conservation in the Lake Tahoe basin should focus on mitigating the effects of impervious cover and increased runoff to enhance and protect soil resources on a storm water basis. The amount of impervious cover is already evaluated (as previously explained using the IKONOS imagery and interpretation); which correlates to a measurement of soil dysfunction. There is additional need for quantifying areas of permanent disturbance where soil erosion and sediment transport exceed natural rates. The

degree of mitigation, in part, can be measured with the number of BMP installations certified by TRPA and the conservation districts. A revised land coverage standard is currently under review and final wording is expected in 2007.

Rationale for Change

There is a need to expand the land coverage threshold to include human disturbance that significantly affects soil functioning, as well as address the effects of land coverage. The threshold goal for soil conservation in the Lake Tahoe basin needs to identify how soil functioning is different for urban areas and forest areas. The forest areas threshold goal should focus on maintaining or enhancing soil function to sustain native plant and animal life, regulate water flow, flooding and infiltration cycle nutrients and filter excess pathogens, excess nutrients and other pollutants. In contrast, the threshold goal for urban areas should be enhanced soil and watershed function and land use designations appropriate to minimize soil erosion, runoff, and pollutant loading on a storm water basis. Hard coverage needs to continue to be an indicator; however, saturated hydraulic conductivity, runoff, soil strength, ground cover, plus BMP implementation need to be additional indicators.

The current land capability systems were designed primarily for new construction (on vacant ground) and in particular in the urban areas where land and allowed impervious cover are at a premium. After 30 years of use, the current land capability system has indicated a need for a different criteria for forest lands, where soil conditions remain mostly undisturbed and land management focuses on soil health and production. Consequently, when development occurs on forest land, it already has minimal impacts, typically far below the coverage allowed by the current land capability system.

In the next 20 years, redevelopment of aging business, homes and facilities will dramatically increase. Thus, there is an imperative need to have a land capability system that is applicable to both vacant land and redevelopment scenarios. Incentives are needed for over covered redevelopment to mitigate the impacts of excess impervious cover.

The use of land capability and land coverage as guiding concepts to regulate development has proved sound, but changes to the current goals and policies are necessary due to numerous difficulties in applying the current system, new soils information, and new scientific literature on the impacts of impervious cover. With the NRCS soil survey update now complete, many of the soil map units described in the Bailey Land Capability system no longer exist, including some of the 1B or SEZ soil map units. Thus, it will no longer be possible to achieve the current standard, except if the old soil survey components remain as the standard. In the long run, it is in the public interest to utilize the updated soil survey, rather than stay dependent on the old one. The current land capability goals and policies should be modified as part of the Regional Plan update process.

The use of land capability systems and land coverage limitations has proven effective in reducing soil erosion. Nonetheless, the current land capability systems (Bailey and IPES) were designed primarily for new construction (on vacant ground). Such development, while still occurring, is on the decline. In addition, some difficulties have arisen in the past 10 years in the application of the Bailey

and IPES systems. These difficulties are further compounded by the fact that the regulations associated with these systems are also tied to a now-obsolete soil survey. For example, the release of the updated Tahoe Basin Area soil survey (2006) further necessitates adjustment of the land capability systems because several of the soil map units described in the Bailey Land Capability system no longer exist, including some of the 1B or SEZ soil map units. Said differently, the updated soil survey makes the current standard no longer achievable without some internal modifications. There is also a need to review the Bailey and IPES systems in light of new scientific findings on the relationship of impervious cover to stream systems and watershed health. Standard revision should then proceed based on the findings of these analyses.

In the next 20 years, redevelopment of aging businesses, homes and facilities will dramatically increase. Thus, there is an imperative need to have a land capability system that is applicable to both vacant land and redevelopment scenarios. Furthermore, mechanisms are needed for over-covered redevelopment (“grandfathered coverage”) to meet public expectations for compatibility with environmental constraints, and to mitigate the impacts of excess impervious cover on watershed runoff and water quality. While the Bailey and IPES systems limit new coverage on the basis of soil conditions, neither system adequately addresses “grandfathered” (pre-1972) land coverage (however the Excess Land Coverage Mitigation and Transfer Programs do.). And, neither system has a watershed orientation nor structured to mitigate the effects of impervious surfaces.

4.5.2 SC-2 STREAM ENVIRONMENT ZONES (SEZs)

The following proposed Vision Statement and Threshold Goal Statement reflect the recommended basis for changing the existing threshold standard.

