County of Santa Barbara

Environmental Thresholds and Guidelines Manual

Published May 1992
Revised January 1995, October 2001 and October 2002

Planning and Development Department

TABLE OF CONTENTS

1. INTRODUCTION

This manual has been prepared to assist the public, the applicant, environmental consulting firms, and County decision makers in understanding the use and application of various environmental impact thresholds as they relate to project proposals.

The Emergence of the Environmental Impact Assessment Process in California

At the height of the environmental movement, the California State legislature passed the Environmental Quality Act of 1970 (C.E.Q.A.)[1]. The California law, closely patterned after the National Environmental Policy Act (NEPA), included a requirement that assessments be made of the environmental impact of all proposed, publicly sponsored projects. These assessments were to take the form of "Environmental Impact Reports," (EIR's) nearly identical to the "Environmental Impact Statements" (EIS) of NEPA. Like the EIS, the EIR was intended to be a source of data which would better inform the decision maker of the implications of approving or disapproving a publicly undertaken or funded project.

The EIR, which environmentalists considered a rather limited document in 1970, became one of their principal tools when in 1972, the State Supreme Court handed down its "Friends of Mammoth" decision.[2] The court held that an EIR is required before state or local government may grant a permit authorizing the construction of privately undertaken projects which may have a significant effect on the environment.

Subsequently, the State Secretary for Resources devised procedures for the writing and processing of EIR's. These County Guidelines are available for purchase or review at the Division of Environmental Review, 105 East Anapamu Street, Santa Barbara, CA 93101.

Additionally, the state guidelines set out what decisions and tasks have to be performed by local government in the processing of EIR's. First of all, local governments are charged with the duty of determining if a proposed project has the potential to significantly affect the environment. In typically legalistic fashion, the guidelines define "significant effect" as "a substantial adverse impact on the environment", and "environment" as " the physical conditions which exist in the area which will be affected by a proposed project including land, air, water, minerals, flora, fauna, ambient noise, objects of historical or aesthetic significance." (CEQA, Sec. 15382).

1. CAL. PUB. RES. CODE §§21000-21151.

2. Friends of Mammoth v. Board of Supervisors of Mono County, 8 Cal. 3d 1, 500 P.2d 1360, 104 Ca. Rptr. 16 (1972), modified, 8 Cal. 3d 247, 502 P.2d 1049, 104 Cal. Rptr. 761 (1972)

Secondly, the local governments must determine if the proposed activity is a "project" as defined by the state. The guidelines define "project" as: the whole of an action, resulting in physical impact on the environment, directly or ultimately, that is any of the following:

1. an activity directly undertaken by any public agency including but not limited to public works construction and related activities, clearing or grading of land, improvements to existing public structures, enactment and amendment of zoning ordinances, and the adoption of local General Plans or elements thereof;

2. an activity undertaken by a person which is supported in whole or in part through public agency contracts, grants, subsidies, loans, or other forms of assistance for one or more public agencies;

3. an activity involving the issuance to a person of a lease, permit, license, certificate, or other entitlement for use by one or more public agencies. (CEQA §15378)

The local governments must also determine if the proposed project calls for a discretionary decision or merely ministerial approval or non-approval. The guidelines define a discretionary project as one "which requires the exercise of judgment, deliberation, or decision on the part of the public agency or body in the process of approving or disapproving a particular activity, as distinguished from situations where the public agency or body merely has to determine whether there has been conformity with applicable statutes, ordinances, or regulations.

Determining whether or not a proposed project is "categorically exempt" from CEQA is also a function of the local governments. The state has listed a number of project types to which CEQA does not apply. In general, these "categorically exempt" projects include: construction or replacement of single structures in environmentally non-crucial areas, minor alterations to the land, and governmental regulatory action intended to manage resources.

Determining whether or not a project will have a "significant effect" on the environment is an additional decision to be made by local government. This is the first important decision in that it involves the discretion of the agency. A positive finding commits the agency to request that the project description (i.e. plans/proposals) be substantially revised to avoid significant impact, or failing in that, to have prepared an EIR. If no possible significant effect is foreseen, a "negative declaration" is prepared and the proposed project is processed as it would have been prior to CEQA's enactment.

It is the responsibility of the local government to commission the drafting of an EIR. Most local agencies do not have the staff to prepare an EIR, consequently the task is normally contracted to a consulting firm.

Lastly, local government is charged with the duty of reviewing and finalizing the EIR. The state guidelines require that all interested agencies have the opportunity to review and comment on the adequacy of a draft EIR. Before the agency can make a decision regarding the project at hand, the draft EIR has to be finalized by including and responding to, if necessary, the comments made during review. Once the EIR is finalized, it is considered an official document containing data for the decision maker.

Several state and federal court decisions have defined the terms: substantial, potentially adverse, adverse, and significant. The following narrative is a brief sketch of conclusions related to only one of the court cases which have a substantial bearing upon the Guidelines and Thresholds used in this manual to determine levels of significant impact.

California Supreme Court Decision in the case of No Oil, Inc. v. City of Los Angeles, (12/10/74): "The important feature of this decision was that an EIR must be prepared whenever it can be fairly argued on the basis of substantial evidence that the project may have a significant environmental impact. Further, the interpretation of significant effect "which will afford the fullest possible protection to the environment within the reasonable scope of the statutory language is one which will impose a low threshold requirement for preparation of an EIR."

As a consequence, many California cities and counties use guidelines or thresholds of significance to determine whether or not a project proposal may have a significant effect on the environment.

In terms of addressing potentially significant adverse environmental impacts, the following thresholds are used as guidelines to determine the level of significance for any given impact. The discussions which follow are designed to provide an understanding of how thresholds of significance are applied to projects under review by the Planning and Development Department. Should projects exceed these thresholds, an Environmental Impact Report may be warranted.

These environmental thresholds and guidelines are intended to supplement provisions in the State Guidelines for determination of significant environmental effect including Sections 15064, 15065, 15382 and Appendix G.

2. RULES FOR USE AND CRITERIA FOR AMENDMENT

The following passages from Santa Barbara County's Guidelines for the Implementation of CEQA describe how thresholds are to be used and amended.

Rules for Use

P&D's determination on whether or not a project may have a significant effect on the environment shall be based in part on thresholds of significance. These thresholds are measures of environmental change which are either quantitative, or as specific as possible for topics which are resistant to quantification such as aesthetics, cultural resources, and biology. A project which has no effect above threshold values individually or cumulatively shall be determined not to have any significant effect, and a negative declaration shall be prepared as provided by Article IV. Projects which have a potential effect above a threshold of significance will require an EIR.

Thresholds of significance are intended to supplement provisions in the State Guidelines for determination of significant environmental effect including Sections 15064, 15065, 15382 and Appendix G incorporated herein. P&D shall maintain detailed descriptions of current thresholds, which shall be publicly available, and which shall be revised periodically as necessary to maintain a standard which will afford the fullest possible protection to the environment, within the reasonable scope of CEQA, by imposing a low threshold requirement for the preparation of an EIR. For issue areas for which there are no thresholds, the guidance provided in CEQA Sections 15064, 15065, 15382 and Appendix G shall provide the basis for determining significance.

Criteria for Amendment

A. General

Several threshold methodologies include a mechanism to enable them to respond automatically to environmental change. For example, changes in attainment status relative to air quality standards, changes in traffic levels on roads, and changes in the balance between water supplies and water use all affect how thresholds determine significance. However, other changes in environmental conditions or environmental information may require an alteration to the methodology used to evaluate significance.

B. Change of Scientific Basis and Criteria

The underlying basis of threshold criteria may change with the discovery of new data or theories about relationships between environmental change and environmental quality. When data from scientific publications, reports, or conference proceedings, etc. suggest the need for such a change, DER shall review these data and determine the justification for threshold revisions.

C. Change in Environmental Circumstances

Environmental characteristics such as groundwater levels, traffic counts and sensitive biological habitat acreage are subject to constant change due to development trends. In order to ensure reasonable significance determinations, thresholds will be changed to reflect changes in environmental carrying capacity, resource scarcity and resource use. Information on such changes may come from resource managers (e.g. water purveyors, Air Pollution Control District), applicants, or the public.

D. Workshops

P&D will hold public workshops on environmental thresholds at least once a year. The workshops have several purposes: to advise the public of the technical basis for thresholds and how they are used in the environmental review process; to propose revisions as necessary; to obtain public comment on each threshold and the need for revisions; and to gather relevant data from the public for inclusion in threshold data bases.

These workshops and threshold revisions will occur annually unless new information suggests that the purpose of a threshold can only be served by immediate revision. Any changes in thresholds made without opportunity for comment at a public workshop shall be posted in a public area of P&D for at least 30 days following adoption of the changes and shall be reviewed at the next workshop. A determination by DER to revise a threshold may not be appealed.

E. Application of Threshold Revisions to Projects in the Review Process

When thresholds are revised due to new information, updated cumulative impact assessment, an improved methodology, or any other reason that provides a more accurate response to or reflection of existing conditions, the revised threshold shall be applied to projects in process up until an environmental document is found to be adequate and complete by the environmental hearing officer. Alternatively, if a threshold revision is ~~simply~~ a matter of applying a different standard, such a revision shall only be applied to any projects which are found to be complete after the threshold is revised.

3. RELATIONSHIP BETWEEN THRESHOLDS AND POLICIES

Environmental thresholds are often but not always based on policies and standards from the Comprehensive Plan. The agricultural resources guidelines, biological resources guidelines, and noise thresholds are examples of thresholds that are partially derived from and consistent with Comprehensive Plan policies. Although consistency between thresholds and policies is a general goal, there are situations in which strict consistency is not desireable. For example, due to concerns about the existing severity of these problems, policies relating to water and traffic are in many cases more restrictive than the thresholds for these issues. Lowering the thresholds to make them consistent with restrictive policies would greatly increase the burden of complying with CEQA on both applicants and the County. Instead, the County's thresholds for water and traffic impacts are designed to indicate cutoff points at which at a project's contribution to these cumulatively significant problems become substantial. Achieving planning goals through the use of strict policies is both justifiable and efficient and does not undermine the use of CEQA and environmental thresholds to move toward those same goals.

4. AGRICULTURAL RESOURCE GUIDELINES

A. Introduction

The State: California's 36,000,000 acres of agricultural land produce important economic and environmental benefits to the people of the state, nation, and world. Covering one-third of the state, agricultural land supports one of California's major industries and is responsible for the production of an important portion of the nation's food and fiber. The state is also a major exporter of produce to the rest of the world. A unique combination of geography, climate and soils enables California agriculture to produce many crops that are produced nowhere else in the United States.

The state's agricultural land also plays a critical environmental role. Farmland is an important filter for rain and snowfall runoff, allowing groundwater basins to recharge themselves. Farms and ranches are wildlife habitats for many common game and endangered species. Agricultural land provides valuable open space, giving visual relief for urban dwellers, and protecting the rural way of life important to farmers, ranchers, and small-town residents. Because of these great public benefits, the unnecessary and/or premature conversion of agricultural lands to urban uses should be discouraged.

Achieving the goal of agricultural land conservation requires wise and efficient land use, and a strong commitment to that goal by local officials. A California appeals court in Cleary vs. County of Stanislaus (1981) 118 Cal. App. 3d 348, has indicated that the conversion of agricultural land to nonagricultural uses may in itself be considered a significant environmental impact. To assure that the impacts of agricultural land conversion are considered in project decisions, environmental documents should contain information about the impacts of projects on agricultural land. Government officials can make better decisions affecting agricultural land when they have complete data about the land and its relationship to the agricultural economy.

The County: Agriculture continues to be Santa Barbara County's major producing industry with a gross production value for 1991 of more than $500 million. This is an increase of nearly two hundred million dollars from the 1981 total. Santa Barbara County's agricultural industry includes vegetable, field, fruit and nut, and seed crops, nursery products, livestock, poultry, and aviary products. (Santa Barbara County 1991 Agricultural Report)

The diversity of our agriculture continues to provide a strong economic base through its multiplier effect on our local economy. With thirty-seven different commodities exceeding a million dollars in value, our local agricultural diversity provides stability against the cyclic nature of weather, pests, and especially market fluctuations which currently are plaguing agriculture in other parts of the nation. (Op cit)

Agricultural preservation in the County has been extremely successful to date in placing lands adjacent to urban areas, as well as more remote lands, under Williamson Act agreement which provides for taxation according to agricultural rather than market value of the land.

Qualifications for lands to be designated as agricultural preserves are found in "Criteria for Agricultural Preserves", adopted by the Santa Barbara County Board of Supervisors. The land must either be in a Class I or II Soil Capability classification, as prescribed by the U.S. Soil Conservation Service, or qualify for an 80 to 100 rating in the Storie Index System to be designated prime land, in which case the minimum size of a preserve is 40 acres. Land also can qualify as prime if it fulfills one of the following: it supports livestock at a density of one animal per acre; is in orchard use that can return at least $200 per acre; or is devoted to other agricultural production that generally would return $200 per acre. Farm land not meeting these qualifications is classified as non-prime, and the minimum size for an agricultural preserve is 100 acres. However, in certain instances, super prime land of at least 5 acres in a separate ownership may be combined with adjacent prime land to meet the 40 acre minimum requirements.

B. Determination of Significant Effect

CEQA Section 15064 states that:

(b) The determination of whether a project may have a significant effect on the environment calls for careful judgement on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.

(d) In evaluating the significance of the environmental effect of a project, the Lead Agency shall consider both primary or direct and secondary or indirect consequences.

(1) Primary consequences are immediately related to the project such as the dust, noise, and traffic of heavy equipment that would result from construction of a sewage treatment plant and possible odors from operation of the plant.

(2) Secondary consequences are related more to effects of the primary consequences than the project itself and may be several steps removed from the project in a chain of cause and effect. For example, the construction of a new sewage treatment plant may facilitate population growth in the service area due to the increase in sewage treatment capacity and may lead to an increase in air pollution.

CEQA Appendix G states that a project will normally have a significant impact on the environment if it will:

(a) Conflict with adopted environmental plans and goals of the community where it is located.

(b) Convert prime agricultural land to non-agricultural use or impair the agricultural productivity of prime agricultural land.

C. Comprehensive Plan Policies and Goals

The following agricultural goals and policies are taken from the County's Comprehensive Plan Land Use Element, the Environmental Resources Management Element (ERME), the Local Coastal Plan, the Agricultural Element, and adopted Community Plans.

Land Use Element

Agriculture: In the rural areas, cultivated agriculture shall be preserved and, where conditions allow, expansion and intensification should be supported. Lands with both prime and non-prime soil shall be reserved for agricultural uses.

Carpinteria-Summerland Area Goals

The agricultural economy and the semi-rural qualities of the area should be preserved. Every effort should be made to preserve fertile lands for agriculture.

Santa Ynez Valley Area Goals

Agriculture should be preserved and protected as one of the primary economic bases of the Valley.

Goleta Area Goals

Existing orchards and groves should be preserved, and expansion of agricultural land use, particularly orchards and grazing, should be encouraged.

Lompoc Area Goals

Prime agricultural lands should be preserved for agricultural use only. Preservation of lesser grades of presently producing or potential agricultural land should be actively encouraged.

Environmental Resource Management Element (ERME)

The Santa Barbara County Comprehensive Plan Environmental Resources Management Element (ERME) states that existing croplands on prime soils should be preserved. For agricultural lands on less than prime soil, is should be preserved insofar as possible.

Under Category A, Urbanization should be prohibited in:

- Existing croplands with a high agricultural suitability rating (within study areas) or a Class I or II soil capability classification. Modification to permit urban uses may be made, within Urban areas, on parcels of ten (10) acres or less.

- Agricultural preserves subject to Williamson Act agreements.

Under Category B, Urbanization should be prohibited except in a relatively few instances in:

- Existing croplands with a moderate or low agricultural suitability rating (in urban areas) or a Class III or IV soil capability classification.

- Lands highly suitable for expansion of cultivated agriculture.

It will be noted that agricultural preserves, although not subject to environmental constraints, are included in Category A. The reason is that in entering into Williamson Act agreements, the County has made a legal commitment that the land will remain in agricultural use for a minimum of ten years, subject to automatic annual renewal.

Agricultural Element

The Agricultural Element Goals and Policies can be found on pages 7-14 of this document. These goals and policies are briefly summarized below:

Goal I speaks to the preservation, encouragement, and enhancement of agriculture. This is accomplished through policies which discourage incompatible uses, promote an agriculturalist's freedom for determining methods of operation, encouraging land improvement programs, supporting the Williamson Act, recognizing certain nuisances are part of agricultural operations, protecting the availability of resources for agriculture, and encouraging sustainable agricultural practices on agricultural land.

Goal II calls for agricultural land to be protected from adverse urban influence. This is accomplished through policies which prevent flooding and silting from urbanization, protect agricultural property from being illegally violated, discourage expansion of urban spheres of influence, and discouraging conversion of highly productive agricultural lands.

Goal III calls for the preservation of remaining agricultural lands in cases where it is necessary to convert agricultural lands to other uses. This accomplished through policies which discourage expansion of urban development into active agricultural lands, and to promote and retain productive agricultural land within urban boundaries.

Goal IV recognizes that agriculture can enhance and protect natural resources, and therefore these operations should be encouraged to incorporate resource protection techniques. This is accomplished through policies which encourage range improvement and fire reduction programs, the use of agriculture on certain slopes to prevent erosion, and preventing grading and brush clearing on hillsides which would cause excessive erosion.

Goal V calls for the County to allow for areas and installations of uses supportive to agriculture. It accomplishes this through policies allowing the installation of commercial support uses on-farm, and allowing areas for supportive agriculture services within a reasonable distance to the farm user.

Goal VI calls for making provisions to allow for effective access to agricultural areas. This includes a policy which encourages the County to design roads in agricultural areas with agricultural vehicles in mind.

Local Coastal Plan

Agricultural policies in the Local Coastal Plan (LCP) are found on pages 106-113 of that document, and are listed as Policies 8-1 through 8-10. Briefly, these policies speak to the following issues:

* Defining the criteria for assigning agricultural land use designations in rural areas.

* Defining the criteria for allowing conversion of agriculturally designated land not contiguous with an urban/rural boundary.

* Defining the criteria for allowing conversion of agriculturally designated land contiguous with an urban/rural boundary.

* Defining the finding which must be made for approving a land division of any land designated as Agriculture I or II.

* Setting the criteria and findings for environmental review of greenhouse projects of 20,000 or more square feet.

* Setting setback and maximum lot coverage requirements for greenhouses, hothouses, and accessory structures.

* Setting landscaping and screening requirements for greenhouses and/or accessory buildings.

* Setting the criteria for the protection of large, non-prime agricultural operations of 10,000 acres or more in the Gaviota Coast or North Coast planning areas or large, non-prime operations in the Channel Islands planning area, including the findings and conditions which must be made/required in order to approve any development/land division on such property.

* Setting the criteria for subdivision of legal parcels of non-prime agricultural land in excess of 2,000 acres which are designated as AG-II-320.

Goleta Community Plan

Policy LUA-GV-1: Land designated for agriculture within the urban boundary shall be preserved for agricultural use, unless the County makes findings that the land is no longer appropriate for agriculture or there is an overriding public need for conversion to other uses for which there is no other land available in the Goleta urban area.

Policy LUA-GV-2: New development adjacent to agriculturally zoned property shall include buffers to protect agricultural operations.

Policy LUS-GV-4: In consideration of conversion of any agricultural land within the urban boundary to urban uses, the County shall first consider smaller, more isolated parcels with greater urban/agricultural conflicts prior to larger blocks of agricultural land.

Summerland Community Plan

Policy LUA-S-1: Existing land designated for agriculture shall be preserved for agricultural use.

Policy LUA-S-2: New development adjacent to agricultural zoned property shall include buffers to protect the viability of agricultural operations adjacent to the community.

Montecito Community Plan

Policy LUG-M-2.1: Agricultural activities on residential parcel that are consistent with the provisions of the applicable residential zone district shall be supported and encouraged by the County.

D. Methodology in Determining Agricultural Suitability and Productivity

The County Initial Study form contains two questions pertaining to impacts on agricultural resources. The first is as follows:

10.d. Will the proposal result in the conversion of prime agricultural land to non-agricultural use, impairment of agricultural land productivity (whether prime or non-prime), or conflict with agricultural preserve programs?

The following weighting system is provided to perform a preliminary screening of a project's agricultural impacts during the initial study process. The initial study screening looks at the value of a site's agricultural suitability and productivity, to determine whether the project's impact on loss or impairment of agricultural resources would be a potentially significant impact. These are guidelines, to be used with flexibility in application to specific sites, taking into account specific circumstances and specific agricultural uses.

The weighted point system is utilized to assign relative values to particular characteristics of a site's agricultural productivity (e.g. soil type, water supply, etc.).

Where the points from the following formula total 60 or more, the following types of projects will be considered to have a potentially significant impact:

- A division of land (including Parcel and Tract Maps, etc.) which is currently considered viable but would result in parcels which would not be considered viable using the weighting system.

- A Development Plan, Conditional Use Permit, or other discretionary act which would result in the conversion from agricultural use of a parcel qualifying as viable using the weighting system.

- Discretionary projects which may result in substantial disruption of surrounding agricultural operations.

If a potentially significant impact is identified using these criteria, further more detailed, site-specific evaluation of agricultural impacts is completed in an EIR. This analysis should focus upon the factors and criteria, but not the points, in the weighting system of these guidelines, and any other relevant factors such as the history of agricultural use on the site, land use trends, etc. Final determination of the project's level of impact will be based on this analysis.

