TRPA
APC
PACKETS

DECEMBER
1996

TAHOE REGIONAL PLANNING AGENCY
ADVISORY PLANNING COMMISSION
NOTICE OF MEETING

NOTICE IS HEREBY GIVEN that the **Advisory Planning Commission** of the Tahoe Regional Planning Agency will conduct its regular meeting at 9:30 a.m. on Wednesday, **December 11, 1996**, at the North Tahoe Conference Center, 8318 North Lake Boulevard, Kings Beach, California. The agenda for the meeting is attached hereto and made a part of this notice.

December 2, 1996

By: _____
Jerry Wells
Deputy Director

This agenda has been posted at the TRPA office and at the following post offices: Zephyr Cove and Stateline, Nevada, and Tahoe Valley and Al Tahoe, California. The agenda has also been posted at the North Tahoe Conference Center in Kings Beach, the Incline Village GID office, and the North Lake Tahoe Chamber of Commerce.

TAHOE REGIONAL PLANNING AGENCY
ADVISORY PLANNING COMMISSION

North Tahoe Conference Center
8318 North Lake Boulevard
Kings Beach, California

December 11, 1996
9:30 a.m.

All items on this agenda are action items unless otherwise noted. Page #

AGENDA

I. CALL TO ORDER AND DETERMINATION OF QUORUM

II. APPROVAL OF AGENDA

III. PUBLIC INTEREST COMMENTS (No Action)

Any member of the public wishing to address the Advisory Planning Commission on an agenda item not listed as a Public Hearing or a Planning Matter item, or on any other issue, may do so at this time. However, public comment on Public Hearing and Planning Matter items will be taken at the time those agenda items are heard.

NOTE: THE ADVISORY PLANNING COMMISSION IS PROHIBITED BY LAW FROM TAKING IMMEDIATE ACTION ON, OR DISCUSSING ISSUES RAISED BY THE PUBLIC THAT ARE NOT LISTED ON THIS AGENDA.

IV. DISPOSITION OF MINUTES

V. PUBLIC HEARING AND RECOMMENDATION TO THE GOVERNING BOARD

A. Draft EIS for the Lake Tahoe Shorezone Development Cumulative Impact Analysis 1

B. Presentation of the Recommendations of the 1996 Threshold Evaluation Report, Appendix B Schedule of Implementation 3

1. Potential Water Quality, Air Quality, Vegetation, Noise, and Fisheries Threshold Amendments (A List)

2. Potential Goals and Policies and Code Amendments Adopted With the 1996 Environmental Threshold Report

3. Other Amendments, Programs, and Studies (B and C Lists)

VI. PLANNING MATTERS

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B. Lowering of the IPES Line for 1997 33

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VII. REPORTS

A. Executive Director

B. Legal Counsel

C. APC Members

VIII. ADJOURNMENT

TAHOE REGIONAL PLANNING AGENCY

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MEMORANDUM

November 22, 1996

To: TRPA Advisory Planning Commission

From: TRPA Staff

Subject: Lake Tahoe Shorezone Development Cumulative Impact Analysis and Draft Environmental Impact Statement (DEIS)

This item is an ongoing issue that is placed on the APC agenda each month throughout the comment period which has been extended to January 31, 1997.

For the past seven months, TRPA staff, along with 24 other representatives of public and private interests, have been working in a partnership to gain consensus on the difficult issues highlighted in the Shorezone DEIS. The Shorezone Partnership Committee meets twice a month for all-day facilitated sessions.

Please contact Coleen Shade at (702) 588-4547 if you have any questions or comments regarding this agenda item.

CS/rd

AGENDA ITEM V.A.

TAHOE REGIONAL PLANNING AGENCY

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MEMORANDUM

December 2, 1996

To: TRPA Advisory Planning Commission

From: TRPA Staff

Subject: Presentation of the Recommendations of the 1996 Threshold Evaluation Report, Appendix B, Schedule of Implementation.

Proposed Action: No action is requested at this time; however, APC comments would be appreciated since a final report and amendments will be prepared for future APC action. This is a continuation of a series of presentations to inform the APC about the 1996 Evaluation Report.

Presentation: The presentation is based on Appendix B of the 1996 Evaluation Report. The complete draft Evaluation Report is included in your packet. The Evaluation Report provides an overview of the status of threshold attainment and the corresponding staff recommendations. Appendix B is a schedule of implementation that lists the recommendations that will require action in the following categories:

1. A List - These recommendations will need to be enacted as part of the approval of the 1996 Evaluation Report.

2. B List - Implementation of these recommendations will be phased in over the next five years.

3. C List - Implementation of these recommendations are subject to other actions by other agencies and/or acquisition of major funding and will also be phased in over the next five years.