Stream Environment Zone Vision: SEZs function at natural levels within the context of the watershed, and provide values commensurate with their functions. Societal and beneficial uses of SEZ, such as water management, cultural and scientific purposes, limited agriculture and recreation, are compatible with the naturally functioning condition of SEZ lands.

Threshold Goal 2. SEZ physical and chemical processes function properly within the constraints and dynamics of the watershed, including but not limited to, natural hydrologic processes, water quality, and stormwater treatment capacity.

Threshold Goal 3. SEZ biological processes function properly within the constraints and dynamics of the watershed. Vegetation, terrestrial wildlife, and aquatic communities are healthy and sustainable.

The condition and restoration of stream zones, as evident by the natural functions of SEZs (SC-2) fall under this threshold goal.

Threshold Recommended Changes

A minor change to the SEZ threshold is recommended, which includes modification of the threshold text to specify the acreage amount of SEZ restoration (rather than the percentage). The threshold goal for SEZs should focus on restoration of SEZ characteristics to naturally functioning conditions. The threshold goal should be

measured using acres of SEZ restored. This finite number of SEZ restoration more clearly shows the current status of acres of SEZ restoration in disturbed and subdivided areas.

While there are existing studies and baseline evaluations of selected stream systems in the Lake Tahoe Basin, it is expected new indicators would not be completed until after the adoption of the Regional Plan Update. This amount of time is needed to have adequate baseline studies, as well as complete hydrologic modeling to determine historical peak flows for representative watersheds. A similar set of baseline conditions for littoral processes is also needed and will need several years to develop and field test.

Rationale for Change

The current standards for this threshold are not sufficient to maintain significant resource values. The current standard does not accurately quantify SEZ restoration, and thus it does not provide an adequate basis for determining SEZ standards. Future assessment protocols would define SEZ functions such as flood water adsorption, denitrification in the soils, habitat for terrestrial and aquatic species, and sediment trapping. Assessment of these functions should clarify specific SEZ needs for pre-treatment and detention of urban runoff, restoring capacity to SEZs for attenuation of catastrophic events (fire, floods, landslides, etc.), and sustain native plant and animal populations that are dependent on SEZ for a portion of their life cycles. The rationale for updating the SEZ threshold is as follows:

TRPA's SEZ Threshold Standard calls for the "preservation of existing naturally functioning SEZ lands in their natural hydrologic condition." At present, TRPA does not have an accurate means of determining if this preservation has occurred and will be sustained in the future. The indicators and standards for SEZ preservation need refinement and precision to provide this accountability. Criteria need to be established for the assessment of SEZ lands for adequate functioning in their natural physical, chemical and biological condition.

The existing SEZ threshold standard calls for the restoration of "all disturbed SEZ lands in undeveloped, unsubdivided lands". This standard needs clarification to define "disturbed" SEZs and to better define natural function. The database of SEZ restoration projects needs updating with all completed SEZ restoration projects outside of the urban boundary. Additionally, an inventory is needed of disturbed SEZ lands, both inside and outside the urban boundary.

For clarity, the existing SEZ threshold standard specifying the amount of restoration of SEZ lands that have been identified as "disturbed, developed, or subdivided" needs revision to simply specify 1100 acres of SEZ restoration, rather than 25 percent of the 4,400 acres of "disturbed, developed, and subdivided SEZ lands".

At present, the number of SEZ acres restored is recorded upon completion of project construction activities and preliminary evaluation of project accomplishments such as removal of fill, impervious cover, apparent return of SEZ hydrology, or vegetation establishment, but there is no system for estimating restoration of specific SEZ functions. SEZ restoration indicators and revised

standards are needed to ensure the restoration of SEZ functions and values. The appropriate time (i.e., number of years after completion of construction) when the functionality of SEZ restoration projects should be assessed needs to be set. This includes criteria development for the assessment of “naturally functioning” SEZ restoration projects.

4.5.5 OTHER

Threshold Recommended Changes

No other threshold changes at this time are recommended for soil conservation, which focus on land coverage and SEZ restoration. Future management (non-threshold) standards may be appropriate to address soil functioning, watershed functioning and risk management for catastrophic events (floods, fires, landslides, etc.).