As a general guideline, an agricultural parcel of land should be considered to be viable if it is of sufficient size and capability to support an agricultural enterprise independent of any other parcel. To qualify as agriculturally viable, the area of land in question need only be of sufficient size and/or productive capability to be economically attractive to an agricultural lessee. This productivity standard should take into consideration the cultural practices and leasehold production units in the area, as well as soil type and water availability. For dry land farming and grazing operations the production or carrying capacity should be based upon normal rainfall years only, not periods of drought or heavy rainfall. It should be noted that the Santa Barbara County Cattlemen's Association has stated that an appropriate threshold for impacts to grazing land in the County is the displacement or division of land capable of sustaining between 25 to 30 animal units per year. This "threshold" utilizes a carrying capacity threshold similar to the weighting system below. Because of this, on grazing projects, detailed information of the number of animal units supportable on a particular parcel should also be considered in the project's environmental document.

The Agricultural Threshold is weighted toward physical environmental resources rather than economics. This emphasis is in keeping with CEQA's emphasis on physical environmental impacts and not social or economic impacts (State CEQA Guidelines Section 15131). Given high land values in the County and the subdivision and turnover of agricultural lands in some areas of the County, agricultural production on some lands may be economically marginal. Because of these factors, economics is considered primarily a planning issue and will not be addressed in environmental documents.

The following determination of agricultural land value is divided into nine components which are weighted according to their estimated resource value. These nine areas are:

- Parcel size
- Adjacent Land Uses
- Water Availability
- Comprehensive Plan Designation
- Agricultural Preserve Potential
- Existing Land Use
- Soil Classification
- Agricultural Suitability
- Combined Farming
- Operations

1. Parcel Size

Large parcel size is, in general, an important indicator of potential agricultural suitability and productivity. However, because of the wide variability in the value of various agricultural products, suitable and productive parcel sizes also vary. Smaller parcels may be viable for high value crops, while significant acreage is necessary for viable grazing operations.

	Project Parcel Size:	Points Assigned
a.	less than 5 acres	0- 3
b.	5 acres to less than 10 acres	4- 6
c.	10 acres to less than 40 acres	7- 8
d.	40 acres to less than 100 acres	9-10
e.	100 acres to less than 500 acres	11-12
f.	500 acres to less than 1000 acres	13-14
g.	1000 acres or greater	15

2. Soil Classification

Points in this category are based primarily upon soil capability classes from the US Soil Conservation Services Soil Surveys.

The Soil Conservation Service has defined eight soil capability classes. Classes I and II are considered to be prime agricultural soils because they impose few limitations on agricultural production, and almost all crops can be grown successfully on these soils. More limited agricultural soils are grouped into Classes III and IV either because fewer crops can be grown on these soils, special conservation and production measures are required, or both these conditions exist. Classes V, VI, and VII include soils that are suited primarily for rangeland. (Class V is not found in the County.) Finally, soils and landforms that are unsuited for agricultural use are placed in Class VIII.

Where a variety of soil types are present on a site, weight should depend upon extent of useable prime/non-prime acreage. As appropriate, points may be assigned according to approximate percentages of site area containing various soil classifications.

Application of points within the ranges should be based on area and site-specific considerations. For grazing land, the SCS survey should be checked for opinion on soil suitability, and site vegetation should be inspected for forage value. Sites with soils

which can support good forage should be assigned higher points within the range. Similarly, sites with soils classified as non-prime, but which can support specialized high cash crops (eg. strawberries, avocados and specialty crops) should be assigned higher points within the ranges.

In addition, initial studies should note whenever a site contains large, contiguous areas of prime soil, as this may constitute a separate significant impact.

	Soil Classification	Points Assigned
a.	Class I (prime)	14-15
b.	Class II (prime)	11-13
c.	Class III	8-10
d.	Class IV	6- 7
e.	Class V	1- 5
f.	Class VI	1- 5
g.	Class VII	1- 5
h.	Class VIII	0

3. WATER AVAILABILITY

Availability of water of suitable quantity and quality is a critical component of agricultural suitability and productivity. Assignments of points within the ranges should take into account suitability of water resources for the type of agriculture practiced (i.e. crops or grazing).

	Water Availability	Points Assigned
a.	Land has an adequate Water Supply from on/offsite sources suitable for crops or grazing.	12-15
b.	Land has water, but may be marginal in quantity or quality suitable for crops or grazing.	8-11
c.	Land does not have developed water supply but an adequate supply is potentially available.	3-7
d.	Land does not have developed water and potential sources are of poor quality/quantity	0-2

4. Agricultural Suitability

Based upon the Conservation Element of the Comprehensive Plan (p. 195) County lands were assessed and mapped for agricultural suitability classifications based on a computer model which applied weighted factors, including soil classification, water availability, slope, and environmental constraints (flood hazard, local water resources, biological tolerance-intensity, and high groundwater).

Because the Conservation Element does not fully account for the effects of weather on crop suitability, the assessment of suitability should account for the approximate frequency and intensity of frosts and other climactic factors in applying points within the ranges. Parcels which are relatively frost free and may accommodate multiple croppings may be considered more suitable than those which can support only a single crop or limited crop types due to climactic factors.

Agricultural Suitability		Points Assigned
Crops		
a.	Highly suitable for irrigated grain, truck and field, orchard, or vineyard crops	8-10 6- 8
b.	Highly suitable for irrigated ornamentals, pasture, alfalfa, or dry farming.	
c.	Moderately suitable for irrigated crops, orchard, ornamentals or dry farming.	4- 5
d.	Low suitability for irrigated crops, orchard, ornamentals or dry farming.	1- 3
e.	Unsuitable for crop production because of of soil capabilities, environmental constraints, etc.	0
Grazing		
f.	Highly suitable for pasture or range.	6-10
g.	Moderately suitable for pasture or range.	3- 5
h.	Low suitability for pasture or range.	1- 2
i.	Unsuitable for pasture or range.	0

5. Existing and Historic Land Use

Current or previous use of a property for agriculture can provide a practical measure of its suitability for agriculture, while urban development generally indicates a lack of suitability.

Existing and Historic Land Use		Points Assigned
a.	In active agricultural production	5
b.	In maintained range/pasture	5
c.	Unmaintained, but productive within last ten years	3-5
d.	Vacant land: fallow or never planted with range of suitabilities of agricultural potential	1-3
e.	Substantial urban or agricultural industrial development onsite.	0

6. Comprehensive Plan Designation

The County general plan land use maps designate property for long-range uses. Agricultural and open space designations generally provide an indicator of agricultural suitability. However, some older land use designations provide for smaller agricultural parcel sizes than are suitable or viable for sustaining agriculture today. Designations applied more recently by the County as part of community plan updates establish agricultural designations with more realistic parcel sizes. This should be taken into account in assessing suitability with this factor.

Comprehensive Plan Designation		Points Assigned
a.	A-II	5
b.	A-I	4
c.	MA	3-4
d.	Existing public/private open space or rec.	3-4
e.	Proposed public/private open space or rec.	3-4
f.	Open lands	3-4
g.	Rural residential 40-100 acres	3-4
h.	Residential Ranchette 5-20 acres	2
i.	Residential 5 acres or less	0
j.	Commercial, Industrial, Community Facility	0

7. Adjacent Land Uses (existing)

Adjacent land uses can play an important role in the continuing suitability and productivity of a property for agricultural uses. In general, being surrounded by agricultural or open space is conducive to continued agricultural use, while encroachment of urban uses may be problematic. However, applying points within the ranges should be based on specific circumstances and uses, recognizing that some urban uses are more compatible with agricultural, (e.g., industrial, public facilities), while others conflict (e.g., residential). In addition, the existence or ability to create buffers between incompatible uses should be considered in assessing agricultural suitability with this factor. The adequacy of agricultural support in the vicinity may be another factor affecting agricultural suitability.

Adjacent Land Uses		Points Applied
a.	Surrounded by agricultural operations or open space in a region with adequate support uses.	9-10
b.	Surrounded by agricultural operations or open space in a region without adequate agricultural support uses	7-8
c.	Partially surrounded by agriculture/open space with some urban uses adjacent, in a region with adequate agricultural support uses [1,2]	7-8
d.	Partially surrounded by agriculture/open space with some urban uses adjacent, in a region without adequate agricultural support uses [1,2]	3-6
e.	Immediately surrounded by urban uses, no buffers	0-2

8. **Agricultural Preserve Potential**

Qualifying for agricultural preserve designation under State Williamson Act agreement for prime and non-prime preserves entails meeting criteria for soil type, parcel size [individually or jointly with adjacent parcel(s)], and/or productivity/value on return. Agricultural preserves have constituted one of the most successful means of sustaining and preserving land in agriculture in California.

Agricultural Preserve Potential		Points Applied
a.	Can qualify for prime agricultural preserve by itself, or is in a preserve	5-7
b.	Can qualify for non-prime agricultural preserve by itself	2-4
c.	Can qualify for prime agricultural preserve with adjacent parcels	3-4
d.	Can qualify for non-prime agricultural preserve with adjacent parcels	1-3
e.	Cannot qualify	0

[1] Various types of urban uses create more potential conflicts than others (e.g., residential could create more spraying problems than light industrial).

[2] If project is well buffered, it may be agriculturally viable even with adjacent urban uses (e.g., stream, roadway).

9. **Combined Farming Operations** [3]

This section is designed to award bonus points to parcels which provide a component of a combined farming operation. The reason these points are assigned as a bonus is to address cumulative impacts and to recognize the importance of combined farming operations in Santa Barbara County.

Bonus Points for Combined Farming Operations		Points Applied
a.	Provides a significant component of a combined farming operation.	5
b.	Provides an important component of a combined farming operation.	3
c.	Provides a small component of a combined farming operation.	1
d.	No combined operation	0

E. Use of State Important Farmlands Map

A second question on agricultural land resources is included in the Initial Study under Land Use-e: "Will the proposal result in any effect [potentially significant adverse effect] upon any unique or other farmland of State or Local Importance?" The State Important Farmlands Map is used in answering this question. The map is also considered in applying points under the "Agricultural Suitability" category.

The map identifies lands in the following categories:

Prime Farmland (Land with the best combination of physical and chemical features for the production of agricultural crops)

Farmland of Statewide Importance (Land with a good combination of physical and chemical features for the production of agricultural crops)

Unique Farmland (Land of lesser quality soils used for the production of the State's leading agricultural cash crops)

Farmland of Local Importance (All dry land farming area and permanent pasture)

[3] Combined farming operation refers to more than one separate parcel managed as a single agricultural operation.

Grazing Land (Land on which the existing vegetation is suited to the grazing of livestock)

Urban and Built-up Land (Land occupied by structures or infrastructure to accommodate a building density of at least one unit to one and one-half acres, or approximately six structures to ten acres)

Other Land (Land which does not meet the criteria of any other category)

5. AIR QUALITY THRESHOLDS

A. Introduction

Air quality thresholds of significance are intended to help local agencies determine whether a discretionary project will individually or cumulatively have a significant effect on air quality. Santa Barbara County does not meet the state clean air standards for ozone and the state standard for fine particulate matter. Unmitigated air pollution emissions from the operation of some development projects could impair the region's progress in meeting the ozone and fine particulate matter standards.

These thresholds are designed to be used by environmental professionals preparing documents under the California Environmental Quality Act (CEQA) and the land use decision makers who rely on these documents. The goal is to identify projects which may have a significant affect on air quality in Santa Barbara County, so that measures to reduce the impact can be incorporated into the project.

A separate implementation document, Air Quality Analysis for EIRs, explaining how to apply the air quality thresholds of significance is available from the County Planning and Development Department.

1. Resource Setting

The federal government and the state of California have established ambient air quality standards to protect public health. California's standards are more protective of public health than the federal standards. State and federal standards have been established for the following pollutants, known as "criteria pollutants":

- ozone (O_3)
- carbon monoxide (CO)
- nitrogen dioxide (NO_2)
- sulfur dioxide (SO_2)
- suspended particulate matter 10 microns or less in diameter (PM_{10})
- lead

In addition, California standards have been established for:

- sulfates (SO_4)
- hydrogen sulfide (H_2S)
- vinyl chloride
- visibility reducing particles.

Table 1 shows the National Ambient Air Quality Standards (NAAQS) and the California Ambient Air Quality Standards (CAAQS) for ozone, CO, H_2S, NO_2, and PM_{10}. The table also shows whether the air in Santa Barbara County meets these standards (attainment) or violates them (nonattainment).

Sulfur dioxide, lead, sulfates, vinyl chloride, and visibility reducing particles are not generally a problem in this region and are not discussed further in this document. However, these and other pollutants are regulated by the APCD under their rules and regulations.

The entire County of Santa Barbara violates the federal and state standards for ozone and the state standard for PM_{10} (particulate matter with an aerodynamic diameter of less than 10 microns). Ozone air pollution is formed when reactive organic compounds (ROC) and nitrogen oxides (NO_x) react in the presence of sunlight. Ozone is a regional pollutant; ozone concentrations throughout the county do not always correspond with the location of sources of the ozone precursors ROC and NO_x. The major sources of ozone precursor emissions in Santa Barbara County are motor vehicles, the petroleum industry and solvent usage (paints, consumer products and certain industrial processes). Sources of PM_{10} include mineral quarries, grading, demolition, agricultural tilling, road dust, and vehicle exhaust. Additional information on ozone, PM_{10}, and other pollutants of concern is provided in the 1991 Air Quality Attainment Plan.

2. Air Pollution Control District Rules and Regulations

The Santa Barbara County Air Pollution Control District (APCD) is the agency responsible for regulating stationary sources (businesses and industry) of air pollution in Santa Barbara County. Examples of businesses that emit air pollution include gasoline stations, auto body shops, dry cleaners, oil and gas facilities, and water treatment plants. The APCD regulates these and other businesses by issuing permits and adopting rules, as required by state and federal air pollution control laws.

The air quality thresholds are intended to provide guidance in evaluating the significance of adverse long-term air quality impacts from all sources, including businesses not regulated by the APCD and motor vehicles. These thresholds of significance are unrelated to the permitting requirements of the APCD and cannot be used to determine whether a project will need an APCD permit. For information on whether a project will require an APCD permit, please contact the Permitting Section Supervisor of the APCD. For assistance in applying the thresholds in this manual please contact the Supervisor of the Interagency Review Section of the APCD. Both section supervisors may be reached at (805) 961-8800.

Table 1

Federal and State Ambient Air Quality Standards and Attainment Status of Selected Pollutants in Santa Barbara County

Pollutant & Averaging Time	Standard		Attainment Status	
	Federal	State	Federal	State
Ozone				
1 hour	0.12 ppm	0.09 ppm	Nonattainment[a]	Nonattainment[a]
NO_2				
Annual Average	0.053 ppm	-	Attainment	Attainment
1 hour	-	0.25 ppm		
CO				
1 hour	35 ppm	20 ppm	Attainment[b]	Attainment[b]
8 hours	9 ppm	9 ppm	Attainment	Attainment
H_2S				
1 hour	-	0.03 ppm	-	Attainment[c]
PM_{10}				
24 hours	150 ug/m^3	50 ug/m^3	Attainment	Nonattainment
AGM[d]	-	30 ug/m^3	-	Nonattainment
AAM[e]	50 ug/m^3		Attainment	

Notes

a. Nonattainment for entire County. Based on monitoring data as of 1993, the County has achieved the Federal ozone standard and the APCD will be applying to the USEPA for redesignation to an "attainment area".
b. "Hot spots" at congested intersections may violate standards during the peak hour.
c. Recently designated as attainment.
d. Annual Geometric Mean.
e. Annual Arithmetic Mean.

3. The California Environmental Quality Act (CEQA)

The air quality impact analysis in an environmental document required under CEQA should include the elements described in the APCD's Scope and Content of Air Quality Sections in Environmental Documents. This document is available upon request from the Interagency Review section of the APCD. Briefly, the air quality impact analysis in an Environmental Impact Report (**EIR**) should include:

- **existing environmental setting** of the area affected by the project, in terms of climate and current air quality;
- a discussion of all direct and indirect, long term and short term, **air quality impacts of the proposed project and the classification of the significance of long-term impacts using established criteria;**
- significant **cumulative air quality impacts** of the project;
- **consistency** of the project with local and regional plans, including the Air Quality Attainment Plan;
- **mitigation measures** to reduce or avoid potentially significant air quality impacts, including effectiveness of mitigation measures and discussion of **residual impacts**;
- feasible **alternatives** to the project which would reduce air quality impacts, including the air quality impacts of the "No Project" alternative and the environmentally superior alternative;
- **potential growth inducing effects** of the project on air quality;
- required air quality mitigation measures in the **Mitigation Monitoring and Reporting Plan** (MMRP).
- appendices containing all calculations and assumptions used in assessing long-term air quality impacts.

The air quality sections of Negative Declarations (**NDs**) should include a brief description of the air quality setting as it relates to project impacts, mitigation measures and inclusion of all air quality mitigation measures in the MMRP.

B. Determining Significance of Air Quality Impacts

The two major criteria for determining if a project will have a potentially significant adverse air quality impact are listed below. These criteria are based on Appendix G of the State CEQA Guidelines. If the project meets either of the two listed criteria, the impacts must be discussed and analyzed in detail and appropriate mitigation measures must be identified. **Section 3** provides the quantitative emission thresholds and screening tables to determine the significance of long-term (operational) impacts of the project. **Sections 4 and 5** discuss cumulative impacts

and consistency with the AQAP. **Section 6** provides guidance on how other air quality considerations should be described.
A significant adverse air quality impact may occur when a project, individually or cumulatively, triggers any one of the following:

- interferes with progress toward the attainment of the ozone standard by releasing emissions which equal or exceed the established long-term quantitative thresholds for NO_x and ROC;

- equals or exceeds the state or federal ambient air quality standards for any criteria pollutant (as determined by modeling);

Cumulative air quality impacts and consistency with the policies and measures in the Air Quality Supplement of the Comprehensive Plan, other general plans, and the Air Quality Attainment Plan (AQAP) should be determined for all projects (i.e., whether the project exceeds the AQAP emission projections or growth assumptions).

The following issues should be discussed only if they are applicable to the project.

- Emissions which may affect sensitive receptors (e.g. children, elderly or acutely ill);

- Toxic or hazardous air pollutants in amounts which may increase cancer risk for the affected population; or

- Odor or another air quality nuisance problem impacting a considerable number of people.

C. Quantitative Emission Thresholds

CEQA requires that the significance of a project's direct and indirect emissions be determined for both short-term (construction) and long-term (operational) impacts. If a project's air quality impacts are found to be significant, then mitigation measures will be required. Numeric emission thresholds of significance have been established for the ozone precursors NO_x and ROC. Criteria for triggering modeling have been established for carbon monoxide (CO). In order to determine if a project exceeds these quantitative thresholds, the expected emissions of these pollutants from the project must be calculated. Because calculations can be time consuming, the APCD has developed screening tools to identify projects not likely to exceed the thresholds. These sizes of projects are based on simple calculations that show the relationship between the size of a project and potential emissions.

If a project is smaller in size than the project sizes listed, project-specific emission calculations are generally not required. **If the project is equal to or larger than any size listed, is not similar to any of the categories listed, or is subject to an APCD permit, then emission calculations may be required.** Emission calculations in the environmental document must provide the methodology used to estimate the emissions, including input data, assumptions, and all calculations. Emission calculation methods or modeling inputs using URBEMIS, EMFAC, CALINE or other air quality analysis tools must be fully documented so that the calculations or modeling can be duplicated and confirmed by the APCD. In order to be given emission

reduction credits for mitigation measures which can be quantified, emission calculations must be approved by the APCD.

1. Short-term/Construction Emissions

Short-term air quality impacts generally occur during project construction. CEQA requires a discussion of short-term impacts of a project in the environmental document. The reasoning for considering short-term impacts insignificant is provided below.

No quantitative threshold has been established for short-term, construction related PM_{10} (which is 50% of total dust). However, this impact should be discussed in all environmental documents for projects involving ground disturbance. Dust control measures are required under the County of Santa Barbara's Grading Ordinance for most projects. Some projects have the potential for construction-related dust to cause a nuisance. Also, Santa Barbara County violates the state standard for PM_{10}. Therefore, dust mitigation measures are required for all discretionary construction activities. The standard dust mitigation measures are based on policies in the 1979 AQAP and are listed in a separate implementation document, Air Quality Analysis for EIRs, available from Planning and Development.

The short-term thresholds for NO_x and ROG emissions from construction equipment were not established. Emissions of NO_x from construction equipment in the County are estimated at 1000 tons per year of NO_x. When compared to the total NO_x emission inventory for the County of approximately 17,000 tons per year, construction emissions comprise approximately six percent of the 1990 county-wide emission inventory for NO_x (Santa Barbara County 1993 Rate-of Progress Plan). In general, this amount is considered insignificant.

2. Long-term/Operational Emission Thresholds

Long-term air quality impacts occur during project operation and include emissions from any equipment or process used in the project (e.g., residential water heaters, engines, boilers, operations using paints or solvents) and motor vehicle emissions associated with the project. These emissions must be summed in order to determine the significance of the project's long-term impact on air quality.

a. Ozone Precursors (NO_x and ROC)

The long-term air quality threshold of significance is **25 pounds per day** of either nitrogen oxides (NO_x) or reactive organic compounds (ROC). Long-term project emissions primarily stem from motor vehicles associated with the land use project and stationary sources which may require permits from the APCD. Examples of stationary emission sources include: gas stations, auto body shops, dry cleaners, oil and gas production and processing facilities, and water treatment facilities. Some stationary sources such as residential heating and cooling equipment, wood burning stoves and fireplaces, or other individual appliances do not require permits from the APCD. Emissions from wood burning stoves may be significant for housing developments of 250 homes or more. Emissions from appliances may be significant for developments of about 1000 homes or for commercial projects. These emissions should be included in the operational phase emission evaluation. The APCD should be contacted for assistance with estimating direct emissions from stationary sources. **Stationary source emissions must be added to**

transportation source emissions prior to applying the project-specific threshold of significance.