If you have any questions regarding this agenda item, please contact the specific program manager or Gordon Barrett at (702) 588-4547.

GWB/rd

AGENDA ITEM V.B.

TAHOE REGIONAL PLANNING AGENCY

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MEMORANDUM

December 3, 1996

To: TRPA Advisory Planning Commission

From: TRPA Staff

Subject: Results of Study on the Be (Beaches) Soil Map Unit

Proposed Action: Review the information contained in the Be Soil Map Unit Study report and presentation and make a recommendation to the Governing Board supporting the conclusions of the study.

Staff Recommendation

The staff recommends that the Advisory Planning Commission review the information and the conclusions contained in the Be (Beaches) soil map unit study and make a recommendation to the TRPA Governing Board supporting the findings of the study.

Background

The definition for the Beaches (Be) map unit in the Soil Survey for the Tahoe Basin was overly-simplistic, contained typographic errors, and was not sufficiently detailed to account for the variety of soils and landforms that are contained within the mapped extent of the Be soil map unit.

The description in the soil survey reads as follows:

> Beaches (Be) is adjacent to the lake shore, mainly the south shore near Kings Beach. It is coarse sand derived mainly from granitic alluvium.

Staff realized that this overly-simplistic description of Be soils in the text of the Tahoe Basin Soil Survey, is inadequate to deal with the variety of soils and landforms encountered within the mapped extent of the Be map unit. This presents difficulties for all users of the soil survey. The soil scientists who mapped the Be soil map unit, included parcels in the Be soil map unit that had many different landform characteristics, including pocket beaches, barrier beaches, and dunelands, among others. They recognized that these areas are all sensitive lands in terms of land capability classification and shorezone tolerance district. However, they failed to provide a sufficiently detailed description of all of the components of the Be soil map unit to explain the way it was mapped in the soil survey.

TRPA staff considers all of the landforms currently mapped in the Be soil unit to be sensitive and in need of maximum protection from new disturbance. Staff deemed it essential that their be a more workable and detailed description of the Be soil map unit for use in making land capability class determinations concerning this soil map unit.

Therefore, TRPA contracted with Randy Moory, who in conjunction with Dr. Lynn Moody, prepared a more detailed description of the Be soil map unit. Dr. Moody is an instructor at California Polytechnic State University, San Luis Obispo and an expert in the classification and mapping of shoreline sediments. Copies of abstracts of her recent scientific journal articles on the subject are included for review (Exhibit 1a and 1b).

Randy Moory has been under contract as the Soil Conservation Mentor for TRPA's Shorezone Structures EIS and Cumulative Impact Analysis, and his expertise is very relevant to the questions of concern in this matter.

The field work for this study was completed in August, and a Draft report completed in October. The final report is included in your APC packet. The information from this study is of great assistance in defining and guiding the appropriate use and management of areas within the Be map unit.

The study by Randy Moory and Dr. Moody, entitled "Criteria for Identification of the Be Soil Map Unit", (Exhibit 2), consisted of an investigation of the shoreline of Lake Tahoe. Their report contained much greater detail in the description of the sediments and the landforms that were included in the mapped Be soil map unit. Dr. Moody examined representative soils within each of the beach units using conventional soil survey techniques, including the barrier beaches on the South Shore, the beach area in Incline Village, and the wave-reworked wind blown sand dunes in Tahoe Vista.

The soils within the Be map unit are described as being very young with little soil horizon development as indicated by the lack of concentrations of clay, iron oxides, pedogenic silica, and calcium carbonate, which in addition to organic matter act to cement soil particles together into stable aggregates.

According to Dr. Moody, the soil at Tahoe Vista, "consists of fine sands, with no aggregation, and very little organic matter.....Like the south shore soils, the north shore soils are developmentally very young. No accumulations of cementing agents were noted. "Dr. Moody determined that "The K factors (erodibility) of the fine sands are uniform through the profile... and overall, this soil is the most erodible of the four soils examined."

She further states that " The dune and reworked dune soils on the north shore are especially erodible, by both wind and water, if the vegetative cover is removed. Rapid to very rapid permeability will tend to lessen the likelihood of runoff on these sandy beach soils, yet this property, and the proximity of these soils to open water (the lake), means that contaminants that enter the soil could be transported rapidly into the lake."