4.6 RECOMMENDATIONS

4.6.1 SC-1 LAND COVERAGE (IMPERVIOUS COVER)

Status of 2001 Threshold Recommendations

Table 4-5: Status of 2001 Threshold Recommendations for the Land Coverage (Impervious Cover) Threshold

Recommendation	Rationale	Status
A. Impervious coverage tracking through use of advanced satellite imagery	The use of satellite imagery, along with remote-sensing techniques developed by the Desert Research Institute (DRI), can identify and map most types of impervious cover. Such mapping will create an inventory of impervious cover more thorough and accessible than current record keeping.	Complete
B. Parcel Tracking System (PTS) database updating and recompilation	Impervious cover can be recorded and associated with APNs. Recordkeeping procedures and forms need revision to be inputted in existing system.	Incomplete
C. Augment impervious coverage tracking through analysis of aerial photography	Coverage and disturbance, other than impervious cover, can be mapped using recent, high resolution aerial photography.	Incomplete
D. Individual Parcel Evaluation System effectiveness study	The relationship between IPES and suspended sediment loads has not been quantified. A study or technical advisory group could identify potential modifications to improve IPES effectiveness.	Incomplete. The purpose of this recommendation has been partially satisfied by the development of the TetraTech watershed model (for determining potential TMDL results)

Recommendation	Rationale	Status
E. Increase the accuracy of tracking and inventory of soft coverage	Soft coverage, as defined by TRPA code, can have similar effects as hard coverage, but to a lesser degree. Soft coverage is not currently tracked or inventoried. Use of some high resolution aerial photographs could also be useful in quantifying soft coverage.	Incomplete
F. GIS update	TRPA's existing GIS includes out-of-date layers pertaining to the 1974 soil survey. It also contains moderate resolution aerial photographs. The GIS database should include layers containing recently generated data, higher resolution photographs, and other sources of detailed information.	Complete The information for the soil survey update has been loaded in TRPA GIS system. Newer high resolution aerial photographs were added in mid-2006.
G. Soil Survey update	In Aug. 2006, NRCS completed and electronically published updated soil maps, soil series and related data for the Tahoe basin. NRCS no longer supports the original soil survey, yet existing TRPA codes, regulations, standards and calculations make reference to the 1974 soil survey. Technical revisions are necessary to adapt TRPA codes, regulations to the updated soil survey.	Incomplete TRPA, via the Regional Plan update process, intends to revise code, regulation, to incorporate the soil survey update that was electronically released in Aug. 2006.
H. Amend excess coverage mitigation program to increase the retirement of hard coverage Forest pathology working group	The current mitigation program for excess coverage allows for the retirement of existing and potential coverage. The removal of existing coverage allows for soil resources to be restored; whereas, retirement of potential coverage prevents loss of soil functioning (due to future development). Removal of existing coverage in areas close to water courses and in subwatersheds having excess cover would be beneficial.	Ongoing

Recommended Changes for 2006

The recommendations for changes to soils and SEZ thresholds are described in section 4.5 of this Threshold Evaluation Report and also included in the Draft Pathway 2007 Evaluation Report (Version 1.1, 2006) and Technical Supplement. Some of the recommended changes will be addressed in the 2008 Regional Plan Update. The specific changes to be brought forth in the update will be evaluated in an Environmental Impact Statement to be completed before public hearings and requests for Governing Board action. The Compliance Measure updates listed in this document are intended to provide new information on monitoring, interim targets and to correct previous grammatical and factual errors. Potential changes to threshold standards and indicators will be addressed in the Threshold Update portion of the EIS for the Regional Plan Update.

- 1) Update or supercede the Land Capability Classification System developed by Dr. Robert Bailey (Bailey 1974) and replace selected data (e.g., Tables 2, 4 and 5 plus appendix) as needed to adjust to new data (esp. updated soil survey and SEZ maps). Alternatively, develop a new land capability system

that manages the location and amount of land coverage (i.e., hard and soft cover) in the Lake Tahoe Basin and offsets the impacts of runoff from land coverage. Replacement tables for the existing Bailey system and/or new land capability system should include components for assessing the following, but not limited to:

- a. Erosion sources and locations (on- and off-site);
 - b. Initial base land coverage coefficients for site development as necessary (final coefficients determined by site-specific analysis).
 - c. Appropriate coefficient(s) of permanent land disturbance, if needed.
 - d. Effectiveness of BMPs to mitigate the impacts of land disturbance and coverage.
- 2) Update the Individual Parcel Evaluation System (IPES) per new information (especially the updated soil survey), then re-calibrate IPES scores, or, develop an acceptable substitute system for managing coverage and disturbance on undeveloped single-family residential parcels. Alternatively, develop a land capability tool to determine the appropriate amount of functional open space to offset disturbance related to developed portions of the land. If created, this tool should be viable for both developed and vacant lands.
 - 3) Enhance the present system for monitoring land coverage in the Tahoe Basin by including soft land coverage and other kinds of disturbance, in addition to hard land coverage (i.e., impervious cover). Establish procedures and timelines for the periodic re-assessment of the amount of land coverage in the basin.
 - 4) Establish prescriptions (i.e., corrective actions) for over-covered watersheds and/or subwatersheds and develop strategies for reducing the amount of land coverage and/or reducing the impacts of runoff from excess coverage.
 - 5) Regularly update the Excess Coverage Mitigation Fund program and develop additional strategies for reducing the amount of land coverage on over-covered parcels and/or reducing the impacts of runoff from over-covered parcels. Focus more on restoration of hard and soft coverage, rather than acquisition of potential (future) coverage.
 - 6) Develop a rating or prioritization system that generates larger land restoration credits for restoring hard coverage in areas needing such restoration. For example, restoration of certain 1B lands could slow SEZ degradation and/or significantly improve long-term SEZ restoration and preservation efforts.

Implementation of Supplemental Compliance Measures

The following Supplemental Compliance Measures were identified in the 2001 Threshold Evaluation Report to enhance threshold attainment of the soil conservation (land capability) threshold:

06, 11 and 13

Measure 6 is the Excess Land Coverage Mitigation Program, Measure 11 are the land coverage limits (coefficients), and Measure 13 is the restriction on development in low capability lands (1B), except transportation and municipal needs.

Modifications or Deletions of Past Compliance Measures

The following Compliance Measures were identified as “measures in place” in the 2001 Threshold Evaluation Report:

13, 14, 15, 37, 127, 128, 129, 130, 132, 133, 134, 136, 137, 139, 140, 141, 142, 143, and 151

None of these measures are proposed for modification or deletion.

4.6.2 SC-2 STREAM ENVIRONMENT ZONES (SEZs)

Status of 2001 Threshold Recommendations

Table 4-6: Status of 2001 Threshold Recommendations for the Stream Environment Zones (SEZs) Threshold

Recommendation	Comments	Status
A. EIP participation	SEZ restoration, especially within subdivided, developed and disturbed land is part of the TRPA standard. Attaining 721 acres of restoration will require outside resources to re-establish SEZ functions. The EIP program offers a combination of resources, inter-agency coordination, and staff to achieve SEZ restoration.	Ongoing
B. Amend Code of Ordinances to reflect and incorporate into the SEZ criteria the most current developments in the identification of pedogenic and hydrologic indicators	New terms relating to redoximorphic features and hydric soil indicators have been developed by NRCS that should be incorporated into TRPA code. Similarly, the updated soil survey “retired” some archaic terms and introduced new terms that should be utilized in the updated regional plan.	Incomplete
C. Assess ability to create properly functioning man-made SEZs	TRPA currently lacks adequate definitions for restoration and SEZ functions.	Incomplete
D. Continue development of a bio-assessment inventory of benthic invertebrates to evaluate water quality	An inventory of benthic invertebrates within SEZs would provide valuable baseline data on the health and diversity of SEZs.	Incomplete
E. Continue development of SEZ classification system	SEZs provide multiple functions including, but not limited to wildlife, fisheries and hydrology. Currently there is no system to classify SEZs, although such a system would help prioritize EIP restoration projects.	Incomplete

Recommended Changes for 2006

The Regional Plan Update may address recommendations for future programmatic and regulatory changes to Compliance Measures. Additional recommendations that will be addressed through the Regional Plan Update are described below. Please see sections 4.4 and 4.5 above for recommendations regarding EIP and threshold changes, respectively.