Project screening for long-term impacts: Table 2 is a screening table showing size estimates of the types of land use projects that may exceed 25 lbs per day of NO_x and ROC. The screening table, Table 2, is based on trip generation rates from the Institute of Traffic Engineers (ITE). If the levels in the screening table are exceeded, then specific details about the project location, surrounding uses, linked and pass-by trips, etc., will need to be evaluated. Currently, there is no universally accepted model or procedure to account for diverted trips. Until such time as new methodologies have been developed, staff recommends that diverted trip assignments be made on a case-by-case basis using site specific data. A general methodology for calculating emissions from vehicles and a description of several sources of information for emission factors are discussed in the Air Quality Analysis for EIRs document available from Planning and Development. The air quality analysis tools are revised periodically so **Table 2 is subject to change when the URBEMIS 3 model is updated.**

Table 2
Screening Table to Determine Potentially Significant Long-Term Air Quality Impacts

Approximate Project Sizes with a Potential to Exceed 25 Pounds/Day ROC or NO_X Emissions (based on URBEMIS 3 modeling; subject to change when model is updated)

PRIMARY LAND USE	DAILY TRIP RATES	PROJECT SIZE
RESIDENTIAL		
Single Family Housing	10.0/unit	125 units
Apartment <10 units/acre	6.1/unit	230 units
10-20 units/acre	5.4/unit	260 units
>20 units/acre	3.7/unit	350 units
Condominium (Family)	8.9/unit	150 units
(Adult)	6.4/unit	200 units
Mobile Home	5.4/unit	240 units
Retirement Community	3.3/unit	250 units
COMMERCIAL & INDUSTRIAL		
Discount Store	64.6/1000 sq. ft.	25,000 sq. ft.
Shopping Center - Regional	296.0/1000 sq. ft.	7,500 sq. ft.
-	71.0/1000 sq. ft.	30,000 sq. ft.
Community	117.0/1000 sq. ft.	18,000 sq. ft.
-	553.0/1000 sq. ft.	4,000 sq. ft.
Neighborhood	21.3/1000 sq. ft.	95,000 sq. ft.
Convenience Market (24-Hour)	22.7/1000 sq. ft.	75,000 sq. ft.
Commercial Strip Business	20.7/1000 sq. ft.	76,000 sq. ft.
Commercial Office	90.5/1000 sq. ft.	24,000 sq. ft.
Office Park	7.3/1000 sq. ft.	220,000 sq. ft.
Medical Office Building	4.0/1000 sq. ft.	330,000 sq. ft.
Industrial Park		
Manufacturing		
Restaurant		
- Quality	56.3/1000 sq. ft.	36,000 sq. ft.
- High Turnover	200.9/1000 sq. ft.[b]	10,500 sq. ft.
- Fast Food	652.0/1000 sq. ft.	3,500 sq. ft.
- Fast Food w/ Drive Thru	632.1/1000 sq. ft.[b]	3,500 sq. ft.
Bank - Walk In	169.0/1000 sq. ft.	1,200 sq. ft.
- Drive In	192.0/1000 sq. ft.	1,100 sq. ft.
Hospital	14.4/bed	125 beds
ASSUMPTIONS USED IN THE URBEMIS PROGRAM:		
Air Basin: South Coast Central		
Year: 1995		
Temperature: 50 degrees Fahrenheit		

(a) Trip rates are from the URBEMIS 3 program unless otherwise noted. ARB documentation indicates that URBEMIS trip rates are from ITE's Trip Reduction manual (Institute for Transportation Engineers, 1987).

(b) Trip rate from the ITE Trip Generation manual (5th ed.).

b. Carbon Monoxide (CO)

A project will have a significant air quality impact if it causes, by adding to the existing background CO levels, a carbon monoxide "hot spot" where the California one-hour standard of 20 parts per million carbon monoxide is exceeded. This typically occurs at severely congested intersections.

Project Screening for CO Impacts:

1) If a project contributes less than 800 peak hour trips, then CO modeling is not required.

2) Projects contributing more than 800 peak hour trips to an existing congested intersection at level of service (LOS) D or below, or will cause an intersection to reach LOS D or below, may be required to model for CO impacts. However, **projects that will incorporate intersection modifications to ease traffic congestion,** are not required to perform modeling to determine potential CO impacts.

CO concentrations at congested intersections can be estimated using air quality impact modeling such as CALINE4 or similar models. The CALINE4 model requires intersection-specific, operational data on vehicles per hour and hourly departure volumes obtained from a project-specific traffic study. The methodology is described in the Air Quality Analysis for EIRs, available from Planning and Development.

D. Cumulative Impacts

Cumulative air quality impacts are the effect of long-term emissions of the proposed project on the projected regional air quality or localized air pollution problems in the County. As discussed in the County's 1993 CEQA Guidelines (Guidelines for the Implementation of the California Environmental Quality Act of 1970, as amended (revised 12/21/93), the cumulative contribution of project emissions to regional levels should be compared with existing programs and plans, including the AQAP. To evaluate the cumulative impacts of localized pollutants, the contribution of the project's emissions to background levels should be considered. Due to the county's nonattainment status for ozone and the regional nature of the pollutant, if a project's total emissions of the ozone precursors, NO_x or ROC, exceed the long-term threshold of 25 lbs/day, then the project's cumulative impacts will be considered significant. For projects that do not have significant ozone precursor emissions or localized pollutant impacts, emissions have been taken into account in the AQAP growth projections and therefore, cumulative impacts may be considered to be insignificant.

E. Consistency With The APAQ and Other Planning Documents

Consistency with local and regional plans, such as the Air Quality Attainment Plan (AQAP), the Congestion Management Plan (CMP) and the Regional Transportation Plan (RTP) is required under CEQA. Under the Federal Clean Air Act, projects which receive federal funding or are subject to federal approval must show conformity with the State Implementation Plan, of which the AQAP is a part. Proposed projects subject to AQAP consistency determinations include a wide range of activities such as commercial, industrial, residential, and transportation projects. By definition, consistency with the AQAP, for the projects subject to these guidelines, means

that stationary and vehicle emissions associated with the project are accounted for in the AQAP's emissions growth assumptions. The AQAP generally relies on the land use and population projections provided in the Santa Barbara County Association of Governments' Regional Growth Forecast. The current criteria for determining consistency of these projects are explained in the implementation document, Air Quality Analysis for EIRs.

Consistency with the Air Quality Supplement of the County's Land Use Element must also be analyzed. The air quality policies in the Comprehensive Plan encourage mixed use development and alternative transportation modes. Specifically, project alternatives for proposed housing projects should consider land development design policies aimed at reducing air pollutant emissions, such as pedestrian-oriented and transit-oriented development (TOD). The TOD concept involves a mixed-use community within a typical 2,000-foot walking distance of a transit stop and core commercial area. The design, configuration and mix of uses emphasize a pedestrian-oriented environment and reinforce the use of alternative modes of transportation. TOD designs can help to reduce the number of auto trips and vehicle miles traveled by creating opportunities to walk and bike, while enhancing the area's quality of life and protecting affordable housing goals. The APCD may be contacted for reference material on these concepts. **The APCD also encourages early consultation prior to the CEQA determination by the lead agency.**

F. Other Air Quality Issues Which May Be Applicable

The following issues should be discussed if they are applicable to the project.

1. Siting Criteria for Schools

CEQA Section 21151.8 requires school districts to consider the impacts of siting a new school within one-quarter mile of existing facilities that emit toxic or hazardous air pollutants. The Interagency Review Section of the APCD should be contacted in writing for assistance in identifying the locations of such facilities within the proximity of proposed school sites. The APCD should also be contacted for assistance with health risk assessment methodology, if necessary.

2. Toxic or Hazardous Air Pollutants

Some classifications of projects are more likely than others to emit toxic pollutants. Table 5 lists **examples** of commercial or industrial activities that may be associated with toxic air pollutants. This list is not all inclusive.

TABLE 3

Examples of Projects Which May Emit Toxic Air Pollutants

ACTIVITY	CHEMICAL
Gas Stations	Benzene
Dry Cleaning	Tetrachloroethylene (Perchloroethylene) Carbon Tetrachloride
Medical Sterilization	Ethylene Oxide
Rubber/ Plastic Fabrication	Xylene
Electronic and Parts Manufacturing	1,1,1 Trichloroethylene and other chlorinated hydrocarbon solvents
Landfills	Vinyl chloride, Benzene, etc.

If any of these or other projects which emit toxic air pollutants, such as auto body shops, funeral homes etc., are involved, the APCD should be contacted for information. For most of these projects an APCD permit will be required. Health risk management decisions regarding the project will be addressed during the APCD permitting process to ensure that toxic emissions from the project are reduced to the maximum extent feasible.

3. Nuisance

Construction projects have a high probability of creating objectionable dust impacts. Also fugitive dust from construction is roughly 50 percent particulate matter that is 10 microns (or less) in diameter (PM_{10}). PM_{10} is a criteria pollutant with adverse health impacts. Sensitive receptors may be affected because of their location downwind. Dust mitigation measures are required under the County's Grading Ordinance for all projects involving earth moving activities over 50 cubic yards regardless of location.

If a project has the potential to cause an odor or other long-term air quality nuisance problem impacting a considerable number of people, the environmental document (Initial Study, ND or EIR) should describe the history of complaints from pre-existing conditions, the number of people affected and other relevant information so that the impacts can be mitigated where feasible. This information may be available in APCD files for certain areas. New projects that have a high probability of emitting objectionable odors or new developments that may be affected because of their location downwind should be identified early in the Initial Study. This may prevent nuisance problems after the project is built. Odor issues can sometimes be resolved by changing the location of the equipment or the process. **Nuisance impacts need not be quantified at the initial study stage and may be analyzed qualitatively on a case by case basis.**

BIBLIOGRAPHY

1. Santa Barbara County Air Pollution Control District (SBCAPCD), December 1991. 1991 Air Quality Attainment Plan: State Ozone Standard Countywide.

2. SBCAPCD and Santa Barbara County Association of Governments, 1993. 1993 Rate-of-Progress Plan: Federal Ozone Standard Countywide.

3. SBCAPCD, 1979. 1979 Air Quality Attainment Plan.

4. SBCAPCD, May 1992. Rules and Regulations.

5. SBCAPCD, March 1992. 1990 Annual Air Quality Report.

6. SBCAPCD, June 1991. Particulate Matter Emission Reduction Study.

7. Santa Barbara County Association of Governments (SBCAG), 1991. Congestion Management Plan.

8. SBCAG, August 1989, Forecast '89: Santa Barbara County Regional Growth Forecast 1985-2005.

9. U.S. Environmental Protection Agency (EPA), September 1985, Compilation of Air Pollutant (AP-42) Emission Factors. Vol. II, Fourth edition.

10. Santa Barbara County Resource Management Department, Division of Environmental Review, September 1990. Environmental Thresholds and Guidelines Manual.

11. California Air Resources Board (CARB), 1990.Air Quality Analysis Tools (AQAT-3).

12. CARB, November 1986. Methodology To Calculate Emission Factors For On-Road Motor Vehicles.

13. California Department of Transportation (CalTrans), 1986. CALINE4- A Dispersion Model for Predicting Air Pollution Concentrations near Roadways.

14. Institute of Transportation Engineers (ITE), 1991. Trip Generation.

15. City of San Diego, 1992. Transit-Oriented Development Design Guidelines.

6. BIOLOGICAL RESOURCES

A. INTRODUCTION

Federal and State laws and adopted County policies require the protection of natural habitats and associated wildlife and vegetation in recognition of their many values, including maintaining a healthy balance between urban built areas and supportive natural environment, nutrient recycling, providing for watershed protection, protection against erosion, cleansing of air and water, food chain support, scientific and medical research, education, recreation, aesthetics, and for the intrinsic value of wildlife and vegetation and their natural ecosystems.

Santa Barbara County has a wide diversity of habitat types, including chaparrals, oak woodlands, wetlands and beach dunes. Preservation of large contiguous habitat areas is the key to preserving biodiversity and avoiding additional species becoming rare, endangered or extinct.

Due to the complexities of ecosystems and the many factors involved in assessing the value of biological resources and project impacts, general qualitative guidelines rather than numerical thresholds are provided.

B. LEGAL AUTHORITY

1. CEQA Guidance for Biological Impact Assessment

The following sections of the State CEQA Guidelines provide general direction for the evaluation of biological resource impacts as a part of the environmental review of proposed projects.

California Environmental Quality Act (CEQA) §15065 states that a Lead Agency shall find that a project may have a significant effect on the environment and thereby require an Environmental Impact Report (EIR) to be prepared for the project where the project has the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self sustaining levels, threaten to eliminate a plant or animal community, or reduce the number or restrict the range of a rare or endangered plant or animal.

CEQA Appendix G states that a project will normally have a significant effect on the environment if it will:

(a) Conflict with adopted environmental plans and goals of the community where it is located;

(c) Substantially affect a rare or endangered species of animal, plant or the habitat of the species;

(d) Interfere substantially with the movement of any resident or migratory fish or wildlife species; and

(e) Substantially diminish habitat for fish, wildlife or plants.

2. Federal and State Requirements for Protection of Biological Resources

Environmental impact analysis and mitigation needs to take into account Federal and State biological resource regulations. The Federal Endangered Species Act and California Endangered Species Act formally list plant and animal species determined to be rare, threatened or endangered, or candidate species, and establish regulations for protecting these species and their habitats. Additional information regarding these statutes is provided in a separate technical document (RMD Biological Resources Technical References, 1994).

Other federal statutes include the National Environmental Policy Act (NEPA), the Clean Water Act Section 404 (for protection of wetlands), Bald Eagle Protection Act, Migratory Bird Treaty Act, Executive Order 11990 (wetlands protection), Rivers and Harbors Act Section 10, Marine Protection, Sanctuary and Research Act, Marine Mammal Protection Act, and Section 1601 and 1603 Stream Alteration Agreements.

3. County Biological Resources Policies

Requirements for the protection of biological resources in the unincorporated area of Santa Barbara County are provided by the Comprehensive Plan Conservation Element, Environmental Resource Management Element (ERME), Land Use Element, Community Plans, and the Local Coastal Plan. These documents identify sensitive habitats and species, and provide measures to direct project design and policies to protect biological resources.

C. GUIDELINES FOR ASSESSMENT OF BIOLOGICAL RESOURCES IMPACTS

1. Initial Study Review Process

The term "biological resources" refers to plant and animal species and habitats that support plant and animal species.

The value of a habitat and the resources present on the project site and potential project impacts are assessed preliminarily during the initial study review process. The first task in the assessment of biological impacts is an evaluation of the plant and animal resources on the project site and the second focuses on the project impact itself, using a series of assessment factors. The initial study evaluation determines whether an EIR or Mitigated Negative Declaration should be prepared based upon substantial evidence (not public controversy) that there is the potential for significant adverse biological impacts to occur as a result of a proposed project.

Based on a preliminary site assessment and review of existing historical resource information (designated environmentally sensitive habitat (ESH) areas, biological resource maps, reports, surveys, and Natural Diversity Data Base maps, available in RMD), staff utilizes the methodologies described below to determine whether resources on a site are biologically valuable, and whether a project may result in a significant impact to biological resources. In some instances a biological consultant survey of the site is required to determine the presence or absence of sensitive species and the value of habitat on and surrounding the project site, and to identify potential project impacts and feasible measures which could be incorporated into the project design to avoid or minimize the potentially significant impacts. Guidelines for performance of biological studies and sensitive resource definitions are provided in a separate technical document.

The determination of impact is done on a case-by-case basis. Because of the complexity of biological resource issues, substantial variation can occur between cases. The following sections identify questions and factors used in assessing the value of biological resources, and the significance of project impacts.

2. Evaluation of Resources on the Project Site

(1) Resources Inventory

a. What biological communities are on the site? What size area?

b. Is the habitat type relatively common? Is it rare and occurring in only a few places in the region, or significantly declining in extent and/or quality? Is the habitat designated as an ESH area on County planning documents, or designated as "critical habitat" for listed species by Federal or State agencies?

c. Is the site in an urban, rural or outlying area? What are the uses surrounding the site? Is the habitat isolated or is it contiguous with adjacent habitat or close enough to provide a link between habitats?

d. Does the habitat support resident species or migratory species? Are there protected species (eg., endangered or threatened), or species of candidate, special, or local concern or healthy rare species?

(2) Condition and Quality

a. Is the habitat pristine or disturbed? How much or to what degree?

b. How biologically productive is it? Does it support an especially rich and diverse plant and/or wildlife population?

c. Is the habitat resource (including the surrounding area if it is related) large enough to be viable?

3. Evaluation of Project Impacts

Assessment of impacts must account for both short-term and long-term impacts. Thus the assessment must account for items such as immediate tree removal and longer-term, more subtle impacts such as interruption of the natural fire regime or interference with plant or animal propagation.

(1) Types of Impacts to Biological Resources

Disturbance to habitats or species may be significant, based on substantial evidence in the record (not public controversy or speculation), if they substantially impact significant resources in the following ways:

a. Substantially reduce or eliminate species diversity or abundance
b. Substantially reduce or eliminate quantity or quality of nesting areas
c. Substantially limit reproductive capacity through losses of individuals or habitat
d. Substantially fragment, eliminate, or otherwise disrupt foraging areas and/or access to food sources
e. Substantially limit or fragment range and movement (geographic distribution or animals and/or seed dispersal routes)
f. Substantially interfere with natural processes, such as fire or flooding, upon which the habitat depends.

(2) Less Than Significant Impacts

There are many areas in the County where there is little or no importance to a given habitat and it is presumed that disruption would not create a significant impact. Examples of areas where impacts to habitat are presumed to be insignificant include [1]

a. Small acreages of non-native grassland if wildlife values are low.

b. Individuals or stands of non-native trees if not used by important animal species such as raptors or monarch butterflies.

c. Areas of historical disturbance such as intensive agriculture.

d. Small pockets of habitats already significantly fragmented or isolated, and degraded or disturbed.

e. Areas of primarily rudural species resulting from pre-existing man-made disturbance.

[1] Pursuant to CEQA, a presumption based upon County thresholds that a project's impact is insignificant is rebutted if there is substantial evidence in light of the whole record before the lead agency that the project may have a significant impact on the environment (Pub. Res. Code §21082.2).

(3) Impact Assessment Factors

In addition to the criteria listed in (1) "Types of Impacts to Biological Resources" above, the following questions and factors are used in assessing the significance of project impacts on biological resources.

(a) Size

How much of the resource in question both on and off the project site would be impacted? (percentage of the whole area and square footage and/or acreage are both useful to know)

How does the area or species that would be impacted relate to the remaining populations off the project site? (% of total area or species population, either quantitatively or qualitatively.)

(b) Type of Impact

Would it adversely indirectly affect wildlife (light, noise, barriers to movement, etc.)?

Would it remove the resource or cause an animal to abandon the area or a critical activity (e.g., nesting) in that area?

Would it fragment the area's resource?

(c) Timing

Would the impact occur at a critical time in the life cycle of an important plant or animal (e.g., breeding, nesting, or flowering periods)?

Is the impact temporary or permanent? If it is temporary, how long would the resource take to recover?

Would the impact be periodic, of short duration, but recur again and again?

D. HABITAT-SPECIFIC IMPACT ASSESSMENT GUIDELINES

The following section provides additional impact assessment guidelines specific to several biological communities. These guidelines are to be used in conjunction with the general impact assessment guidelines described in Section III. (Note: Not all habitat types found in Santa Barbara County are addressed by these habitat-specific guidelines. Habitat types not addressed here are assessed with the general impact assessment guidelines in Section III.)

1. Wetlands

(1) **Description:** Wetlands are among the most biologically productive of habitats, and the County's wetlands have been diminished both in areal extent and quality from the historic condition. As a result, naturally-occurring wetlands are an important resource, and projects with potential impacts to wetlands must be carefully evaluated. Examples of wetlands include coastal salt and brackish marshes, fresh water marshes, and vernal pools. Special cases include seasonal wetlands, vegetated flats, interdunal swale wetlands, and vegetated river bars and flats (riparian areas).

(2) **Definition:** For the purposes of determining potentially significant effect, Santa Barbara County uses the following wetland definition that has been adopted by most resource protection agencies (U.S. Fish and Wildlife Service, the California Coastal Commission, the California Fish and Game Commission and the California Department of Fish and Game) [2]. This definition reads:

> "For purposes of this classification wetlands must have one or more of the following three attributes:
>
> *a) at least periodically, the land supports predominantly hydrophytes, that is plants adapted to moist areas.*
>
> *b) the substrate is predominantly undrained hydric soil, and*
>
> *c) the substrate is non soil and is saturated with water or covered by shallow water at some time during the growing season of each year. (Cowardin 1979)"*
>
> In order to ensure that wetland protection standards are applied equitably to affected property owners, wetlands which have only one of the defining three characteristics, especially those defined only by seasonal ponding, require careful review to ensure that highly disturbed areas with artificially compacted soils which do not have true wetland characteristics are not mistakenly identified as wetlands.

(3) **Wetland/Upland Boundary Definition:** The same category used to delineate wetland is used to delineate the boundary between wetland and upland.[3] The upland limit of wetland is designated as 1) the boundary between land with predominantly hydrophytic cover and land with predominantly mesophytic (semi-dry) or xerophytic (dry) cover; or 2) the boundary between soil that is predominantly hydric and soil that is predominantly nonhydric; or 3) in the case of wetlands without vegetation or soil, the boundary between land that is flooded or saturated at some time each year and land that is not.

---

[2] It is the goal of Santa Barbara County to maintain a definition of wetlands consistent with Federal and State resources agencies listed above.

[3] Methodologies used in delineating wetlands are consistent with those utilized by Federal and State resources agencies referenced above.