This determination is also consistent with the 1b (SEZ) classification of the Beaches (Be) map unit by Dr. Robert Bailey on page 29 (Appendix) of his report, "Land Capability Classification of the Lake Tahoe Basin,

California-Nevada, A Guide to Planning, 1974" (Exhibit 3). Dr. Bailey's determination that the Be soil is sensitive land and should therefore be placed in land capability class 1b, is consistent with the criteria that is set out on page 20, Table 4, of the Bailey Report (Exhibit 4). The categories used to classify the soil map units include, slope percent, relative erosion potential, and runoff potential. Each of the categories are peremptory, in that the most restrictive property (slope, erosion potential, or runoff potential) moves the soil map unit into the next lowest category.

In the case of the Be soil map unit, the highly erodible nature of the soil places this in the "High" category in terms of relative erosion hazard. By definition this places it in high hazard lands in terms of sensitivity to new disturbance. Dr. Bailey determined that 1b was the most appropriate land classification class to place the Be soil map unit within the sensitive land classes (1a, 1b, 1c, 2, and 3).

The findings in the Be Soil Map Unit study confirm staff's conclusion that the soils and landforms found within the Be soil map unit are sensitive and should not be subject to new coverage and disturbance. However, the study does not support the placement of all portions of the Be map unit (specifically the dune areas on the North Shore) in the 1b land capability classification.

ELSEVIER

Geoderma 67 (1995) 181–201

GEODERMA

Geomorphic and pedogenic evolution in coastal sediments, central California

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Received 17 August 1994; accepted 16 November 1994

Abstract

Studies of soil chronosequences on marine terraces facilitate the use of terraces for tectonic and paleoclimatic interpretation. However, many areas on the California coast have received substantial eolian deposits after pedogenesis began, so do not qualify as chronosequences. These areas are worthy of study because they are widespread coastal landscape features, and they enable us to interpret pedogenic and geomorphic processes in sandy regolith. The objective of this study was to use soil and deep regolith morphology and chemistry to interpret pedogenic and geomorphic evolution on a sequence of four marine terraces, San Luis Obispo County, California. The terraces are numbered 1, 2, 3, and 4, from oldest to youngest. The eroded terrace platforms have been tentatively dated at 560, 420 or 480, 320, and 120 ka, respectively. The sand deposits on each platform may be considerably younger. The amount of land surface dissection and the depth of stream incision increase with increasing terrace age and elevation. Morphological features suggest that the soils (Xeropsamments on Terrace 4, Haploxerolls on Terrace 3) on the two youngest terraces are well drained, and their morphological development is typical of soils in eolian sand deposits. Morphological and chemical features of the basal regolith contrast with those of the soils. Clay, Fe oxides, and opaline silica were deposited by groundwater flow above the bedrock platform. Above the shoreline angle, where the deep regolith receives additional groundwater from higher terraces, redoximorphic features have developed. Gray mottles are larger, more common, and more distinct in the basal regolith of progressively older terraces. Erosion has removed much of the overburden on Terraces 2 and 1, and soils (Epiaquolls on Terrace 2, Epiaqualfs on Terrace 1) have developed in what was once deep regolith. The landscape, soils, and deep regolith show an evolution of processes, whereby the path and direction of water movement through the regolith is controlled first by terrace morphology and stratigraphy, then by the development of pedogenic features in the soil and deep regolith, and by terrace dissection.

1. Introduction

Marine terraces are records of the interaction of worldwide sea level fluctuations, tectonic activity, and coastal erosion and sedimentation, throughout the late Quaternary. Terrace

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3 Pedogenic Processes in Thick Sand Deposits on a Marine Terrace, Central California

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ABSTRACT

Pedological studies in thick sedimentary sequences are generally limited to the upper few meters. Field investigation of thick (≤ 50 m) sand deposits on an emergent Pleistocene marine terrace in central California showed morphological differences between the solum at the surface and the deep regolith. Based on morphological and geochemical features, four units were identified within the regolith. Two zones of active pedogenesis occur within three of these units. The surficial unit is in Holocene sand deposits (mixed, thermic, Argic Xeropsamments), and has darkened A horizons, a slightly reddened subsoil, and incipient lamellae at the depth of wetting front infiltration. These lamellae have slightly more clay and Fe oxides than the soil above. Mineral weathering is intense at the surface. The other zone of active pedogenesis is at the base of the regolith, where a lithologic discontinuity above the terrace platform forms an aquitard, and throughflow occurs. Meteoric water percolates through thin regolith deposits above the shoreline angle, and at other locations on the terrace where sediment has been removed by erosion. Percolating water carries clay, organic matter, and solutes to the water table. Weathering is intense within this basal unit. Illuviation of clays and Fe oxides, and precipitation of Fe oxides and silica occur within this unit. As pore space is filled, fractures and channels become paths for saturated water flow. Eluviation of Fe occurs at these sites. Most of the intervening regolith is isolated from current pedogenesis by its great depth and a relatively dry Holocene climate. Well-developed lamellae are preserved as relicts of Pleistocene episodes of soil formation. These lamellae formed by illuviation of clay and Fe oxides, and were sites of silica precipitation. The conceptual model presented here is intended to facilitate understanding of pedogenic and geomorphological evolution of marine terrace deposits, and to assist with the interpretation of groundwater flow in these terrace systems.