- 1) Re-evaluate the criteria (i.e., field indicators) for SEZ identification and delineation (i.e., mapping of boundaries) as presently set forth in TRPA's Code of Ordinances Section, 37.3. Develop SEZ criteria identification key to improve consistency of SEZ determinations. Utilize standards and nomenclature common to the updated soil survey and other national terminology in this evaluation. Also, devise criteria (i.e., field indicators) for shorezone SEZ identification and delineation.
- 2) Revise the comprehensive lists of plant species for "riparian plant communities" that are used in TRPA's Code of Ordinances, Section 37.3, as partial criteria for the identification and delineation of SEZ. Correlate primary plant communities with wetland boundaries and secondary plant communities with non-wetland "riparian" plants.
- 3) Evaluate the effectiveness of the present system of setbacks from SEZ required by TRPA (Chapter 37) and compare to riparian setback systems used outside of the Lake Tahoe Basin. If needed, develop replacement criteria for establishing appropriate setbacks. Also, prescribe appropriate uses of the stream/wetland portion of SEZs and also for the riparian/floodplain portion of SEZs.
- 4) Revise TRPA definitions used for determining restoration credit (i.e., acres) and clarify the definition of SEZ Restoration. Consider including SEZ enhancement projects wherein the removal of historic and ongoing perturbations that are causing disturbance to SEZ lands is the primary management action taken. Also consider including restored SEZ lands within Conservation Plan Areas and Recreation Plan Areas that are functionally connected to developed areas. Eliminate grazing and related agricultural uses from appropriate land use, unless such uses are beneficial for land restoration, too.
- 5) Expand the present database of SEZ restoration projects to include documentation of the number of acres of restored SEZs, as well as the restoration attributes (stream channel stability, woody debris, riparian diversity, etc.).
- 6) Update TRPA's Condition Assessment Handbook for SEZs (Huffman & Associates 1998) to include evaluation of streambank (fluvial) stability, terrestrial habitat and aquatic habitat, and related functions. This should be done in conjunction with items no. 4 and 5, above.

- 7) If desired, develop a system for the designation of management units and/or uses within SEZs for the purpose of managing permitted and grandfathered land uses and activities within SEZs (such as recreation, cultural, scientific and archeological investigations).
- 8) Update definition and develop criteria for “naturally functioning” (component of the SEZ Threshold Standard) to be inclusive of SEZ physical, chemical and biological functions, as well as SEZ vegetation.
- 9) Develop hydrographs for representative stream systems to document historical and existing conditions.
- 10) Establish benchmarks for littoral processes to quantify ongoing changes to barrier beach formation and related shorezone features.
- 11) Through code revisions, prescribe a larger portion of the water quality to SEZ restoration, storm water detention, biofiltration and infiltration.

Implementation of Supplemental Compliance Measures

The following Supplemental Compliance Measures were identified in the 2001 Threshold Evaluation Report to enhance threshold attainment and maintenance of the Stream Environment Zone (SEZ) threshold:

13, 14, 15, 21, 22, 23 and 24

Measure 13 is the restriction on new construction in low capability lands, except for transportation and municipal needs. Measure 14 is the SEZ restoration program, which is part of the 208 plan. Measure 15 are SEZ setbacks specified in Chapter 37. Measure 21 is artificial wetlands/runoff treatment program to encourage pre-treatment of created runoff. Measure 22 is a program to grant bonus units for removal of development from SEZs. Measures 23 and 24 are typographic errors and should not be listed as an SEZ-related supplemental compliance measure.

Modifications or Deletions of Past Compliance Measures

The following Compliance Measures were identified as “measures in place” in the 2001 Threshold Evaluation Report:

37, 127, 129, 130, 131, 133, 135, 136, 137, 140, and 141

None of these measures are proposed for modification or deletion.

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Category: ~~Water Quality~~ / Soil Conservation
Parameter: Impervious Coverage