(4) **Wetland Impact Assessment Guidelines:** The following types of project-created impacts may be considered significant:

a. Projects which result in a net loss of important wetland area or wetland habitat value, either through direct or indirect impacts to wetland vegetation, degradation of water quality, or would threaten the continuity of wetland-dependant animal or plant species are considered to have a potentially significant effect on the environment (California Environmental Quality Act: Guidelines, Appendix G; items c, d, and t).

b. Wildlife access, use, and dispersal in wetland habitats are key components of their ecosystem value. For example, many upland species of wildlife could not persist without access to water. Movement between contiguous habitats through riparian areas (e.g.: from mountainous chaparral to valley grassland or coastal mesa) allows for many species to continue to persist and prevents genetic isolation. Projects which substantially interrupt wildlife access, use and dispersal in wetland areas would typically be considered to have potentially significant impacts.

c. The hydrology of wetlands systems must be maintained if their function and values are to be preserved. Therefore, maintenance of hydrological conditions, such as the quantity and quality of run-off, etc., must be assessed in project review.

(5) **Coastal Salt Marsh Impact Assessment Guidelines:** Project-created impacts may be considered significant due to the potential to change species composition and habitat value as outlined below.

a. Substantial alteration of tidal circulation or decrease of tidal prism.

b. Adverse hydrologic changes (eg: altered freshwater input), substantial increase of sedimentation, introduction of toxic elements or alteration of ambient water temperature.

c. Construction activity which creates indirect impacts such as noise and turbidity on sensitive animal species, especially during critical periods such as breeding and nesting.

d. Disruption of wildlife dispersal corridors.

e. Disturbance or removal of substantial amounts of marsh habitats. Because of the high value and extremely limited extent of salt marsh habitat in the County, small areas of such habitat may be considered significant.

(6) **Vernal Pools Impact Assessment Guidelines:** The following types of project-related impacts may be considered significant:

a. Direct removal of vernal pool or vernal pools complex.

b. Direct or indirect adverse hydrologic changes such as altered freshwater input, changes in the watershed area or run-off quantity and/ or quality, substantial increase in sedimentation, introduction of toxic elements or alteration of ambient water temperature.

c. Disruption of larger plant community (eg: grassland) within which vernal pool occurs, isolation or interruption of contiguous habitat which would disrupt animal movement patterns, seed dispersal routes or increase vulnerability of species to weed invasion or local extirpation. For example, fragmentation of habitat may interrupt interaction between the habitat and the organisms within the pools (pollination, seed, invertebrate and vertebrate dispersal, provision of drinking and bathing water, etc.). These types of direct and indirect impacts are potentially significant.

2. Riparian Habitats

(1) **Description:** Riparian habitat is the terrestrial or upland area adjacent to freshwater bodies, such as the banks of creeks and streams, the shores of lakes and ponds, and aquifers which emerge at the surface such as springs and seeps (Bowland and Ferren 1992). A rich assemblage of wildlife series, including birds, mammals and amphibians are found in riparian habitats. In Santa Barbara County, riparian habitat occurs in and along the County's four major rivers (Santa Ynez, Santa Maria, Cuyama and Sisquoc) and in and along the County's many creeks and streams. This habitat can also occur along arroyos and barrancas, and other types of drainages throughout the County.

(2) **Riparian Impact Assessment Guidelines:** The following types of project-related impacts may be considered significant:

a. Direct removal of riparian vegetation.

b. Disruption of riparian wildlife habitat, particularly animal dispersal corridors and or understory vegetation.

c. Intrusion within the upland edge of the riparian canopy (generally within 50 feet in urban areas, within 100 feet in rural areas, and within 200 feet of major rivers listed in the previous section), leading to potential disruption of animal migration, breeding, etc. through increased noise, light and glare, and human or domestic animal intrusion

d. Disruption of a substantial amount of adjacent upland vegetation where such vegetation plays a critical role in supporting riparian-dependent wildlife species (eg: amphibians), or where such vegetation aids in stabilizing steep slopes adjacent to the riparian corridor, which reduces erosion and sedimentation potential.

e. Construction activity which disrupts critical time periods (nesting, breeding) for fish and other wildlife species.

3. Native Grasslands

(1) **Description:** Native Grassland in California once occurred over 8 million acres in the Central Valley and in scattered patches along the Coast Ranges (Heady, 1977). Few stands of native grasslands remain in the state and the habitat is considered rare both in the state and within the county.

(2) **Native Grassland Habitat Impact Assessment Guidelines:**

a. For purposes of resource evaluation in Santa Barbara County, a native grassland is defined as an area where native grassland species comprise 10 percent or more of the total relative cover. [4,5]

b. Removal or severe disturbance to a patch or patches of native grasses less than one-quarter (1/4) acre, which is clearly isolated and is not a part of a significant native grassland or an integral component of a larger ecosystem, is usually considered insignificant.

4. Oak Woodlands and Forests

(1) **Description:** There are three primary types of oak woodlands in Santa Barbara County: Valley Oak, Coast Live Oak, and Blue Oak woodlands. The number, type, and density of oak trees, and the relationship between trees and understory are principal characteristics which define the various types of woodlands. Oak habitats support a diverse wildlife population, and offer abundant resources to wildlife including food sources, shade in summer, shelter in winter, perching, roosting, nesting, and food storage sites.

(2) **Impact Assessment Guidelines for Woodlands and Forest Habitat Areas:** Project-created impacts may be considered significant due to changes in habitat value and species composition such as the following:

a. Habitat fragmentation
b. Removal of understory
c. Alteration to drainage patterns

[4] The California Department of Fish and Game, Natural Heritage Division uses the 10% relative cover figure in determining acreages of remaining native grasslands (Keeler-Wolf, Natural Diversity Data Base, personal communication May 1992). (Relative cover is the cover of a particular species as a percentage of total plant cover of a given area. [Barbour, Burk & Pitts 1980].)

[5] Native grasslands which are dominated by perennial bunch grasses such as purple needlegrass (*Stipa pulchra*) tend to be patchy (the individual plants and groups of plants tend to be distributed in patches). Therefore, for example, where a high density of small patches occur in an area of one acre, the whole acre should be delineated if native grassland species comprise 10 percent or more of the total relative cover, rather than merely delineating the patches that would sum to less than one acre.

d. Disruption of the canopy

e. Removal of a significant number of trees that would cause a break in the canopy or disruption in animal movement in and through the woodland

5. Impact Assessment for Individual Native Trees

(1) **Description:** Native specimen trees, regardless of size, are potentially significant, and rare native trees, which are very low in number or isolated in distribution (such as Island Oak) may be particularly significant. This significance evaluation is done on a case-by-case basis and considers tree size, numbers, location, relationship to habitat, etc.

(2) **Definition:** Specimen trees are defined, for biological assessment purposes, as mature trees that are healthy and structurally sound and have grown into the natural stature particular to the species.

(3) **Native Tree Impact Assessment:** In general, the loss of 10% or more of the trees of biological value on a project site is considered potentially significant. [6]

E. GENERAL MITIGATION GUIDELINES FOR BIOLOGICAL IMPACTS

1. Mitigation Hierarchy

The following general approaches to reducing biological impacts are presented in the order of their effectiveness.

a. Avoidance

Avoid direct or indirect impacts to significant biological resources through project design.

Focus on maintaining large, contiguous habitat areas and animal movement corridors. A project design which clusters development on a relatively limited portion of the project site may reduce the habitat area disturbed by the project.

b. Onsite Mitigation

Minimize or reduce impacts through on-site design and resource protection measures.

[6] The number of trees present onsite form which the 10% is measured may be calculated either by counting individual trees or by measuring the area of the tree canopy with a planimeter.

Measures may include vegetative spatial buffer between project and habitat areas; revegetation; habitat enhancement; erosion and water quality protection; on-site replacement/compensation; maintenance and management measures such as fencing, weed control, use of building envelopes, and dedication of areas through open space or conservation easements or grant deed of development rights; short-term measures to protect against construction impacts (e.g., fencing, timing of construction to avoid nesting season).

c. Off-Site Mitigation

Compensate for on-site impacts through off-site measures.

When avoidance or on-site mitigation is infeasible or inadequate to reduce impacts, measures such as those listed under on-site mitigation can be considered in off-site locations, or may be accomplished through in-lieu fees. Off-site approaches may be appropriate at times if a greater ecological value may be clearly gained than with on-site mitigation. (i.e., where on-site habitat is of low quality or highly fragmented).

2. Habitat Replacement/Compensation Guidelines

The mitigation approach of replacing habitat either on-site or off-site, to compensate for habitat loss, is generally not a preferred approach because it always results in some habitat loss (either short-term or long-term), and because prospects for successful habitat replacement are problematic.

Replacement mitigation should involve the same habitat type, location(s) within the same watershed and as close as possible to the site of impact, and should result in comparable and compensating size and habitat value.

3. Consultation on Mitigation and Project Design

a. Biological Information

County biological information available to project applicants, consulting biologists and the public by appointment includes resource and wetland maps, historical aerial photographs, and a library of previous biological surveys and reports. More specific mitigation guidance is provided in a separate technical document augmenting these Guidelines.

b. Consultants

County staff is available through consultations and pre-application meetings to advise project applicants on project design measures to minimize biological impacts.

Project sponsors may consult informally with California Department of Fish and Game and/or area consulting biologists at the preliminary review or initial study stage to determine what wildlife and vegetation resource information is available or needed and how the necessary information can be obtained.

F. TECHNICAL BACKGROUND DOCUMENT

A separate technical document contains the following additional information:

A. Summary of Biological Resources Statutes

B. Biological Survey Guidelines

C. Detailed Biological Habitat Descriptions

D. Biological Mitigations

7. COASTAL RESOURCES

(Seawall/Coastal Protection Policy)

INTRODUCTION

On April 10, 1990 the Board of Supervisors unanimously approved a new policy which requires that EIRs be prepared for seawalls and other coastal protection structures. These documents would include extensive analysis of cumulative effects and regional issues for which a given project would be involved. Concern over a potential proliferation of seawalls along the south coast led to the adoption of this policy. Note that infill structures would not be subject to the EIR requirement unless warranted by site specific impacts.

I. Administrative Policy

a. Coastal Units

For purposes of seawall review, it is proposed that the unincorporated portion of the South Coast be divided into ten units as shown on the attached map and listed below:

Coastal Unit	Location
Pt. Conception	VAFB to Gaviota
Gaviota	Gaviota to Eagle Canyon
Ellwood	Eagle Canyon to Coal Oil Point
Isla Vista	Coal Oil Point to UCSB
Goleta	UCSB to More Mesa
Hope Ranch	More Mesa to the City of S.B.
Montecito	City of S.B. to Sheffield Drive
Summerland	Sheffield Dr. to Loon Point
Sandyland	Loon Point to Carpinteria
Rincon Point	Carpinteria to Ventura County line

Note: No coastal units were defined north of the southern boundary of Vandenberg Air Force Base (VAFB) because the presence of VAFB, the State Park at Point Sal and the Guadalupe Dunes will preclude private coastal development under County jurisdiction for the foreseeable future. Additionally, no coastal unit was defined for UCSB because they are a separate state jurisdiction.

Each unit was chosen primarily on the basis of similar geologic/geomorphic character.

b. Infill Structures

The administrative policy requiring extensive analysis of cumulative effects and regional coastal issues would not apply to infill coastal protection structures. A limited infill seawall or coastal protection structure is one which is limited in length and would be connected to an existing similar structure on each end. Infill

protective structures, due to the potential for environmental impacts, would still require preparation of a site specific environmental document.

c. Scope of Review

Cumulative impact analysis for the identified stretches of beach would address geologically similar areas, would contain consistent design criteria, and would analyze the full range of alternatives to the construction of seawalls and other coastal protection structures to address coastal process/bluff retreat issues. These options could include sand replenishment, coastal protection structures, phased relocation or abandonment of bluff top homes, etc. The goal of requiring extensive cumulative analysis would be to address the potential for regional impacts, insure the implementation of a consistent approach to coastal processes for each section of coast, and to implement standard mitigation measures. An additional goal would be to integrate the policies and findings of all seawall EIR's in order to provide the most consistent approach possible for the County as a whole. In the ideal situation, an EIR addressing a given stretch of beach could be used as a base environmental document for the processing of future coastal process/bluff retreat measures required along that stretch of coast. Each seawall EIR should address the potential impacts for the full range of alternatives (sand replenishment, seawalls, home relocation/abandonment, etc.), cumulative impacts, and specifically discuss the following:

1. Geology of the rocks which underlie a 500 foot wide strip along the coast.
2. Sea bluff retreat rates.
3. Potential for large-scale landslides.
4. Effects of coastal protection structures on littoral sand supply.
5. Effects of sea level rise due to global warming.
6. Impacts on beach access.
7. Aesthetic impacts.
8. Biological Impacts (offshore, coastal strand and bluff, etc.).
9. Coastal protection alternatives.
10. General design criteria and standard mitigation measures for seawalls.
11. Available on and offshore sand sources.

Procedurally, seawall EIRs would provide general guidelines for implementation of the particular coastal process/bluff retreat program for a given section of coast. The findings of each seawall EIR would provide guidance to County decision-makers and coastal homeowners on the acceptable methods of addressing coastal process issues within a given coastal unit. Actions taken by homeowners or the County to address coastal process issues that are consistent with the findings of the EIR for a previously reviewed coastal unit would not require major additional environmental review. Alternatively, should an application for the alteration of coastal processes contain design features which are inconsistent with those provided in a seawall EIR previously prepared for that coastal unit, the application would be subject to additional environmental review through an Addendum or a Supplement to the previous EIR.

This process will allow the decision-makers to adequately evaluate the regional issue of coastal processes/bluff retreat from a long term and regional perspective.

Santa Barbara County Resource Management Department

EVALUATION CRITERIA FOR TEMPORARY FOUNDATION IMPROVEMENTS ON SEACLIFF PARCELS IN ISLA VISTA

Prepared by Brian R. Baca
Registered Geologist
Resource Management Department

December 1, 1992

These "Evaluation Criteria" (formerly named "Design Guidelines") have developed over the past several months during the review of several proposed projects located on Del Playa Drive in Isla Vista. Each of these projects involved the installation of underground foundation improvements with the primary feature being 35-40 foot long vertical caissons (a caisson is a cylindrical, steel-reinforced concrete piling). These criteria identify design parameters and mitigation measures which, if incorporated into the project description by the applicant, may allow for the preparation of a Negative Declaration for the project (i.e. the potential for significant impacts and the need for an EIR would be avoided). These criteria follow the intent of State CEQA Guidelines section 15070(b) which describes the Mitigated Negative Declaration process. Numerous applications similar to the cases now under review are expected to be filed with the County within the next several years. The Evaluation Criteria are intended to be a standard under which each is to be reviewed. The permitting process would involve a discretionary Special Use Permit which would authorize installation and subsequent removal followed by implementing ministerial Coastal Development Permits at the time of construction and at the time of removal.

INTRODUCTION

These evaluation criteria address two distinct areas of County review of proposed temporary foundation improvements including:

1. **Review of Environmental Impacts.**

   The assessment (and avoidance) of environmental impacts on the bluff face and the beach upon the exposure of the improvements due to continuing retreat of the sea cliff.

2. **Safety Hazards.**

   The removal of elements of the proposed improvements which are undermined by ongoing erosional processes such that they become unstable and hazards to public safety.

The below listed criteria (or guidelines) are intended to allow an applicant to design a project such that significant environmental impacts could be avoided for the following issue areas *in the absence of evidence of unique circumstances indicating a potential for project-specific or cumulative significant impacts*:

- Aesthetics
- Increased erosion of adjacent properties
- Long-term loss of beach width (i.e. lateral access impacts)
- Erosion of the bluff face during construction and removal activities

The principles underlying these criteria is that the proposed foundation improvements (caissons and related structures) would be temporary and that they would not substantially alter the rate of seacliff retreat (i.e. at no time would they protect the cliff from erosion). These criteria also specify the regulatory process which would be followed in the event that the improvements are found to create a safety hazard after exposure on the seacliff. This process is considered to adequately address potential impacts on public safety.

EVALUATION CRITERIA

1. **Caisson spacing along the bluff face**

   The proposed caissons shall be at least five feet apart, measured edge to edge. (For example: Caissons which are 2 feet in diameter would be 7 feet apart measured from the center of the caissons.)

   Monitoring: The P&D Geologist shall review and approve the final construction plans prior to the issuance of the CDP.

2. Caisson spacing perpendicular to the bluff face

Caissons or other foundation support structures constructed on or along a line approximately perpendicular to the general trend of the seacliff (e.g. at Isla Vista Beach this would be approximately perpendicular to Del Playa Drive) shall be constructed a minimum distance of 5 feet apart (7 feet on center for 24 inch diameter caissons) with the following exception: They may be constructed as close as 3 feet apart (5 feet on center for 24 inch diameter caissons) if designed and approved by a Registered Engineer or Certified Engineering Geologist. In no case shall they be closer than 3 feet apart (5 feet on center for 24 inch diameter caissons). This criteria applies, in general, to caissons located along the side property lines on coastal parcels. *(This criteria is intended to prevent undermining or weakening of support of a caisson during removal of an adjacent caisson.)*

Monitoring: The P&D Geologist shall review and approve the final construction plans prior to the issuance of the CDP.

3. Maximum coverage of the bluff face

The caisson support system shall be designed such that upon exposure due to continuing erosion, the bluff face shall at a minimum be composed 70% of native material. (For example: Two foot diameter caissons constructed 7 feet apart on center would cover a maximum of 30% of the area of the bluff face if the system were fully exposed.)

Monitoring: The P&D Geologist shall review and approve the final construction plans prior to the issuance of the CDP.

4. Setback from adjacent property

Foundation support structures shall be located at least three feet from a property boundary except as follows: The support structures may be located as close as one foot from a property boundary if designed and approved by a Registered Engineer or Certified Engineering Geologist. In no case shall any portion of a foundation support structure be closer than one foot from a property boundary. This setback provision is considered adequate to assure that an adjacent property is not encroached upon or subject to erosion during the installation of a caisson. Removal of caissons due to environmental impacts or safety hazards would occur only after they were no longer in contact with the bluff face. Thus, the bluff face on the adjacent property would not be affected by caisson removal activities.

(This criteria does not pertain to boundaries between two properties which are both part of the proposed project.)

Monitoring: Prior to the issuance of the CDP, the following shall occur: 1) the P&D Geologist shall review and approve the final construction plans and 2) the applicant shall submit a letter from a Registered Engineer or Certified Engineering Geologist that states

that the location of the subject caisson meets the above setback and that the adjacent property will not be encroached upon or subject to erosion during the installation of the caisson(s).

5. Caisson setback from the bluff face

Caissons shall be constructed a minimum of 10 feet landward of all parts of the bluff face in order to avoid potential erosion of the bluff face during construction. This setback was established by the P&D Geologist based on observations of the character of the weak rocks exposed on the bluff face at Isla Vista Beach. A lesser setback distance for one or more caissons may be used if the P&D Geologist determines that substantial construction-related impacts are not reasonably foreseeable based on site-specific conditions. In no case shall any construction occur within 5 feet of the bluff face (Ordinance required setback).

Monitoring: The P&D Geologist shall review and approve the final construction plans prior to the issuance of the CDP. The applicant shall clearly mark the locations of the proposed caissons and Permit Compliance shall conduct a site inspection during the pre-construction meeting required under the CDP to assure that the locations of the caissons meet the setback requirement.

6. Tieback design

Angled tiebacks may be incorporated into the design of the foundation improvements if the proposed tieback design allows for removal in a manner which is safe for workers and unlikely to result in bluff face erosion or a public safety hazard in the opinion of the County Building Official and the P&D Geologist. Tiebacks shall be removed at the time of caisson removal to the extent feasible without causing substantial erosion of the bluff face. (Note: *DYWIDAG Systems International* Threadbar Rock Anchors have been reviewed by the P&D Geologist and County Building Official and are considered at this time acceptable for use as tiebacks.)

Angled tiebacks which do not meet the above criteria shall not be incorporated into the design. Lateral support for the caissons may be obtained through structures at the top of the bluff. (For example: Caissons may be tied to patios and building foundations located on the elevated marine terrace landward of the top edge of the bluff face.)

Monitoring: The P&D Geologist and County Building Official shall review and approve the proposed tieback design and the proposed removal method prior to issuance of the CDP.

7. Notification and Removal to avoid environmental impacts

The project description shall incorporate the following procedures regarding the removal of the caissons in order to prevent the occurrence of significant

environmental impacts on beach width (lateral access) and increased (or accelerated) erosion of adjacent properties.

a) **Advisory Letter to Property Owner:** The property owner may receive an advisory letter from the Resource Management Department or the County Building Official (Public Works Department) upon exposure of one or more caissons on the bluff face. This letter would inform the current owner of the apparent condition of the caissons (i.e. the level of caisson exposure on the bluff face) and the procedures outlined in the *Evaluation Criteria* (this document) which will be followed by P&D and the County Building Official as erosion of the bluff face continues. "Exposure" of a caisson is defined as the full width of the caisson(s) being visible over the lowermost three feet of the bluff face or the full width of the caisson(s) visible for a total of 10 feet (measured vertically) on the bluff face. This letter would not require any action but would provide early notification to the property owner of upcoming removal requirements.

b) **Notice to Remove to Avoid Environmental Impacts:** A "*Notice to Remove*" letter may be provided by the Resource Management Department to the property owner which calls for removal of one or more caissons to avoid impacts on beach width (lateral access) or increased erosion of adjacent properties. Removal shall be accomplished by the property owner within one year of the date of the *Notice to Remove* letter using the procedures specified in the Removal Plan prepared in accordance with the parameters listed in paragraph c) below. The physical parameters which would result in the preparation of a *Notice to Remove* letter are listed below.

Beach Width and Lateral Access Impacts: Significant impacts on beach width and lateral access will be considered to begin when seacliff retreat has proceeded to the point that the caisson(s) are located more than three feet seaward from the base of the bluff. At this point the caissons would not be in contact with the bluff face. (According to studies incorporated into the environmental impact report for the Del Playa Seawall, certified by the Santa Barbara County Board of Supervisors on July 28, 1992, the emplacement of seawall (i.e. a fixed structure similar to an exposed caisson) 3 to 4 feet seaward of the base of the bluff would result in an estimated loss of up to 24% of the remaining average daily lateral access time.) The property owner shall receive a *Notice to Remove* letter from the Resource Management Department that states that the caisson(s) are three feet or more from the bluff face and calls for removal. The caisson(s) shall be removed by the property owner within one year of the date of this notification.