Pedological studies in thick sedimentary sequences are usually limited to the upper few meters. These depths generally encompass the solum and parent material. Some soil studies have recognized deep occurrence of pedogenic

 Whole Regolith Pedology. SSSA Special Publication no. 34.

Criteria for Identification of the Be Soil Map Unit

December 1, 1996

Prepared for
Tahoe Regional Planning Agency

by
Randall L. Moory, Consulting Marine Scientist

Dr. Lynn Moody, Consulting Soil Scientist

Criteria for Identification of the Be (beaches) Soil Map Unit

The Tahoe Regional Planning Agency adopted a land capability classification as an environmental threshold and carrying capacity to address the response of lands in the Lake Tahoe basin to development or more specifically coverage and disturbance by development activities. The basis for this land capability classification is the report by Robert G. Bailey entitled "The Land-Capability Classification of the Lake Tahoe Basin, California-Nevada" (Bailey, 1974). This land capability classification system ranks lands in the Lake Tahoe basin into 7 capability levels and 3 sub-capability levels as shown in Table 1. Geomorphic setting and soil type are the principal factors used in the Bailey land-capability classification system. It should be noted that minimum mapping unit for geomorphic setting as defined by Bailey was 1 (one) square mile. For the purposes of this study, Be (beaches) classified by Bailey as 1b are of concern. According to the Soil Survey of the Tahoe Basin Area (Rogers, 1974), Be (beaches) represent 0.1 percent or 275 acres of the Lake Tahoe Basin.

The Bailey land capability classification system reflects conditions and land uses expected in the Lake Tahoe Basin. Soil erodibility is the principal measure for determining capability in this land capability system. This capability classification uses soil type, erosion hazard, hydrologic soil group, soil drainage, rockiness and stoniness, geomorphic setting, and ecological sensitivity, to classify land and soil types into 7 capability groups. The Bailey system defines lands having low capability as easily eroded or least tolerant to disturbance without sustaining permanent damage. One of the principal soil units falling into this low capability definition are the soils characterized as Be (beaches) map unit on the 1972 Soil Survey for the Lake Tahoe Basin area (Rogers, 1974). The Bailey Land Classification system classifies the Be (beaches) soil unit as subclass 1b or one of the least capable lands in the basin. This soil unit is capable of sustaining 1 percent coverage without permanent damage (Bailey, 1974). According to Bailey, subclass 1b are characteristically "a narrow one including stream channels, marshes, flood plains, and meadows. These lands are naturally wet, poorly drained and critical areas for management and protection of water resources. Policy for use of these lands should reflect their value as floodwater and sediment storage, wildlife habitat,

and fish spawning grounds."[1]

The soil map unit Be (beaches), occurs as narrow, arcuate bands immediately adjacent and in contact with Lake Tahoe. The Soil Survey of the Lake Tahoe Basin area (Rogers, 1974) reports 0.1 percent (275 acres) if the Tahoe Basin area to be in the Be (beaches) soil unit. According to the Soil Survey, the Be (beaches) soil unit is geographically associated with soils in the Elmira and Elmira Variant, Jabu, Fugawee, Cagwin, Inville, Gefo, Tallac and Umpa series, and March and Rock Outcrop miscellaneous land types. The Elmira, Elmira Variant, Jabu, Inville, Gefo, and Tallac formed soils formed in granitic alluvium and outwash; the Cagwin soils formed in granitic grus; and the Fugawee and Umpa soils formed in latite and andesite (Rogers, 1974).

Purpose of this Study:

Recent evidence suggests that the Be (beaches) soil unit is more variable than the single differentiation shown in the 1974 Soil Survey. In order to provide more complete criteria for field investigation of the Be (beaches) soil unit, the Tahoe Regional Planning Agency requested a study to determine criteria for identification and differentiation of the Be (beaches) soil unit. These criteria will be used for future mapping of the Be (beaches) soil unit in the Lake Tahoe Basin. The criteria developed in this study include landform, soils, and hydrologic factors that can be used to differentiate the Be (beaches) soil unit from surrounding soil units. This study defines the landforms that represent environments where the Be (beaches) soil unit exists. It characterizes soil, geomorphological, and vegetation factors involved in determining soil erodibility, and provides differentiation for future mapping of the Be (beaches) soils unit.