1. STANDARD: TRPA: Impervious coverage shall comply with Land Capability Classification of the Lake Tahoe Basin, California-Nevada, a Guide for Planning (Bailey, 1974).
2. INDICATOR (UNITS): Additional land coverage, by project, (sq. ft.).
3. MONITORING SUMMARY: Additional land coverage was ~~is~~ monitored by TRPA as part of the project review process, and recorded in the ~~Tahoe Environmental Geographic Information System (TEGIS)~~ Parcel Tracking System (PTS) on a parcel-by-parcel basis, in accordance with Chapter 38 of the TRPA Code. It is also recorded with water quality mitigation fees (\$fee collected /\$1.54 = sq. feet additional land coverage in basin).
4. ATTAINMENT STATUS: Non-Attainment, but near-attainment. The TRPA Code (Chapter 20) limits all additional land coverage to the Bailey coefficients, either directly or by coverage transfers within a related hydrologic area. Threshold attainment is measured on a basis-wide basis, not on the basis of hydrologic transfer areas. However, the 1994, 1996 and 2004 Evaluation Previous evaluations concluded the threshold is not in attainment; however, the data was insufficient to isolate where coverage limits were exceeded. Excess land coverage mitigation programs contribute to gradual reduction of existing and/or potential land coverage. Based on financial records, the amount of disbursements since ~~1994-2001~~ from excess coverage mitigation funds amounted to \$5,610,674.24 \$2,635,056, which equates to over 20 acres of coverage reduction and potential coverage retirement. This acreage exceeds the 5 acre target set in 2001. This The disbursed fees ~~amounted to 80~~ 36 percent of the ~~\$6,982,386.28~~ total fees of \$7,355,823 collected over this same period. Thus, The interim target of dispersing 80% of the funds was not met. The lower-than-expected distribution percentage is not significant because it accurately reflects the CTC land coverage credit surplus. In forthcoming years, CTC anticipates new land acquisitions that should utilize the

undistributed fees for replenishment of their surplus. Based on appraised land coverage values, adjustment to the excess coverage mitigation fees (Chapter 20 of the TRPA Code) ~~was~~ were adopted in 2001 and again in 2006 by the Governing Board. ~~and went into affect 7/1/04.~~

5. TARGET DATE: ~~2030~~-2026
6. EVALUATION INTERVAL: Annual
7. INTERIM TARGETS:
 - a. By December 31, 1993, and every year thereafter, outlays from the excess coverage mitigation funds for land coverage retirement were to be not less than 80 percent of the funds collected. ~~TRPA must work diligently with the Nevada Division of State Lands, a limited Nevada side land bank, to identify and acquire excess land coverage, so that the 2006 interim target can be achieved.~~
 - b. By October 15, ~~2006~~-2011, a minimum of 60 acres of land coverage removed and restored and 5 acres of coverage mitigated by fee.
 - c. ~~By June 2004~~ For Regional Plan update, amend the Excess Coverage Mitigation Program to emphasize the retirement of Hard Coverage and biannual appraisal of the cost of land coverage and restoration costs (rather than annually).
 - d. Revise Chapters 2, 20 and 37 of the Code of Ordinances to incorporate new soil survey mapping and technical data.
8. COMPLIANCE MEASURES: (See ~~Section~~ Appendix A for inventory)
 - a. MEASURES IN PLACE: Urban Runoff and Erosion: 06, 11, and 13
Natural Area Management: 46
 - b. EFFECTIVENESS OF MEASURES IN PLACE: The Goals and Policies and Code limit additional land coverage to the Bailey coefficients, either directly or by transfer within the related hydrologic area. The excess land coverage mitigation program gradually reduces existing and/or potential land coverage on parcels that exceed the Bailey coefficients. In order to evaluate the effectiveness of these measures in bringing about attainment and

maintenance of the threshold, ~~a complete coverage database is required~~ an improved recordkeeping is needed to quantify land coverage reduction associated with redevelopment projects and new coverage is correlated with specific land capability classes. ~~Consideration of additional opportunities for land coverage transfer is also dependent on the completion of this database.~~

- c. SUPPLEMENTAL MEASURES: Urban Runoff and Erosion: 01, 03 and 05
 - d. EFFECTIVENESS OF SUPPLEMENTAL MEASURES: The 1996 Evaluation and 2001 Evaluation recommended implementation of supplemental measures 03 and 05 specifically with regard to the permanent retirement of coverage removed from U.S. Forest Service and State Parks lands and a performance audit of the IPES program to determine if further restrictions or safeguards on the movement of the IPES line are needed to attain and maintain this threshold standard. These supplemental measures were not implemented., ~~however this evaluation again recommends there implementation.~~ An informal evaluation of the field component of the IPES program was evaluated regarding land capability challenges and new lot scoring. Revisions to the IPES Soil Procedures Manual are recommended to utilize laboratory analyses and field measurements of hydraulic conductivity when determining land coverage.
9. ADEQUACY OF COMPLIANCE MEASURES: The compliance measures will gradually bring about attainment and maintenance of the threshold.