Erosion of Adjacent Properties Impacts: Erosion of adjacent properties due the presence of caissons would occur if the caissons served to reduce the rate of seacliff retreat such that a promontory was formed. Wave reflection off a promontory could cause increased erosion of an adjacent property. This effect is not anticipated to occur due to the spacing between caissons specified in criteria 1 and 2 above. These criteria (if followed) result in at least 70% of the bluff face being exposed to wave energy. When a majority of the bluff face is protected from wave energy, the rate of seacliff retreat is reduced, as can be observed at the

existing seawalls at Isla Vista Beach. Isolated obstructions such as the support timbers for the access stairways on Isla Vista Beach which are several feet apart (similar in geometry to caissons exposed in front of the bluff face) have not discernably reduced the retreat rate of the bluff face. However, if increased erosion of an adjacent property occurred due to a caisson-related promontory effect, it would happen after the caissons were no longer in contact with the bluff face and could be readily observed during the annual site inspection by the P&D Geologist or County Building Official. If this effect is observed during the annual inspections, the property owner shall receive a *Notice to Remove* letter from the Resource Management Department that includes a description of the evidence of increased erosion. The caisson(s) shall be removed by the applicant or current property owner within one year of the date of this notification.

c) **Removal Plan to avoid environmental impacts:** A detailed description of the process by which the caissons would be removed shall be included in the project description submitted in the application for a Special Use Permit. This description should include a discussion of the following:

1) the physical procedure for cutting and removing the caissons,
2) access to the property,
3) equipment to be used,
4) the estimated duration of removal activities,
5) transport of the removed material from the beach to a disposal site,
6) worker safety and
7) an estimate of the future cost of caisson removal.
8) the project description shall include a proposed financial security adequate to assure implementation of the provisions for caisson removal. **(Security will be required prior to the issuance of the Coastal Development Permit for the installation of the caissons.)**
9) In addition, the removal of structures (i.e. buildings,patios) supported by the caissons or other measures to assure structural stability should be similarly discussed. The feasibility associated with the described process will be evaluated by P&D and the Building Division of the Public Works Dept.

d) **Removal Process:** "Removal" of a caisson refers to the caisson in its entirety including tiebacks and any other supported structures. The portion of a caisson which would extend below the surface of the bedrock terrace shall be removed and the resulting hole backfilled with erodible material (fragments of Sisquoc Shale, if available, or gravel). A Coastal Development Permit (CDP) issued by the Resource Management Department will be required to conduct removal activities. Issuance of the permit will be based on conformance with the conditions of subject Special Use Permit and the project description.

e) **Monitoring:** The County Building Official (Public Works Department) or the P&D Registered Geologist shall conduct annual inspections of the properties along the seacliff at Isla Vista Beach to monitor the level of exposure of foundation structures (i.e. the visibility of the caissons and the distance that they

extend seaward of the bluff face). The P&D Geologist shall prepare a *Notice to Remove* letter to the property owner which calls for removal of the exposed structure if the caissons have become exposed such that they are located three feet or more seaward of the base of the bluff **or** are causing increased erosion on an adjacent property.

Funding for County staff time associated with the annual inspections and notification shall be provided from the accrued earnings from a interest-bearing account set up by the applicant to be reviewed and approved by P&D and County Counsel prior to issuance of the CDP for the construction of the caissons. Upon removal of the last foundation component associated with the current application, the principal and any remaining accrued interest shall be released to the applicant. The signature of the Director of P&D or his designated representative will be required before release of this account.

In order to assure implementation of the removal provisions included in these evaluation criteria, the applicant shall provide a financial security to be reviewed and approved by the Resource Management Department and County Counsel prior to issuance of the CDP for construction of the foundation improvements. (Note that this financial security would be separate from the "interest-bearing account" discussed above.)

8. **Notification and Removal for Public Safety Hazards**

The project description shall incorporate the following procedures regarding the removal of the caisson(s) and related structures which are undermined by ongoing erosional processes such that they become hazards to public safety.

a) **Advisory Letter to Property Owner:** The property owner may receive an advisory letter from the Resource Management Department or the County Building Official (Public Works Department) upon exposure of one or more caissons on the bluff face. This letter will inform the current owner of the apparent condition of the caissons (i.e. the level of caisson exposure on the bluff face) and the procedures outlined in the *Evaluation Criteria* (this document) which will be followed by P&D and the County Building Official as erosion of the bluff face continues. "Exposure" of a caisson is defined as the full width of the caisson(s) being visible over the lowermost three feet of the bluff face or the full width of the caisson(s) visible for a total of 10 feet (measured vertically) on the bluff face. This letter would not require any action but would provide early notification to the property owner of upcoming removal requirements.

b) **Notice to Remove due to public safety hazards**: Upon identification of a potential hazard, the County Building Official or the P&D Geologist shall prepare a *Notice to Remove* letter to the applicant/property owner which identifies the potentially hazardous condition. Upon receipt of this notification, the applicant will have 45 days to submit a report by a Registered Engineer or a Certified Engineering Geologist which documents the condition of the structure with regards to safety. After 45 days from notification, the hazardous components of

the project shall be subject to hazard abatement (e.g. removal) procedures established by the County Building Official if no report is submitted, the report indicates that a safety hazard exists or if the County Building Official determines that a hazard exists despite contrary opinion expressed in the submitted report.

c) **Removal Process:** The timing and method of removal shall be determined by the County Building Official during the hazard abatement process. The hazard abatement procedures are independent of these evaluation criteria and are based on standard engineering practice and applicable building regulations.

d) **Monitoring:** The County Building Official (Public Works Department) or the P&D Registered Geologist shall regularly conduct annual inspections of the properties along the seacliff at Isla Vista Beach to monitor the level of exposure of foundation structures (i.e. the visibility of the caissons and related structures and the distance that they extend seaward of the bluff face). If the caissons (or other foundation improvements) are determined by the County Building Official to represent a potential safety hazard, the P&D Geologist or the County Building Official shall prepare a *Notice to Remove* letter to the property owner which calls for removal of the exposed structure. The procedures discussed in 8b) and 8c) above would then be implemented.

Funding for County staff time associated with the annual inspections and notification shall be provided from the accrued earnings from a **interest-bearing account** set up by the applicant to be reviewed and approved by P&D and County Counsel prior to issuance of the CDP for the construction of the caissons. Upon removal of the last foundation component associated with the current application, the principal and any remaining accrued interest shall be released to the applicant. The signature of the Director of P&D or his designated representative will be required before release of this account. Note that this account would be the same one as discussed in section 7e) of these evaluation criteria.

Note that the **financial security** to be provided by the applicant to assure implementation of removal for environmental effects (see section 7c and 7e) is not intended to cover hazard abatement costs and would be available only to the Resource Management Department. Funding of required hazard abatement work not performed by the property owner would be obtained by the County Building Official from the property owner through established legal procedures.

IMPACT ANALYSIS SUMMARY

Aesthetics

Criteria 1 and 3 above would assure that no more than 30% of the bluff face would be covered with concrete. This design parameter would avoid significant visual impacts. The white vertical lines which would be formed by the caissons would, however, still be visually dominant when exposed. For the following reasons the aesthetic impact of the caissons (upon exposure) would be considered less than significant:

1. Maximum 30% concrete coverage of the bluff face (as stated above).

2. The temporary nature of the caissons and the variability in the time of exposure due to the non-linear trend of the bluff edge would generally preclude all of the caissons on a particular parcel from being exposed at the same time.

3. The sea bluff at Isla Vista is not an undeveloped, pristine area. The caissons would only incrementally degrade the visual character of the area. Because of the existing densely-developed nature of the bluff top on the particular properties, exposure of the caissons, as designed pursuant to these evaluation criteria, would not constitute a significant visual effect.

Erosion of the adjacent unprotected properties

Evaluation criteria 1,3,7 and 8 would be considered to avoid significant erosion impacts based on the following reasons:

1. The caissons are not anticipated to substantially reduce the rate of landward erosion of the seacliff. Thus, a promontory would not develop with the exception of the caissons themselves. If a promontory did develop behind the caissons, the caissons would be removed pursuant to Criteria 7.

2. Each caisson would be become separated from the bluff face within a short time after its initial exposure. Waves would wash behind the caissons and not be reflected onto the adjacent properties. Wave reflection and wave refraction effects which would occur with a free-standing caisson would not substantially change the wave energy impinging on the adjacent property.

3. The setback from property lines (Criteria 4) would allow for the installation of the caissons without substantial erosion impacts to the adjacent property.

Long-term loss of beach width (lateral access impacts)

Impacts would be less than significant due to the implementation of the procedures included in criteria 7. Removal of the caissons within a year of the time that potentially significant impacts

could *begin* to occur would prevent a substantial long-term effect on beach width and lateral access.

Erosion of the bluff face during caisson removal activities

Erosion of the bluff face is not anticipated to occur during the removal of the caissons to avoid environmental impacts as specified in criteria 7 because removal would not be required until after the caissons had been separated by natural processes from the bluff face. Removal of caissons due to public safety hazards as specified in criteria 8 would also be anticipated to occur after separation from the bluff face. Loss of bluff material by accidental contact with the bluff face during the process of caisson removal would constitute a short-term impact and would not alter the long-term rate of seacliff retreat.

Erosion of the bluff during removal of the tiebacks

Criteria 6 would prevent the potential of an ongoing erosion problem either by requiring a design which would not result in such impacts during tieback removal. Tieback components remaining after initial caisson removal would be periodically cut back as they became safety hazards (Criteria 8).

Near-term erosion due to caisson construction

Criteria 5 would minimize the potential of erosion of the bluff during construction of foundation improvements. With this provision, substantial erosion due to construction activities is not anticipated.

8. CULTURAL RESOURCES GUIDELINES[1] ARCHAEOLOGICAL, HISTORICAL, AND ETHNIC ELEMENTS

Introduction

This document discusses in general the cultural resource review process used by DER. A technical document, Regulations Governing Cultural Resource Projects Undertaken in Conformance with Federal and State Environmental Protection Acts, provides procedures for cultural resource consultants to follow in preparing their investigations. These Regulations are available at DER.

A. Phase 1: Literature Search and Preliminary Assessment

As part of the environmental review process, DER reviews archaeological site maps to determine if a recorded cultural resource is located within the project site or whether there is a high potential for its presence onsite based on recorded site distribution patterns or historical accounts. If this determination is positive and the project site is not developed, a Phase I archaeological investigation including a systematic inspection of the ground surface is carried out by DER staff or a County approved professional archaeologist (depending on the size of the parcel) and sub-surface testing to define the presence of archaeological artifacts or site boundaries when vegetation obscures ground visibility. If historical remains are suspected, a professional historian will be retained to evaluate more fully the resource. The Phase I investigation and report will follow the specifications defined in the Cultural Resource Regulations defined above.

B. Phase 2: Cultural Resource Significance Determination

If an archaeological or historical site is observed, DER will work with the applicant to modify project plan descriptions such that direct impacts on cultural resources are avoided. Avoiding damage may be accomplished by many approaches, including the following:

1. Planning construction to miss cultural resource sites;

2. Planning parks, greenspace or other open space to incorporate archaeological or historical sites;

3. "Capping" or covering prehistoric or historic archaeological sites with a layer of fill soil before building tennis courts, parking lots, or similar facilities. Capping may be used in the following cases:

   a. The soils to be covered will not suffer serious compaction.

[1] Santa Barbara County Department of Resource Management, Division of Environmental Review, 1989.

b. The covering materials are not chemically active.

c. The site is one in which the natural processes of deterioration have been effectively arrested; and

d. The site has been recorded.

Although the placement of fill on top of an archaeological site may reduce direct impacts of construction, indirect impacts will possibly result from the loss of access to the site for research purposes and scarification and compaction of soils. To mitigate this impact, a sample of the cultural resource shall be excavated and appropriately curated for research purposes.

4. Deeding archaeological or historical sites into permanent conservation easements.

If the above avoidance measures cannot be used, a Phase 2 excavation program is funded by the applicant and performed by a County approved archaeologist and/or historian if necessary to determine if the cultural resource is "important" as defined in Appendix K of CEQA. If the project would cause damage to an important cultural resource, the project is considered to have a significant effect on the environment. For the purposes of CEQA, an "important archaeological resource" can be defined by one of several criteria listed below. Such a resource may have the following characteristics:

a. Is associated with an event or person of:

1. Recognized significance in California or American history; or
2. Recognized scientific importance in prehistory.

b. Can provide information which is of both demonstrable public interest and useful in addressing scientifically consequential and reasonable or archaeological research questions,

c. Has a special or particular quality such as oldest, best example, largest, or last surviving example of its kind.

d. Is at least 100 years old and possesses substantial stratigraphic integrity; or

e. Involves important research questions that historical research has shown can be answered only with archaeological methods.

The Archaeological Element of the County Guidelines provides a variety of relevant research questions for use in addressing significance criterion 4.e.

The Phase 2 investigation and report must follow the specifications defined in the Cultural Resource Guidelines defined above. The report must include significance assessments and propose ways to avoid impacting the important

resource. The report shall also include a suggested excavation plan for mitigating the effect of the project on the qualities which make the resource important if avoidance is considered infeasible.

The excavation plan shall include the following:

a. A brief summary of the excavation proposed as part of a mitigation plan.
b. Be available for review only on a need-to-know basis;
c. Shall not include the specific location of any archaeological resources if the plan would be made known to the general public.

An excavation plan shall also mention the following:

1. List and briefly discuss the important information the archaeological or historical resources contain or are likely to contain;
2. Explain how the information should be recovered to be useful in addressing scientifically valid research questions and other concerns identified in subdivision (a);
3. Explain the estimated cost of time required to complete all activities undertaken under the plan.

A list of significance criteria for evaluation of historical resources is found in the Historic Element of the County Guidelines and is summarized below. Any structure 50 years or older is considered potentially significant and shall be subjected to the following criteria:

A significant resource a) possesses integrity of location, design, workmanship, material, and/or setting; b) is at least fifty years old[2]; and c) demonstrates one or more of the following:

1) Is associated with an event, movement, organization, or person that/who has made an important contribution to the community[3], state, or nation;

2) Was designed or built by an architect, engineer, builder, artists, or other designer who has made an important contribution to the community, state, or nation;

3) Is associated with a particular architectural style or building type important to the community, state, or nation;

4) Embodies elements demonstrating a) outstanding attention to design, detail, craftsmanship, or b) outstanding use of a particular structural material, surface material, or method of construction or technology;

---

[2] A historic resource less than fifty years old may be considered significant if it is unique or possesses extraordinary elements of integrity, design, construction, or association.

[3] Community is defined as a neighborhood, town, city or district.

5) Is associated with a traditional way of life important to an ethnic, national, racial, or social group, or to the community-at-large;

6) Illustrates broad patterns of cultural, social, political, economic, or industrial history;

7) Is a feature[4] or a cluster of features which convey a sense of time and place that is important to the community, state, or nation;

8) Is able to yield information important to the community or is relevant to the scholarly study of history, historical archaeology, ethnography, folklore, or cultural geography.

The level of significance for these criteria are established by rating each significance attribute of the resource (detailed below) according to the following scale:

E = exceptional
3 = high; very good
2 = good
1 = little

A rating of E for any significance attribute marks a resource as possessing extraordinary or exceptional importance and indicates that it should receive special consideration in the planning process regardless of the numeric rating for other significance attributes. For instance, a resource may be of extreme antiquity,

And therefore be rated E in the aspect of age, but achieve an average numeric rating of, say, 1.7 in all other attributes of significance.

The following guidelines shall govern the assignment of significance level ratings for each aspect:

a. Integrity

E = pristine integrity in all 5 categories
3 = good integrity in at least 3 categories
2 = good integrity in at least 1 category
1 = fair to poor integrity in all categories

Integrity means that the resource retains the essential qualities of its historic character. These guidelines recognize five components of integrity: location, design, setting, materials, and workmanship.

Integrity of location means that the resource remains at its original location.

[4] A feature may be defined as a structure, building, structural element, object, tree, garden, etc.

Integrity of design, strictly applied, means that the resource accurately reflects its original plan. However, it is rare to find intact structures that have never undergone change. Thus, design integrity often infers that the components of the structure as a whole reflect design compatibility. For example, building additions that accurately incorporate design elements found in the original structure (e.g., roof pitch and covering, window placement and form, or exterior wall treatment) would not compromise integrity of design.

Integrity of setting means that buildings, structures, or features associated with a later development period have not intruded upon the surrounding area to the extent that the original context is lost. For instance, an old barn now in the midst of suburban residential development might retain integrity of setting if the immediately surrounding area still reflects a rural setting (e.g., open space, fencing, water troughs, etc.).

Integrity of materials means that the physical elements present during the historic period are still present or, if materials have been replaced, the replacement(s) have been based on the original. For instance, a Victorian style wood-frame dwelling that has been covered with stucco has lost its integrity of materials. Conversely, an adobe wall that has been reconstructed with similar adobe mud, as opposed to adobe-simulate concrete, would retain its integrity of materials.

Integrity of workmanship means that the original character of construction details is still present. These elements cannot have deteriorated or been disturbed to the extent that their value as examples of craftsmanship has been lost. For example, if the surface of a carved sandstone gate post has been seriously eroded, the feature will have lost much of its integrity of workmanship because its ability to provide information concerning older designs and techniques of stonecarving has been lost. Conversely, a steel superstructure may hide unreinforced brick walls of an old commercial building which can provide a valuable record of 19th century solid-wall brick construction techniques.

b. Age

E = 125 years old or older
3 = 100 " " " "
2 = 75 " " " "
1 = 50 " " " "

Comment: An E designation is based on the premise that any manmade feature which survives for 125 years or more is intrinsically exceptional and therefore subject to special consideration by virtue of its age, irrespective of other ratings.

c. Association

1. Association with an event, movement, organization, or person important to the community, state or nation:

E = resource has a central or continuous association with an event. . .
3 = resource has a direct association with. . .
2 = resource has an indirect association with. . .
1 = resource has a distant association with. . .

Comment: The significance of the event, movement, organization, or person must be established before this criterion is applied.

2. Designer

E = a designer who has made important contributions to the community and to the state or nation
3 = a designer who has made important contributions to the community
2 = an "attributed to" designer who has made important contributions to the community
1 = the designer is unknown.

Comment: This significance attribute focuses on overall designer contributions rather than on the aesthetic merits of the design itself.

3. Architectural Style or Building Type

E = retains all the attributes associated with its style or type or is a good example of its style or type if few survive
3 = retains most of the attributes associated with its style or type or is remodeled in a recognizable style that does not destroy the original style or type
2 = retains few, but sufficient attributes associated with its style or type
1 = undecipherable as a style or type or is one of many examples of its style or type

Comment: Vernacular building types and industrial architecture are equal in resource value to well-defined and studied architectural styles.

4. Construction materials

E = outstanding or very early example if few survive
3 = outstanding or very early example if many survive; good example if few survive
2 = good example if there are many examples of any material(s) and/or method(s) not generally in current use
1 = common example of any method(s) and/or material(s)

Comment: Examples of outstanding construction methods or structural materials include those which successfully address challenging structural problems, or which are treated as visible elements that contribute significantly to the resource's overall design quality, or which exhibit fine craftsmanship.

5. Traditional Lifeways

E = resource has a central association with a tradition spanning three or more generations
3 = resource has a direct association with a tradition spanning three or more generations
2 = resource has a direct association with a tradition spanning two generations or an indirect association with a tradition spanning two or more generations
1 = resource has a distant association with a tradition spanning two or more generations

Comment: Traditional lifeways, as used here, pertain to cultural patterns which have attained antiquity commensurate with the age requirement to which tangible resources are held. A central association ("E" rating) implies a quality of uniqueness between the resource and the tradition.

6. Association with Broad Themes of Local, State, or National History.

E = resource has a central association with theme(s)
3 = resource has a direct association with theme(s)
2 = resource has an indirect association with theme(s)
1 = resource has a distant association with theme(s)

Comment: The theme and its significance must be established before this criterion is applied. A helpful measure of this criterion is to consider how useful the resource would be for teaching or writing about cultural history.

7. Conveys Important Sense of Time and Place

E = an individual resource or a unified urban or rural landscape which defines a period of 100 or more years ago
3 = an individual resource or a unified urban or rural landscape which defines a period of 75 or more years ago
2 = an individual resource or a unified urban or rural landscape which defines a period of 50 or more years ago
1 = a unified urban or rural landscape which is less than 50 years old

Comment: A useful measure of this criterion is to consider whether the resource(s) has/have a prominence which contributes to a historic, visual, or environmental continuity. Would a typical resident of the area notice the resource(s) and remember it/them?

8. Ability to Yield Important Information

This attribute of significance is not quantifiable. Generally, when this criterion is invoked, it is an indication that the resource under study

requires further examination by a professional from a related discipline. Nevertheless, it is incumbent upon the historical specialist to consider what qualities of the resource or the project area might enable it to yield information that is important to another scholarly discipline.

For instance, the presence of building foundations or of a well, privy, trash pit, drain, sump, or cistern indicates that the project area may possess historic archaeological research potential. Similarly, is there archival evidence (maps, written documents, etc.) that the project area was occupied before or during some transitional period, either naturally occurring (e.g., fire, flood, drought, or earthquake) or culturally induced (e.g., highway or city street construction, the laying of water or sewer mains, or new building construction)? As a corollary, is there evidence that these earlier features may have survived to the present as subsurface resources?

In a different vein, is there evidence, gained through archival research, site inspection, or consultation with community groups or individuals, that the project area has a tangible or intangible quality of tradition that is important to an identifiable cultural group? For instance, there might be evidence that Italian immigrant stonemasons had cut stone from a sandstone outcropping occurring in the project area or that the area might be the site of a legendary event. If so, even if the data are sufficient, to determine a significance level under C-5, it would be appropriate to discuss additional research potential here.