Methodology:

To prepare this study and draw conclusions about the Be (beaches) soil unit, the

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[1]Bailey, Robert G. Land-Capability Classification of the Lake Tahoe Basin, California-Nevada: A Guide for Planning. 1974. Page 23.

authors relied upon their knowledge of Lake Tahoe and coastal soils formation, other published references, and field reconnaissance of the Be (beaches) soil unit. Principal references used by the authors include the "Land-Capability Classification of Lake Tahoe Basin, California-Nevada" (Bailey, 1974), "Soil Survey of the Tahoe Basin area, California and Nevada "(Rogers, 1974), "Sedimentology of the littoral zone in Lake Tahoe, California-Nevada" (Osborne, 1985), and the "Lake Tahoe Shorezone Development Cumulative Impact Assessment, Draft Environmental Impact Statement" (TRPA, 1995).

The authors conducted a field reconnaissance of representative Be (beaches) soil map units in August, 1996. During this reconnaissance, representative soils within each landform were described using conventional methods (Soil Survey Division Staff, 1993; Soil Survey Staff, 1993). At each site, a professional soil scientist examined the soil horizons. Bulk samples were collected by horizon from Baldwin Beach and Tahoe Meadows. Particle size distribution was measured on these samples by sedimentation (ASTM hydrometer) and sieving (Gee and Bauder, 1986). These distributions were correlated with size distribution data reported by Osborne in 1985. Field textures and particle size distributions of these soils, and field textures and examination of cumulative frequency curves for beach samples (Osborne, 1985), were used to estimate soil erodibility (K) factors, using unpublished "alternative" method developed by the Natural Resources Conservation Service (Kenneth J. Oster, NRCS Area Soil Scientist, 1995, personal communication). Joseph Pepi, Senior Planner for the Tahoe Regional Planning Agency provided other soil and site descriptions from several beach locations which were used to assess the spatial variability of soils within each beach unit.

Landforms:

No single landform description represents all the environments that contain the Be (beaches) soil unit. However all the landforms have common features: (1) the Be (beaches) soil units are located along the margins of Lake Tahoe, in contact or potentially in contact with the Lake; (2) portions of the Be soil units lie within the area defined as the backshore of the shorezone; and (3) the landforms are subject to attack by waves that may generate over Lake Tahoe. The shorezone of Lake Tahoe is divided into three zones: the, nearshore, foreshore, and backshore. Accurate delineation of the landward limit of the backshore by mapping the area of instability

is critical to understanding each landform and the location of the Be (beaches) soil unit.

Three landforms represent the different environments where the Be (beaches) soil unit are found. These are the lakeshore strand, barrier beaches, and lakeshore sand dunes. We further divide the barrier beach setting into a younger, active forming barrier beach and older barrier beaches.

Lakeshore Strand

The lakeshore strand landform represents the lands lying along the margin of Lake Tahoe and managed by TRPA under the Shorezone Ordinance. This area is the dynamic zone between the lake and the upland. Within this zone active erosion and deposition occurs and sediments in this zone are in a state of dynamic activity at various times depending on lake water levels and the presence of wind and waves. The zone exists between the offshore area, where wave action contacts the lake bottom and begins initiation of sediment motion, and the upland area exposed to wave run up. This upland area provides a significant source for sediments found on the lakeshore strand.

Characteristics of the lakeshore strand are unstable and unconsolidated sediments in the nearshore, on the foreshore slope and backshore, active erosion of sediment from the upland as a result of wave attack, and exposure to wave action. Sediment sizes range from fine sands to cobbles and boulders. This sediment size is largely dependent on the backshore upland sediments which provides source for the beach sediments and the depth of water nearshore. The lakeshore strand at Lake Tahoe can be grouped into three major types based upon grain size. Bedrock, boulder, and cobble beaches with mean grain diameter greater than 64 mm occurs in areas backed by granodiorite and/or volcanic strata. Cobble, pebble, and granule beaches with mean grain diameter ranging from 2.0 to 64 mm are backed by glacial moraine and older lake bed deposits. Sand beaches with mean grain diameter ranging from 0.0625 to 2.0 mm and backed by fluvio-glacial outwash and younger lake beds.

In this landform, we surveyed sandy beach soils at Incline Beach. Incline Beach is characteristic of sandy beaches associated with the lakeshore strand. Soils at Incline Beach were investigated to a depth of 35 to 39 cm. The soil is