Category: ~~Water Quality/~~ Soil Conservation
Parameter: Naturally-Functioning SEZ

1. STANDARD: TRPA: Preserve naturally-functioning SEZs in their natural condition; restore 25 percent of SEZ lands identified as disturbed, developed, or subdivided, to obtain a 5 percent total increase in the area of naturally-functioning SEZ lands.
2. INDICATOR (UNITS): Area of naturally-functioning SEZs (acres).
3. MONITORING SUMMARY: Disturbance in SEZs is monitored by TRPA as part of the project review process, and recorded in the ~~Tahoe Environmental Geographic Information System (TEGIS) Parcel Tracking System (PTS)~~ on a parcel-by-parcel basis, in accordance with Chapter 38 of the Code. (See Section III, Cumulative Account). Approximately ~~475 526~~ acres (~~approximately 200 acres on National Forest lands~~) of SEZ restoration work have been completed, including 379 acres in urban areas. The threshold calls for restoration of ~~5 25~~ percent of the 4,400 disturbed, developed or subdivided acres, or about 1,100 acres of disturbed, developed, and subdivided SEZs.
4. ATTAINMENT STATUS: ~~Improving but not in Non-attainment~~. Over ~~474 379~~ acres of urban SEZ have been restored, leaving ~~625 721~~ acres (~~an average of 125 acres/year~~) of SEZ restoration to meet the threshold of 1,100 acres of SEZ restored by ~~2006 2026~~. ~~Interim targets were not established as called for in the 1996 Evaluation~~. TRPA Goals and Policies and the Code implement prohibitions on SEZ disturbance in accordance with the threshold.
5. TARGET DATE: ~~2006 2026~~
6. EVALUATION INTERVAL: ~~Semi-Annual~~
7. INTERIM TARGETS:
 - a. Restore ~~624 400~~ acres of SEZ by October ~~2006 2011~~, of which 50 percent should occur in the McKinney Bay, Tahoe City and Upper Truckee Hydrologic Transfer Areas.
 - b. Continue creation of a SEZ classification system that categorizes SEZ type by function in terms of wildlife, fisheries and hydrology ~~by December 2003~~.
8. COMPLIANCE MEASURES: (See Section II for inventory)
 - a. MEASURES IN PLACE: Urban Runoff and Erosion: 13, 14, 15, 21, 22, 23, and 24
 - b. EFFECTIVENESS OF MEASURES IN PLACE: The restoration threshold was based on the feasibility of restoring SEZs in the urbanized portions of the Tahoe Region. Disturbance in the urbanized areas includes filling, grading, draining, encroaching, displacing vegetation, altering drainage, blocking channels, and channelizing. TRPA (1977) and Morris (1981) showed that SEZs are effective for removing sediment and nutrients from surface runoff; however, natural treatment capability is reduced where development causes channelized flows. Consequently, channelized SEZs may actually increase sediment and nutrient loads delivery to Lake Tahoe through concentration of surface runoff. Storm water facilities and artificial ~~and restored~~ SEZs will can provide many of the same benefits as natural SEZs, but may be less effective at treating the increased volume of surface runoff. ~~especially during the first few years of operation~~. Improved urban runoff management and functional restoration is needed ~~For additional discussion, see the Water Quality Management Plan for the Lake Tahoe Region, Volume III (TRPA, 1988)~~. Measures in-place, for the most part, are successful at protecting SEZs and limiting development of impacts to them. ~~Additional restoration is needed~~. A Code amendment to strengthen the protection of SEZ vegetation, updating SEZ identification criteria using the new soil survey, and improved financing and planning of projects are needed.
 - c. SUPPLEMENTAL MEASURES: None.
9. ADEQUACY OF COMPLIANCE MEASURES: There are approximately 21,944 acres of SEZ in the Tahoe Region. TRPA estimates that over 1,100 acres will can be restored by a combination of: (1) completed projects; (2) restoration projects on TRPA's EIP list; (3) large development projects; and (4) small projects of the California Tahoe Conservancy, Forest Service, and Nevada Division of State Lands.

For additional detail, see the Water Quality Management Plan for the Lake Tahoe Region, Volume III (TRPA, 1988). In general, adequate regulatory and program compliance measures are in place. It is implementation of these measures that is ~~the~~ challenge-needed to focus on the effects of urban runoff (such as flashy flood peaks and increased storm water discharges in creeks). The recommendations made in this evaluation, coupled with an improved fiscal situation for the program, will improve overall implementation and eventual attainment of this threshold.