If a cultural resource is determined not to be "important", both the resource and the effect on it shall be noted in the project file Initial Study or EIR but need not be considered further in the CEQA process. The project applicant is responsible for the complete funding of Phase 2 investigations. Phase 2 investigations are not limited by cost; however, costs are limited to providing services defined in scopes of work which are developed by DER.

C. Phase 3: Mitigation

1. Introduction

Once it is determined that an important archaeological or historical site may be significantly impacted by a project, the County may require preparation of an EIR. The EIR discussion must include the following work: (1) document the justification for the "importance" determination; (2) determine what type of information is necessary to evaluate the "scientifically consequential information from and about the resource," and if this information has already been gathered during previous investigation phases. The consultant developing the mitigation program consider that excavation as part of a mitigation plan shall be restricted to areas of direct and indirect impact unless special circumstances require limited

excavation or an immediately adjacent area in order to develop important information about the part of the resource that would be destroyed.

2. Mitigation of Important Archaeological or Historical Sites and Timing

There are special timing and deadline issues on mitigation programs required in CEQA Appendix K. Important timing issues state that unless special or unusual circumstances warrant an exception, the field excavation phase of an approved mitigation plan shall be completed within 90 days after final approval necessary to implement the physical development of the project, or, if a phased project, the excavation should take place in connection with the phased portion to which the specified mitigation measures are applicable, provided that the project applicant may extend that period if he/she so elects. A mitigation plan shall not authorize violations of any law protecting Native American cemeteries. This means that the County must apply a standard condition to insure that the applicant performs all applicable archaeological mitigation within 90 days after receiving approval on final development plans, or after subdivision (TPM or TM) map records unless phasing or special circumstances change this "deadline." The County has the responsibility to wait at least 60 days after the EIR is completed before making a final decision on the project. This time is required in order that persons interested in providing funding agree to do so before the decision is made which would implement any specific mitigation measure.

3. Information Regarding Project Costs and Mitigation

CEQA Appendix K designates limits on an applicant's responsibility to fund mitigation programs. These limits follow:

a. An amount equal to one-half of one percent of the projected cost of the project for mitigation measures undertaken within the site boundaries of a commercial or industrial project.

b. An amount equal to three-fourths of one percent of the projected cost of the project for mitigation measures undertaken within the site boundaries of a housing project.

c. If a housing project consists of more than a single unit, an amount equal to three-fourths of one percent of the project cost of the project for mitigation measures undertaken within the site boundaries of the project for the first unit plus the sum of the following:

(1) Two hundred dollars ($200) per unit for any of the next 99 units.
(2) One hundred fifty dollars ($150) per unit for any of the next 400 units.
(3) One hundred dollars ($100) per unit in excess of 500.

Where an important archaeological site is involved, the applicant must provide the County with documented, itemized, and projected total project

costs, and if applicable, any project phasing information which could more adequately accommodate the timing and implementation of the field excavation portion of the work beyond the 90 day deadline.

The applicant must also provide an itemized cost estimate of all project design expenditures necessary to preserve portions of all or any archaeological site from disturbance. The County may give credit for these costs in computing the applicant's mitigation costs.

The archaeological consultant must provide several sets of mitigation programs. One will be the estimate of the excavation costs and timing along with the laboratory analysis and report preparation costs and time necessary to fulfill the requirements of the research design. In addition, the consultant should present an alternative mitigation program in case funds guaranteed by the applicant and voluntarily guaranteed by any other persons or persons are less than the original mitigation estimate.

4. Land Use Element and Local Coastal Plan Policies and Mitigation

Historical and Archaeological sites policies in the County Land Use Element and Local Coastal Plan specify that if "sufficient planning flexibility does not permit avoiding construction on.... cultural sites, adequate mitigation shall be required. Mitigation shall be designed in accord with guidelines of the State Office of Historical Preservation and The Native American Heritage Commission." It is possible that adequate mitigation costs based on this policy may exceed limits imposed by CEQA Appendix K defined above. In these cases, use of the Appendix K funding limit would cause an inconsistency with these County Land Use Element and Local Coastal Plan policies.

5. Sites Discovered During Construction

CEQA Appendix K provides for an archaeological evaluation of the "surprise" find during construction. Construction shall cease in the area of the find but may continue on other parts of the building site while evaluation and necessary mitigation takes place. The applicant would be responsible for funding an immediate evaluation of the find's potential importance. If the find is determined to be an important archaeological resource under CEQA Appendix K, contingency funding and a time allotment sufficient to allow recovering a data recovery sample or to employ one of the avoidance measures shall be implemented.

These provisions shall be included as project conditions where there is some likelihood of an archaeological impact during construction. For example, this would apply to an area near an adjacent recorded site or where no cultural resources were discovered during a field survey, or within a site area previously tested and mitigated by a sample excavation.

D. Curation of Collections

All non-burial related artifacts collected during Phase 1, 2, and 3 investigations must be curated at an institution within Santa Barbara County. Qualified institutions are those with proper facilities and staffing for insuring research access to the collections. The UCSB Department of Anthropology is currently the only qualified local institution providing this service to the public and scientific community. In addition to artifacts, all supporting archaeological documentation must be submitted with the artifact collection. Curation arrangements with a qualified institution must be established prior to archaeological proposal preparation. Artifacts curated at the institution may be borrowed by qualified individuals and groups for educational use, display, ceremonies, etc.

The disposition of burial-related artifacts is covered by state law concerning burial remains (see Ethnic Impacts, Discovery of Human Remains).

E. Ethnic Impacts

1. Ethnic Impact Assessment

Appendix G, Significant Effects, of CEQA defines the need for evaluating the impacts a project may have on a community, ethnic, or social group.

A project will normally have a significant effect on the environment if it will cause one of the following:

j. Disrupt or adversely affect a prehistoric or historical archaeological site or a property or historical or cultural significance to a community or ethnic or social group.

w. Conflict with established recreational, educational, religious, or scientific uses of the area.

In order to evaluate these potential impacts, the County requires that appropriate representatives of affected community groups be contacted to assess their concerns and viewpoints concerning measures to mitigate those impacts. Ethnologists approved by DER are to carry out this research in accordance with requirements and procedures for assessing ethnic cultural resources and concerns in compliance with the California Environmental Quality Act (Susan Brown n.d.) adopted by the DER, and the Native American Heritage Commission's Guidelines for the Protection of the Native American Heritage Resources. Contact should be made early in the evaluation process during the Phase I investigation as well as subsequent phases of work.

If the affected community does not consider to mitigation measures proposed by consulting archaeologists and incorporated in the project description by the applicant, the project may be considered to result in a significant impact and an EIR (or EIR section) may be prepared.

There are currently four recognized Native American groups in Santa Barbara County representing local Native American individuals of Chumash descent. The United Chumash Council represents various Chumash groups of the South Coast. The Santa Ynez Federally Recognized Elders Council represents Chumash living on the Santa Ynez Reservation. The Santa Ynez Kit Wo' N' Unio represents particular families on the Reservation, and the Candelaria American Indian Council represents South Coast documented Chumash. DER will contact all groups if prehistoric archaeological sites are to be impacted to evaluate this effect on their ethnic values.

2. Discovery of Human Remains

The County policy regarding disposition of human remains disturbed during project construction is defined in CEQA Appendix K, Section VIII. If remains are encountered at any time, the County Coroner shall be contacted to determine the age and the origin of the bones. A qualified physical anthropologist will assist the coroner to make the determination whether human remains are prehistoric or not. If human remains are considered Native American, the individuals most likely to have descended from the individuals represented by the remains will then be contacted who will make recommendations regarding the treatment and reinterrment of the remains and associated grave goods. If no descendants can be identified, the Native American Heritage Commission shall select the representative responsible for the disposition of the remains. These arrangements will be made with the landowner and will include an appropriate period of time for a DER approved physical anthropologist to analyze and record the remains and a DER approved archaeologist to analyze the associated grave goods.

3. Native American Consulting

Native Americans are retained during all sub-surface investigations and disturbances of archaeological sites to insure compliance with Appendix K, Section VIII. They may be involved in Phase I fieldwork investigation as well.

F. Sequential Steps for Implementation of CEQA Appendix K.

1. Determination by DER staff during Initial Study process that a project site may have a potential archaeological, or historical, or Native American culturally significant resource.

2. Professional fieldwork and documentation that a project will or will not have a direct or indirect physical impact on such a resource (Phase 1 investigation).

3. If the project does not have such potential, a finding of "significant impact" is not made and EIR is not prepared (specifically for "cultural resource reasons"). The project may also be redesigned or "self conditioned" at this stage to avoid the resource or to guarantee its protection.

4. If the project does have the potential to impact significantly a resource and the project cannot be revised to avoid the resource, the site must be evaluated in order to determine whether it meets the criteria to be defined as important (Phase 2 investigation). Evaluations are performed by DER approved archaeologists, historians, and/or ethnographers and may or may not require field excavation as well as laboratory analysis but such reports do require, at a minimum, a historical records search when the site has been previously disturbed.

5. If the resource is found to be unimportant, no further professional work is required and a negative declaration may be issued if the only issue is cultural resource impacts.

6. If a determination is made that the resource is important, the applicant will be requested to work closely with the County and the cultural resource consultant to provide for appropriate mitigation either by avoidance of the deposit, adoption of development restrictions to preserve them, or special construction techniques (e.g., covering, etc.) to protect them. To the extent that direct impacts cannot be avoided, mitigation measures shall be required. The development of such measures will be the task of the consultant working in conjunction with the county and the applicant, which would require additional archaeological excavation of a sample of the area to be impacted (Phase 3 investigation).

7. The consultant will need to be provided the cost-estimates of each project if the analysis reaches this stage. According to CEQA the amount paid by a project applicant for mitigation depends upon the kind of project and the number of units. The mitigation cost formula are the following:

   a. Commercial or industrial projects:

      Mitigation Costs (MC) = Total project cost (TPC) x 0.005

   b. Residential Projects:

      (1) One Unit: MC = TPC x 0.0075
      (2) One - 99 units : MC = Project costs for one unit (PC1) x 0.0075 + $200 x (total number of units less one (TNU-1))
      (3) 99-499 Units: MC =PC1 x 0.0075 + $200 x TNU-1 (up to 99) + 150 x (number of units from 99 up to 499)
      (4) Over 500 units: MC = formula (3) above + $100 x (number of units in excess of 500)

   This total may be determined to be inadequate to fully mitigate cultural resource impacts and be inconsistent with the County Land Use Element and Local Coastal Plan policies.

8. After the consultant prepares a report substantiating the importance of the resource together with an appropriate mitigation program(s) detailing full mitigation costs and maximum applicable costs to the applicant (using (7) above), the County will enter the data into an EIR to allow for full public and applicant comment, and certify the document.

   The consultant must state and the County must decide whether previous studies of the resource have "... adequately recovered the scientifically consequential information from and about the resource." The County and the consultant are required to present the evidence for such a finding in the EIR. In such a case, no further mitigation would be required. In some cases, previous information concerning a site may provide only partial information and more research may be needed.

9. If necessary, the County must seek out private donations for the unpaid one-half of the proposed mitigation program within 60 days of the certification of the EIR and before the discretionary decision on the project application.

G. References

These references are available through the County of Santa Barbara, Division of Environmental Review.

County Resource Management Department, Conservation Element of the County Comprehensive Plan, April 1979. pp. 13 - 14, 224 - 256.

County Resource Management Department, Land Use Element of the County Comprehensive Plan, August 1982. pp. 89 - 90, 109.

County of Santa Barbara, Coastal Plan. Section 3.10, Archaeological and Historical Resources, pp. 140-143, March 1981

County of Santa Barbara, Zoning Ordinance. Article III of Chapter 35, Zoning of the Santa Barbara County Code. Sec. 35 - 211.

9. ELECTROMAGNETIC FIELDS THRESHOLD

INTRODUCTION

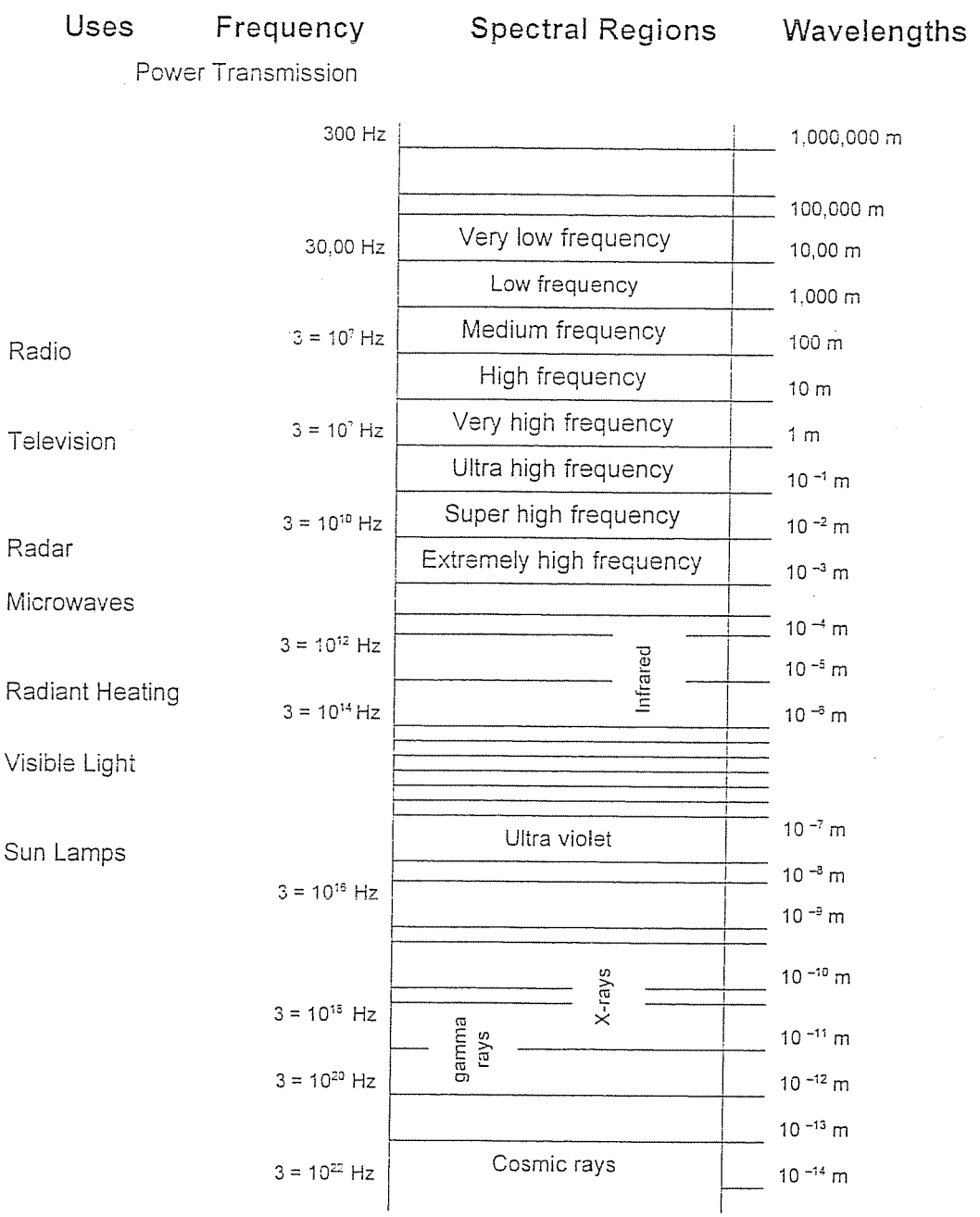
Due to the proliferation of sources of electrical energy with their associated electromagnetic fields (EMFs) and increasing public awareness over the potential health affects associated with these sources, the need to address these potential health effects through disclosure of potential environmental impacts has arisen. Although scientific evidence is inconclusive, this document briefly summarizes the information known regarding EMFs, identifies guidelines for evaluating impacts, sets a threshold to trigger project-level environmental review, and suggests mitigation approaches where possible to reduce exposure to electromagnetic fields.

BACKGROUND

Electromagnetic fields are composed of both electric fields and magnetic fields. Both types of fields occur in nature and in all living things. Electromagnetic energy occurs over a broad range of frequencies known as the electromagnetic energy spectrum (see figure 1). The frequency, or Hertz (Hz), that we are concerned with in this County, ranges from extremely low frequency (60 Hz) associated with power transmission facilities to 3×10^{10} Hz associated with microwaves. In between these frequencies are EMFs generated by radio, television, and radar transmissions. EMFs generated by these sources have similar properties in that they all contain electric and magnetic fields. However, the types of EMFs generated by extremely low frequency sources have different and distinct properties than those generated by higher frequency sources associated with communication facilities. These differences are discussed in more detail below.

Electric and magnetic fields are present wherever there is an electric current and voltage. Electric fields come from the amount of the charge, or voltage. They represent the forces that electric charges, which are either positive or negative, exert on each other. Electric fields are measured in volts per meter (V/m), or kilovolts per meter (kV/m). As electric charges move, they create additional forces on each other. These forces are carried through space by magnetic fields. Magnetic fields, therefore, result from the motion of an electric charge, or current. Magnetic fields are measured in milligauss (mG). When most people think of EMFs, they probably think of power transmission and distribution lines, however, they are present in household wiring and appliances and are propagated by communications facilities.

The physical characteristics of radiofrequency radiation (RFR) and extremely low frequency (ELF) EMFs from electric power differ in their function, frequency, wavelength, power levels and EMF characteristics. The function of communication facilities is to radiate energy away from an antenna outward over long distances, providing a broadcast signal for reception at another point. This is in direct contrast to electric power transmission, where the goal is to minimize any radiation away from the power cable itself (minimize power loss), while maximizing efficient energy movement along the power line. Thus, communications systems broadcast energy out through space, while power transmission attempts to minimize energy loss in space by sending energy along a cable (Wong, 1991).



Source: EFRI, Undated

Figure 1. The electromagnetic spectrum shown by frequency and wavelength. At a frequency of 60 Hz and a wavelength of 5,000,000 meters power transmission is at the top of the figure. Frequencies less than 300 Hz are designated as the ELF (extremely-low-frequency) range.

Regarding the characteristics of frequency, wavelength, and power levels, ELFs differ from radio waves in that they are much lower in frequency, have extremely long wavelengths compared to very short wavelengths of radio waves, and the power levels are generally much higher in power transmission facilities than in communication facilities.

In the case of EMF from communication facilities, the electric and magnetic fields travel, or propagate long distances from their sources. The electric and magnetic fields are linked and are considered together as a radiating electromagnetic field, thus creating what is known as radiofrequency radiation. In contrast, low frequency EMFs found in power lines project fields around the power line itself and do not propagate. In the case of electric power, the electric and magnetic portions are considered to be independent, and are not linked. Thus, when studying power-frequency fields, the separate electric and magnetic fields must be considered, not just the radiating electromagnetic fields or RFR which is typically studied in the case of radio waves (Tenforde and Kaune, 1987).

Radiation associated with EMFs is considered non-ionizing radiation. That is, the energy associated with these types of electromagnetic fields do not have the ability to ionize electrons and molecules. Ionization refers to the breakdown of chemical bonds between molecules, which results in tissue damage (Wong, 1991).

Common sources of EMFs (both low and higher frequency sources) and their field strength characteristics are discussed in Appendix A.

HEALTH & SAFETY ISSUES

In recent years, involuntary exposure of the general public to elevated EMFs has become a growing concern. This attention centers on a growing body of evidence, some of which suggests that 60-Hertz (Hz) magnetic fields at low intensities have been shown to produce adverse biological effects, in addition to factual proof that thermal heating of body tissue associated with RFR can have harmful effects.

Studies regarding ELFs to date have primarily been focused in three categories. These include **cellular level** studies, **whole animal and human** studies, and **epidemiological** studies. Cellular level studies have been focused on calcium efflux, cancer promotion, endocrine secretion and immune response. Animal and human studies have been focused on the nervous system, behavior patterns, reproduction and development; and cancer progression. Epidemiological studies have looked at the hypothetical relationship between human exposure to EMFs produced by power systems and human cancers occurring in children, adults and workers in occupations where extensive exposure to EMFs is an issue. Studies in each of these three categories indicates that there is evidence that 60-Hz magnetic fields can produce biological effects. A summary of these effects is included in Appendix A. What is not clear, however, is whether and how those biological effects can cause public health problems (Wong, 1991).

Effects of RFR have been primarily linked to thermal responses as a result of exposure to RF sources of energy. In general, exposure of humans and animals have the potential to interact with body tissue such that water molecules become excited, causing friction and concomitant rises in body temperature, albeit slight in most instances. This effect is similar to that which is experienced within a microwave oven, where the water molecules within the food substance are excited to

create heat, thus resulting in the warming of food. Other effects, include RF burns, in which in the very near field, especially in the microwave frequencies, a person has the potential to receive a burn similar to a sunburn. The standards for RFR discussed below deal primarily with thermal effects, as many of the athermal effects are still unknown and are similar to those discussed above for ELF sources. Some of the potential ill-effects include behavior changes, abnormal hormone production, and ocular changes.

THRESHOLDS

ELFs

While some evidence supports the fact that there may be some biological effects which may result from low frequency EMFs, there are no standards or guidelines to govern the public's involuntary exposure to ELFs. Some jurisdictions throughout the nation and internationally have tried to address the problem by establishing setbacks based upon field strengths from high voltage power lines. However, none of the setbacks established are based on any causal relationship between field strengths and adverse health effects.

Standards for ELFs are based upon the measurements of Kv/m for electric fields, and mG for magnetic fields. At the present time, most attempts at establishing standards or dosimetric relationships have focused on the limitation of magnetic fields since it is generally impossible to shield individuals from these fields. In general, it is relatively easy to shield individuals from electric fields as they do not readily penetrate buildings, structures, fencing, trees, etc.

At this time, given the current information regarding potential health impacts and the uncertainty surrounding these impacts, the Board of Supervisors did not adopt a specific threshold for ELF exposure. Instead, the Board of Supervisors directed staff to evaluate ELF exposure on a case by case basis, using the most current scientific data.

RFR

For RFR, standards have been established for effects resulting from thermal heating of body tissue. The most widely used conservative standards are the IEEE-ANSI C95.1-1992 Standards, which are based on power densities, as shown in Figures 2 and 3. Power density is the rate at which electromagnetic energy radiates through space in terms of watts per square meter (W/m^2) or milliwatts (1/1,000th of a watt) per square centimeter (mW/cm^2) and is customarily used in addition to the specification of the strengths of electric and magnetic fields by kV/m and mG when defining standards. It is important to note that the IEEE-ANSI standards are frequency dependent. That means that for sources of RF below and above the 30-300 MHz range, the standard is relaxed in accordance with the graph in Figure 2 and 3. The most stringent standard is for the 30-300 MHz range, and is represented by the power density level of 0.2 mW/cm^2 for general population exposure and 1.0 mW/cm^2 for occupational exposure. These standards do not address the athermal effects which are also associated with ELFs.

RFR Threshold

"If humans would be exposed to radiofrequency radiation (RFR) in excess of the IEEE-ANSI C95.1-1992 standard, through the siting of new projects next to RFR sources or through the siting of new RFR sources adjacent to sensitive receptors , then a potentially significant impact would occur. (If the FCC rulemaking committee adopts a revised standard, said standard shall apply).

MITIGATION STRATEGIES

In order to mitigate potential impacts from electromagnetic fields, mitigation should be designed to prevent exposure of individuals to elevated electromagnetic fields. For ELFs, this means that projects should be designed such that no living spaces are exposed to elevated magnetic fields. For RFR, individuals should not be exposed to levels exceeding the IEEE-ANSI Standards. Mitigation may take the form of setbacks, prohibitive/restrictive fencing, warning signs, disclosure statements, reconfiguration of power lines, reduction of power inputs to transmitting facilities, etc..

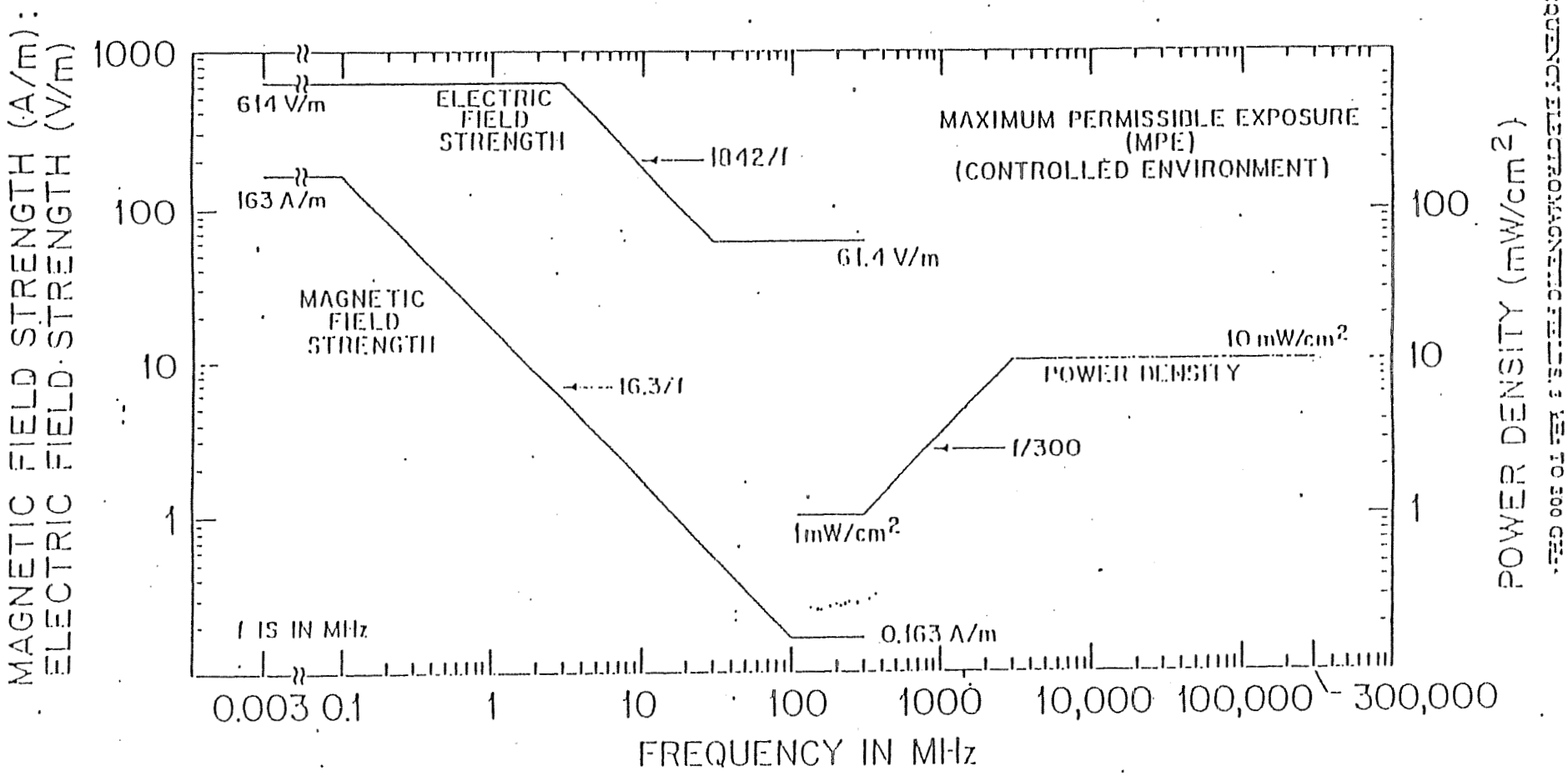


Fig 2

Graphic Representation of Maximum Permissible Exposure in Terms of Fields and Power Density for a Controlled Environment.

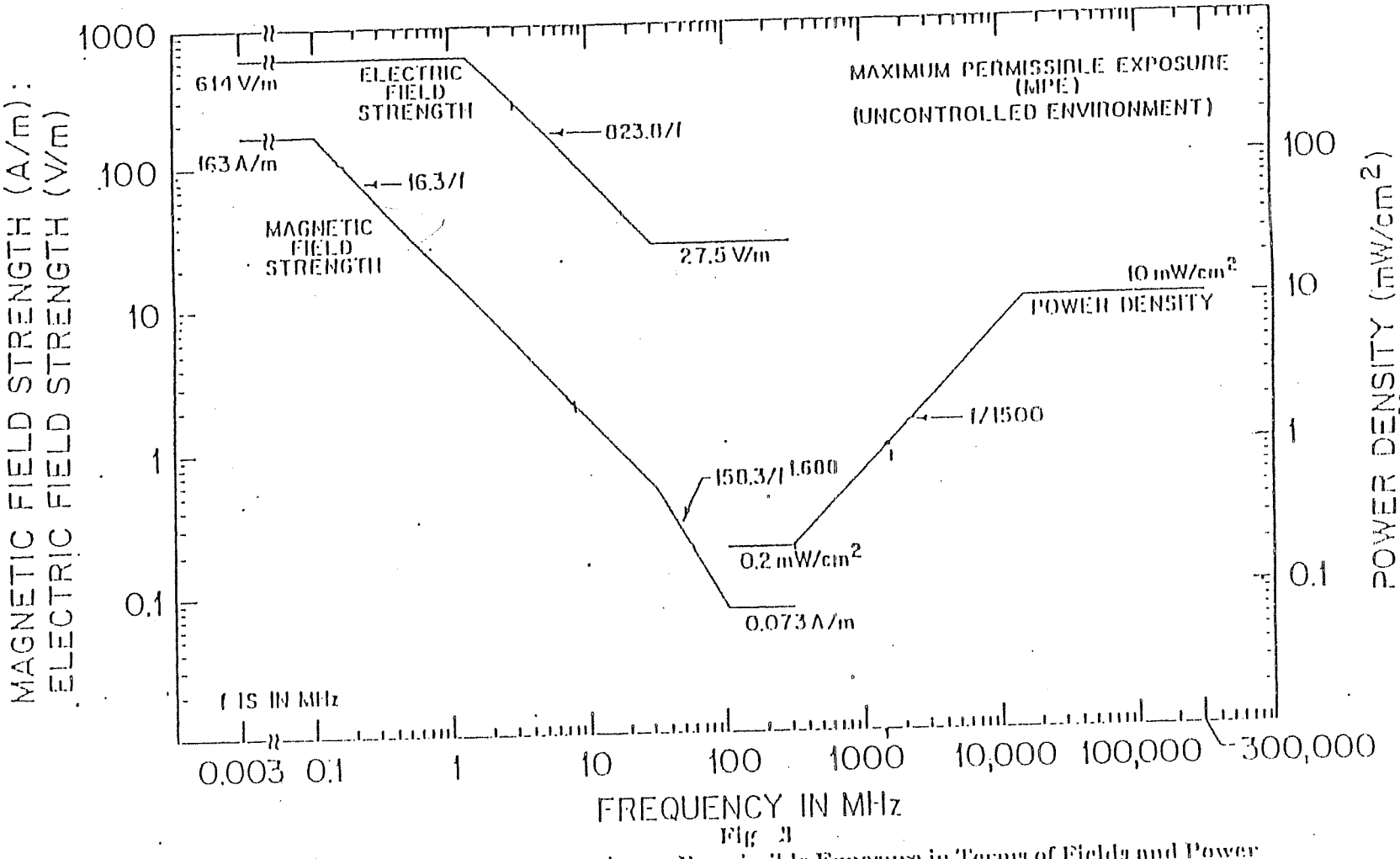


Fig. 3

Graphic Representation of Maximum Permissible Exposure in Terms of Fields and Power Density for an Uncontrolled Environment.

REFERENCES

Krieger, Roy. On the Line. American Bar Association Journal, January 1994.

Adey, W.R. Tissue Interactions With Nonionizing Electromagnetic Fields. Physiological Review, April 1981.

Banks, Roberts Associates. Electric and Magnetic Fields: Summary of Developments. (Edison Electric Institute Electric and Magnetic Fields Task Force, 1990.)

California Department of Health Services. An Evaluation of Alleged Cancer Clusters Among Teachers at Slater School Between 1973 and 1992. p. 11, 1993.

Electric Power Research Institute. Electric and Magnetic Field Fundamentals: An EMF Health Effects Resource Paper. Undated.

Environmental Protection Agency. Questions and Answers About Electric and Magnetic Fields (EMFs). December 1992

E.P.R.I. Survey of Residential Magnetic Field Sources, Volume 1, Goals, Results and Conclusions. L. E. Zaffanella, Principal Investigator, Sept. 1993.

Morgan, M. Granger. Electric and Magnetic Fields from 60 Hertz Electric Power: What do we know about possible health risk? (Pittsburgh: Carnegie Mellon University, Department of Engineering and Public Policy, 1989.)

National Council on Radiation Protection, Report No. 86, Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields. (NCRP Publications, 7910 Woodmont Avenue, Suite 1016, Bethesda, Maryland, 20814. 1986.)

Sage, Cindy. Consultations, January 1994.

Sykes, Thomas M. and Ping Li. Possible Health Effects of Electric and Magnetic Fields from Electric Power Lines: A Summary of Scientific Studies. (Olympia, WA: The Evergreen State College, Washington State Institute for Public Policy, 1990.)

Santa Barbara County Resource Management Department. Gibraltar Peak Communications Site EIR, 91-EIR-12. February 1992.

Tenford and Kuane. Health Physics 53:585-606. 1987.

U.S. Department of Energy. Contractors' Conference, EPRI Survey of Residential Magnetic Field Sources. L.E. Zaffanella and G.B. Johnson, November 1993.

Wong, John S., Staff Counsel, Division of Ratepayer Advocates, California Public Utilities Commission. Order Instituting Investigation on the Commission's own motion to develop policies and procedures for addressing the potential health effects of electric and magnetic fields of utility facilities. (Sacramento: California Public Utilities Commission, 1991.)

APPENDIX A
SOURCES OF EMF AND THEIR FIELD STRENGTH CHARACTERISTICS
HEALTH EFFECTS SUMMARY

SOURCES OF ELECTROMAGNETIC FIELDS

Sources of ELFs are found throughout our daily lives, in and around our homes. It is virtually impossible to live in modern society without exposing one's self to some of these sources of EMFs. Higher frequency EMF sources which generate potentially harmful effects are not as common in our day-to-day lives, and in general expose fewer people. The reason for this is that transmitting communications facilities, such as radio and microwave broadcast facilities, are generally sited in sparsely populated areas. It is also important to note, that in the case of both low and high frequency EMFs, the energy/fields or power density radiated (both electric and magnetic) will generally decrease sharply with distance from any radiating source in keeping with the inverse square law. That is, each time distance from the source is doubled, the power density will decrease by a factor of four (S.B. County RMD, 1992). Figures 1 and 2 illustrate the decreasing electric and magnetic fields associated with transmission, distribution, and household appliances.

As mentioned previously, there are two types of EMFs that are of primary concern: 1) the non-linked electric and magnetic fields associated with extremely low frequencies (ELFs), and 2) the linked electric and magnetic fields constituting radiofrequency radiation (RFR) that is associated with the higher frequencies used for communications, radar, and microwave equipment.

Common sources of Extremely Low Frequency fields include the following:

Power lines
Motors & generators
Transformers, electrical distribution panels, switchgear
Electrical appliances
Electric blankets, heating pads, water bed heaters
Electric resistance heating
Florescent lighting
Electric (Analog) clocks
Home and commercial building wiring
Metal water pipes, gas line, cable TV, telephone cables (grounds)

Common sources of Radio Frequency emissions include the following:

Radio and television transmission facilities
Microwave and cellular facilities
Radios, TV's, computers & computer monitors, etc.
Microwave ovens, induction cook tops

HEALTH EFFECTS SUMMARY

Sykes and Li, 1990, have briefly summarized the four effects that are currently under discussion based upon scientific research currently available. These include:

Changes in cell activity. Exposure to ELF fields can cause changes in calcium flow through the cell membrane, changes in the immune response by cells, and changes in RNA transcription.

Interactions with the nervous system. Animal studies have shown a consistent effect of electric fields on the secretion of certain neurohormones which administer the circadian rhythms, but the effect is demonstrated only at certain field frequencies and intensities. Some studies have reported altered sensory response and stress response.

Variations in reproduction and development. ELF field exposure may be associated with abnormal embryo development for some specific circumstances and may affect brain development.

Effects on cancer promotion. No evidence of initiating cancer by exposure to ELF fields has been found. Labaratory studies on immune response, RNA transcription and circadian rhythms, and epidemiological surveys have suggested that ELF fields might play some role in promoting cancer, but the kind of cancer promotion is still inconclusive.

10. GEOLOGIC CONSTRAINTS GUIDELINES

The purpose of these guidelines is to provide preliminary criteria for determining whether a particular activity could have a potentially significant impact on the environment as described in Section 15064 of the State CEQA Guidelines. Because geologic conditions are highly variable within Santa Barbara County, these guidelines are not fixed thresholds upon which a determination of significant impact would be made. They serve to point out when further study of site-specific conditions is required in order to assess geologic impacts. The level of project geologic impacts (i.e. potentially significant, potentially significant but subject to effective mitigation or not significant) is made by P&D staff (in consultation with licensed geologists and engineers as necessary) upon review of project plans, proposed mitigation measures and site-specific geologic information.

Impacts are considered potentially significant if the proposed development activity, including all proposed mitigation measures, could result in substantially increased erosion, landslides, soil creep, mudslides and unstable slopes (Appendix G(q), CEQA Guidelines). In addition, impacts are considered significant when people or structures would be exposed to major geologic hazards upon implementation of the project (Appendix G(r), CEQA Guidelines).

Impacts related to geology have the potential to be significant if the proposed project involves any of the following characteristics:

1. The project site or any part of the project is located on land having substantial geologic constraints, as determined by P&D or PWD. Areas constrained by geology include parcels located near active or potentially active faults and property underlain by rock types associated with compressible/collapsible soils or susceptible to landslides or severe erosion. "Special Problems" areas designated by the Board of Supervisors have been established based on geologic constraints, flood hazards and other physical limitations to development.

2. The project results in potentially hazardous geologic conditions such as the construction of cut slopes exceeding a grade of 1.5 horizontal to 1 vertical.

3. The project proposes construction of a cut slope over 15 feet in height as measured from the lowest finished grade.

4. The project is located on slopes exceeding 20% grade.

Mitigation measures may reduce impacts to a less than significant level. These measures would include minor project redesign and engineering steps recommended by licensed geologists and engineers subsequent to detailed investigation of the site.

11. GROUNDWATER THRESHOLDS MANUAL

for

Environmental Review of Water Resources
in Santa Barbara County

Revised and updated
August 20, 1992

Brian R. Baca
Registered Geologist

Resource Management Department
County of Santa Barbara

INTRODUCTION

THRESHOLD OF SIGNIFICANCE

The Threshold of Significance is the point at which a project's estimated contribution to the overuse of groundwater in an alluvial basin or other aquifer is considered significantly adverse. This manual documents the methods used to establish the threshold values for groundwater extractions from the various alluvial basins and consolidated rock aquifers in Santa Barbara County. Note that the California Supreme Court has ruled that an EIR must be prepared whenever it can be fairly argued on the basis of substantial evidence that a project may have a significant environmental impact. Implementation of CEQA requires that a lead agency (such as the county) determine what constitutes a potentially significant effect.

In the past, thresholds for the alluvial basins have been determined based on a fixed number of acre-feet per year (AFY), a percentage of existing overdraft, or a percentage of safe yield. In the most recent editions of this manual, the threshold has been calculated from a standard formula which included factors of available storage and overdraft. In this update of the manual, a new methodology developed by the Division of Environmental Review is used. A threshold was chosen for an idealized "Standard Reference Basin" based on a percentage loss of the remaining life of the available storage. Thresholds for the other basins are proportional to this value based on relative size and remaining life. This method was developed to simplify the calculations and more clearly link the various threshold levels to the environmental circumstances specific to each basin.

The Threshold of Significance for consolidated rock ("bedrock") aquifers is considered the amount of new pumpage by a proposed project which would place the aquifer in a state of overdraft. This criteria has remained the same since adoption of the first thresholds manual in 1983.

The groundwater Thresholds of Significance apply to all projects subject to discretionary review by the County of Santa Barbara.

WATER RESOURCES IN SANTA BARBARA COUNTY

Water supplies in Santa Barbara County come from two sources:

1. Surface water impounded behind dams on the Santa Ynez River augmented by infiltration into delivery tunnels drilled through the Santa Ynez Mountains.

2. Groundwater pumped primarily from the fourteen alluvial basins. Additional water is produced from bedrock aquifers in the hills which surround the alluvial basins.

These supplies are limited. Long-term average annual yields of the surface reservoirs, as currently constructed, are fixed values subject only to downward adjustment due to siltation or the occurrence of a new worst-case drought. Groundwater supplies are limited in terms of the annual amount of water which can be withdrawn without causing a long term drop in water levels ("Safe Yield") and in the amount of total storage of a basin which can be removed without

significant environmental effects ("Available Storage"). These limits make conservative use of water a necessary policy in Santa Barbara County in order to avoid or minimize significant and lasting adverse environmental effects.

Figures 1a and 1b illustrate the location of the major alluvial basins in Santa Barbara County. Also shown are the Ellwood/Gaviota and Gaviota/Point Conception areas dominated by bedrock pumpage.

ENVIRONMENTAL CONCERNS IN ALLUVIAL BASINS

Adverse environmental effects which can be caused by overdraft of an alluvial groundwater basin include:

1. Degradation of water quality
2. Saltwater intrusion
3. Land subsidence
4. Loss of well yield
5. Well interference
6. Reduction of surface water available to support biological resources.

Degradation of Water Quality

Water quality varies considerably from one basin to another. In general, water quality in the groundwater basins of Santa Barbara County is declining with continued use of the resource, particularly in areas where the water table has been significantly lowered. Factors attributable to man which contribute to continuing degradation include pollution by agricultural runoff waters laden with fertilizers and pesticides, percolation of water from public and private sewage treatment systems, use of imported water which increases the salt load on a basin, percolation of polluted urban runoff, the reduction of the natural "flushing" effect of water through-flow caused by lowered water levels and the upward or lateral influx of connate brines by over-pumping of the freshwater aquifers. Preventive measures are the best way to address the ongoing deterioration. In general, the amount of pollutants placed in the ground, and the level of overdraft in the basins, should be minimized.

Salt Water Intrusion

Intrusion of marine salt water is a problem which could affect all of the coastal basins of Santa Barbara County. Unfortunately, few data are available on its occurrence in the past. Recent USGS studies have shown that salt water has intruded a few hundred feet onshore in Storage Unit #I of the "Santa Barbara City Basin." Computer modeling conducted as part of this work indicated that the rate of salt water advance was four times greater than the rate at which the salt water could be flushed out by natural processes. Prevention of salt water intrusion is thus a key concern of projects supported by coastal pumpage.

Land Subsidence

Land subsidence can occur in alluvial basins where water levels have dropped due to pumpage. Substantial evidence has not been reported in Santa Barbara County. Subsidence in the

overdrafted Goleta Basin has undoubtedly occurred but most of it probably took place many decades ago when the lower aquifers were first penetrated (according to the County Water Agency). Land subsidence can be a significant problem which can damage structures erected above a local cone-of-depression caused by extensive pumping.

Loss of Well Yield

Dropping water levels in a basin due to overdraft will reduce the rate at which individual wells will be able to produce water. Drilling more wells or deeper wells are the two methods of maintaining groundwater production to service a particular municipal or agricultural demand. There are, however, technical, legal and economic limitations on the ability of individuals or public or private purveyors to use these methods. With these limitations, it is likely that continued drop in water levels due to overdraft will cause loss of agriculture and a reduction in the ability of water districts to serve existing demand.

Well Interference

New pumpage as part of a proposed project may cause a loss of well yield in nearby wells due to 1) a drop in water level as a cone-of-depression develops, or 2) a drop in water level due to storage depletion in a small isolated area. This could result in the current use on adjacent parcels being no longer supportable by the existing well(s).

Effects on Biological Resources

Pumpage of groundwater causes fluctuations over time in the elevation of the groundwater table. Lowering of the water table can effect biological resources on the land surface by reducing access to water by deep-rooted native vegetation or by reducing discharge of groundwater (baseflow) in streambeds. Even if a basin were pumped at a hydrologic "safe yield" rate (long-term water levels remain stable) a drop in water levels during a drought could adversely affect biologic resources.

In nearly all cases, an individual project's effect on biological resources would not have a discernable local effect - the new pumpage would add incrementally to the regional change in water levels. Thus, the thresholds of significance included herein would adequately address this impact. Under certain conditions, however, a local pumping depression could adversely affect a specific habitat area. In this case, the effects would need to be analyzed in the biologic resources section of the project environmental document.

ENVIRONMENTAL CONCERNS IN CONSOLIDATED ROCK AQUIFERS

Consolidated rock aquifers are generally less extensive and have much smaller annual safe yield values than the alluvial basins. Environmental concerns associated with these aquifers include degradation of water quality, long-term loss of well yield, well interference and effects on biological resources. The discussion of these concerns presented above for alluvial basins applies to consolidated rock aquifers except for biological resources. Pumpage of consolidated rock aquifers has a direct effect on average annual flows downstream of the well site. This is because a pumpage-related drop in water levels (from native conditions) will lessen or eliminate baseflow out of the aquifer and induce groundwater recharge by stream flows. The reduction in

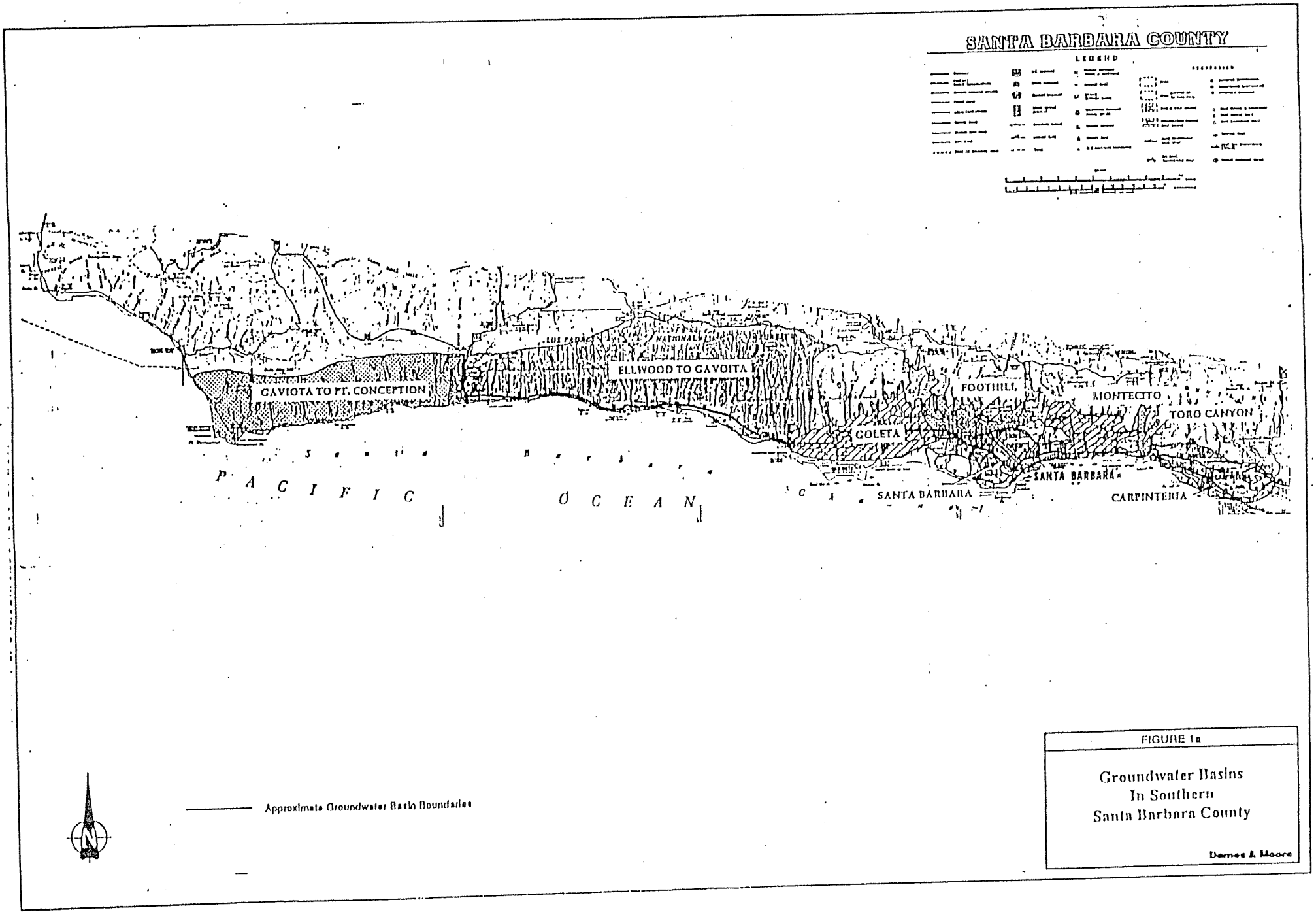


FIGURE 1a

Groundwater Basins
In Southern
Santa Barbara County

Dames & Moore

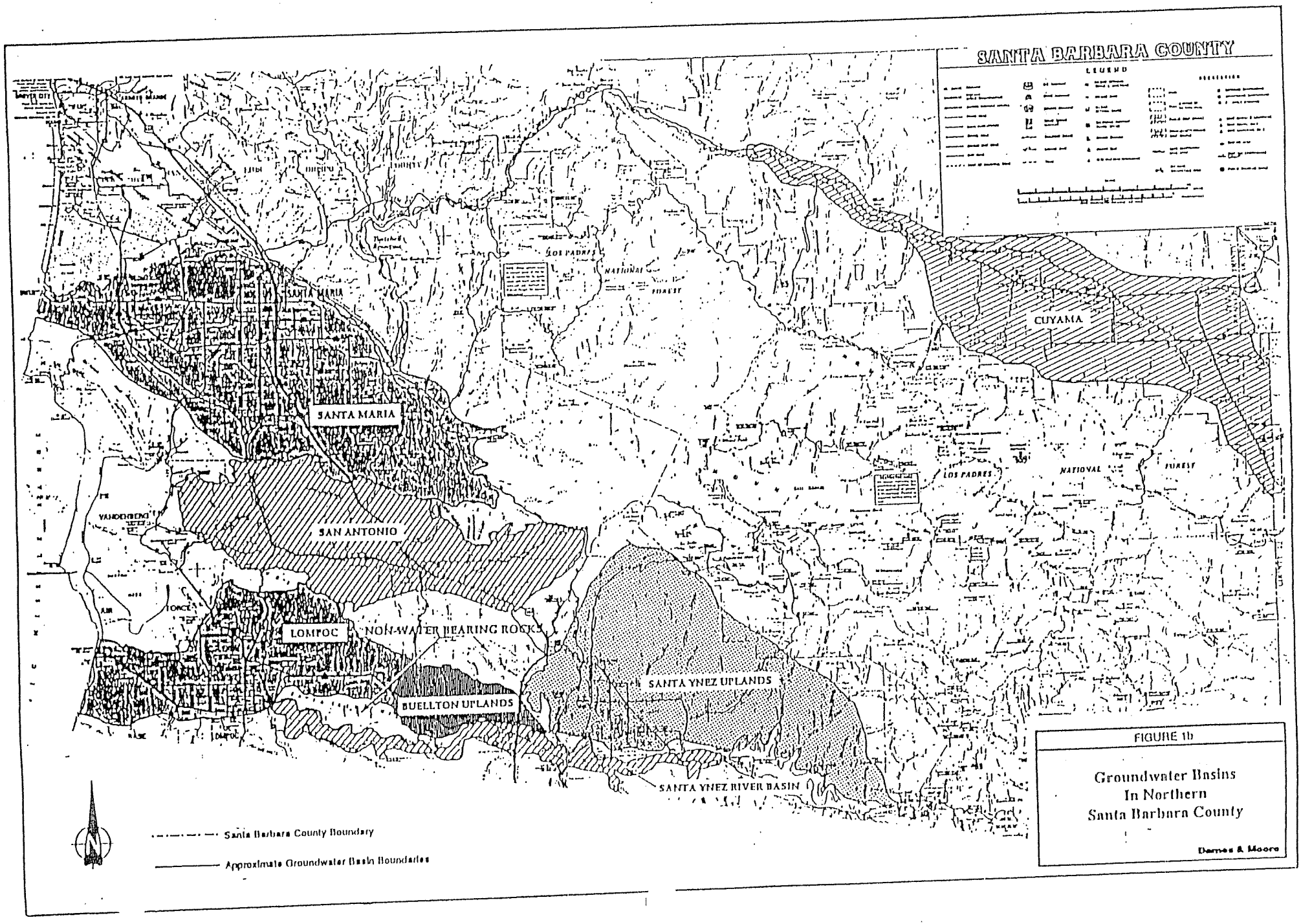


FIGURE 1b

Groundwater Basins
In Northern
Santa Barbara County

Dames & Moore

TABLE 1 - SUMMARY OF GROUNDWATER BASIN CONDITIONS

Data from County Water Agency and Division of Environmental Review as of March 1992
By Brian R. Baca, 6/92 (File "thresh4.wk3") REVISED 8/92

Basin	Return flow Factor (Gross-to-net)	Available Storage	Gross Pumpage (AFY)			Net Pumpage (AFY)		
			Current Use	Estimated Safe Yield	Surplus (Overdraft *)	Current Use	Estimated Safe Yield	Surplus (Overdraft *)
Carpinteria	.90	50000	4238	4294	56	3814	3865	51
Montecito	.90	16000	1823	1350	473 *	1641	1215	426 *
Toro Canyon	.90	650	242	300	58	218	270	52
Foothill	.95	5000	1095	953	142 *	1040	905	135 *
City of Santa Barbara	.95	10000	619	847	228	588	805	217
Goleta North/Central	.95	18000	5167	3600	1567 *	4908	3420	1488 *
Goleta West	.95	10000	See note below					
More Ranch	.90	600	24	84	60	22	76	54
Buellton Uplands	.74	153800	2898	1766	1132 *	2133	1300	833 *
Santa Ynez Uplands	.78	900000	14100	11500	2600 *	10998	8970	2028 *
Lompoc	.67	170000	31087	28537	2550 *	23386	21468	1918 *
San Antonio	.75	800000	19441	8667	10774 *	15431	6500	8931 *
Santa Maria	.70	1100000	149300	118500	30800 *	103800	83800	20000 *
Cuyama	.75	1500000	48700	10667	38033 *	36525	8000	28525 *
S. Y. River Riparian	N/A	90000	Not subject to overdraft.					

Note on the Goleta North/Central Basin:

The overdraft status of the Goleta North/Central Basin is based on pumpage by various private and public entities over the last decade. Overdraft of this basin is not projected to continue as a result of the court judgement in the Wright vs. Goleta Water District lawsuit and the efforts of the GWD to comply with the judgement. The judgement requires that the GWD return the basin to a state of hydrologic balance by 1998. GWD actions to meet this mandate include:

1. Adoption of a Water Supply Management Plan
2. Adoption of Ordinance 91-2 ("WET" Initative ; Desalination Supply)
3. Voter approval of revenue bonds for the State Water Project.
4. Construction of the GWD/GSD waste water reclamation plant.
5. Permanent water conservation programs.

On July 14, 1992 the Board of Supervisors determined that water service to Wright litigants and other holders of Can-and-Will-Serve letters from the Goleta Water District does not have the potential to cause overdraft. Projects fitting in this description are therefore exempt from environmental review as it pertains to questions of groundwater overdraft.

Note on the Goleta West Basin:

The status of the Goleta West Basin (or Subbasin) has not yet been resolved. This is because of uncertainty associated with several well exchange/service agreements between the GWD and landowners in the West Basin. The issue is the subject of ongoing discussions between RMD and GWD staff and is anticipated to be resolved by late 1992.

TABLE 2 - GROUNDWATER THRESHOLDS 1992 UPDATE

Revised methodology for determining Threshold of Significance
By Brian R. Baca, 6/92 (File "thresh2b.wk3") REVISED 8/20/92

METHODOLOGY

An idealized reference basin having overdraft and storage characteristics similar to the overdrafted basin with the greatest remaining life (Santa Ynez Uplands) was chosen as a standard. The Threshold of Significance for this reference basin was set at an amount (61.9 AFY) that if added to the assumed overdraft would result in the loss of 3 % of the remaining life of the Available Storage. The Threshold values for the actual basins are proportional to the Threshold for the reference basin based on the relative length of remaining life and the relative size of the basin. Remaining life is weighted at 75 % ; size at 25 %. Threshold values are rounded to the nearest 1 AFY for use in project environmental review.

STANDARD REFERENCE BASIN

Net Overdraft (AFY)	Available Storage (AF)	Remaining Life of Av. Strg. (Years)
2000.000	900000.000	450.000
a	b	c

Threshold of Significance based on 3.000 % loss of remaining life of Avail. Stor. = 61.856 AFY (d)

Formula for calculation of reference basin Threshold of Significance (x) in AFY. (3 % loss of remaining life)

$$\frac{900000 \text{ AF}}{2000 \text{ AFY} + (x)} = 450 \text{ years} * .97$$

OVERDRAFTED / OVERCOMMITTED BASINS

Basin	Net Overdraft (AFY)	Available Storage (AF)	Remaining Life of Av. Strg. (Years)	Ratio to Standard Reference Basin (1) Remaining Life (R.L./ c)	(2) Available Storage (A.S./ b)	Combined Ratio (1) @ 75% (2) @ 25%	Calculated Threshold of Signif. (Combined ratio times 61.856)	Applied Threshold of Significance (AFY)
Santa Ynez Uplands	2028.000	900000.000	443.787	0.986	1.000	0.990	61.215	61
Buellton Uplands	833.000	153800.000	184.634	0.410	0.171	0.350	21.677	22
San Antonio	8931.000	800000.000	89.576	0.199	0.889	0.372	22.980	23
Lompoc	1918.000	170000.000	88.634	0.197	0.189	0.195	12.058	12
Santa Maria	20000.000	1100000.000	55.000	0.122	1.222	0.397	24.570	25
Cuyama	28525.000	1500000.000	52.585	0.117	1.667	0.504	31.194	31
Montecito	426.000	16000.000	37.559	0.083	0.018	0.067	4.147	4
Foothill	135.000	5000.000	37.037	0.082	0.006	0.063	3.904	4
Goleta No./Central	1488.000	18000.000	12.097	0.027	0.020	0.025	1.556	2

BASINS IN SURPLUS (No Threshold of Significance applies)

Basin	Net Overdraft (AFY)	Available Storage (AF)
Carpinteria	0.000	50000.000
City of Santa Barb	0.000	10000.000
Toro Canyon	0.000	650.000
More Ranch	0.000	1200.000

flows represented by typical safe yield (potential average annual recharge) values estimated for hardrock aquifers is usually only a small proportion of the total average annual streamflows and would not likely result in substantial impacts on downstream riparian habitat. In certain cases where the proposed pumpage would cause a substantial reduction (as determined by the P&D geologist) in streamflow and an environmentally sensitive habitat were present downstream, the effects on that habitat should be addressed in the biological resources section of the environmental document. The existence of a local critical habitat supported by aquifer baseflow and occupied by a rare or endangered species would also need to be addressed in the biologic resources section.

The basis for the assessment of impacts on groundwater resources due to pumpage of consolidated rock aquifers is the avoidance of overdraft (see discussion on Thresholds, this document).

ENVIRONMENTAL REVIEW OF WATER RESOURCES

ALLUVIAL BASINS

The relative significance of proposed new withdrawals from a groundwater basin must be assessed in the preparation of an environmental document (ND, EIR) pursuant to the California Environmental Quality Act. This is done through calculation of specific "Thresholds of Significance" for each of the overdrafted basins in Santa Barbara County. No threshold is established for a basin in a state of surplus. A project in such a basin would be subject to a threshold only if it would use more than the remaining surplus. In an overdrafted basin, projected net new consumptive water use of a project which exceeds the calculated threshold for that particular basin is deemed a significantly adverse environmental impact. This determination during the initial study would require the preparation of an Environmental Impact Report. If the estimated water use remains above the Threshold of Significance in the final analysis, the impact of the project on water resources, would, as stated above, be considered significant (Class I) and the project would require a finding of Overriding Considerations by the Decision-makers for approval.

Thresholds of Significance are calculated from hydrologic parameters for each of the basins in a state of overdraft. The size of the basin and the level of net annual overdraft are the key factors upon which the threshold is based. Current status of the basins is summarized in Table 1. The method used to establish the appropriate values for each basin involves setting a threshold for an idealized "Reference Basin" having overdraft and storage characteristics similar to the overdrafted basin with the greatest remaining life (Santa Ynez Uplands) based on a percentage loss of the estimated remaining life of the available storage. Thresholds for the other basins are proportional to this value based on the relative size and remaining life. A detailed explanation and a worksheet illustrating all the figures used in the calculation and the results are included on Table 2. Threshold values of 2 AFY to 61 AFY are herein established for the eight overdrafted/overcommitted basins in Santa Barbara County.

Definitions of the key parameters are as follows:

Safe Yield - The maximum amount of water which can be withdrawn from a basin (or aquifer) on an average annual basis without inducing a long-term progressive drop in water level.

Available Storage - Available storage is the volume of water in a particular basin which can be withdrawn without substantial environmental effects. This storage reflects the amount of water in the basin on a long-term basis (a point on a long-term trend line) not the current storage level in the basin. The number will be periodically updated by DER and the County Water Agency as new information becomes available.

Net Annual Overdraft - The amount by which average long term demand on a basin exceeds the safe yield of the basin after allowances have been made for return flows. The "demand" figure will generally include commitments of supply such as approved projects not yet constructed with the estimated current level of pumpage.

Portions of Santa Barbara County, especially the South Coast, are served by water districts which distribute both surface water from the Santa Ynez River watershed and groundwater pumped from local basins. For environmental review purposes, the surface supplies are considered to be the first element of supply committed to existing demand. Thus, the water use of a new development is assumed to come entirely from the groundwater basin.

New supplemental supplies of water in the process of development in Santa Barbara County include desalination of sea water, wastewater reclamation and importation of water through the State Water Project. Upon determination that a new source is available over the long term, a project supported by that source would not be subject to the groundwater thresholds of significance. If water from a new source were to offset current pumpage on a long-term basis, the Threshold of Significance would be revised to reflect the lowered pumpage.

CONSOLIDATED ROCK AQUIFERS

The methodology for determining the threshold of significance for water use in consolidated rock (bedrock) aquifers is based on whether the proposed usage would place the aquifer in a state of overdraft. In order to make this determination it is necessary to define the boundaries of the aquifer and to estimate the potential average annual recharge (i.e. Safe Yield) available within the defined boundary.

Aquifer boundaries

Bedrock aquifers in Santa Barbara County generally extend for long distances along bedding strike. On the south flank of the Santa Ynez Mountains, the Miocene and Eocene bedrock formations crop out in a continuous band crossing the intermontane watersheds from the Santa Barbara area to near Point Conception. The sandstone (and sometimes fractured shale) aquifers in these formations are variable in their hydrologic characteristics but are generally far less permeable and productive than unconsolidated alluvial sediments. They are also interbedded with relatively impermeable marine and non-marine shales and mudstones. Clearly, a well pumping at any one point cannot access the water in storage and the potential recharge (i.e. safe yield) over the entire trend. Pumping effects extending further than a few thousand feet cannot

be assumed. For purposes of analysis it is necessary to divide these aquifers into units in which the storage and potential recharge attributable to that unit can be presumed to be accessed from a single location. The watershed divides (ridgelines) are designated as aquifer boundaries for purposes of environmental review. Using watershed areas to define and analyze the bedrock aquifers have several advantages: 1) the boundaries are clearly delineated, 2) most wells are drilled in canyon bottoms and, thus, the topographic divide would occur at the approximate midpoint between pumping centers and 3) the watershed area is directly related to a major source of potential recharge, stream seepage. It must be recognized, however, that the watershed boundaries, a surface feature, do not represent barriers to subsurface groundwater flow. For this reason a well located near a watershed boundary could draw water from an adjacent watershed and access the yield attributable to that watershed. Based on observed well drawdown effects in the Vaqueros Formation at two locations in the Ellwood/Gaviota area, it will be assumed in the analysis of Vaqueros aquifers that a well located within 800 feet of a watershed boundary will access the yield attributable to the adjacent watershed. The combined safe yield of the affected watersheds (and the combined existing demands) will be used to assess a project's impact on groundwater resources. A "radius of influence" greater or less than 800 feet may be used if justified based on site-specific geologic or hydrologic data. In other formations, the ridgeline boundary criteria will be used unless site-specific data is available which better defines the aquifer limits.

The boundary of the "aquifer" in the stratigraphic sense is also necessary to define. In a geologic formation or subunit predominated by sandstone (presumably fractured) a well in any part of that unit is assumed capable of accessing all of the potential recharge to that unit. Specific examples on the South Coast would be the Vaqueros and Coldwater Formations. Note that site specific geologic information could require that these formations be divided into subunits (as determined by the DER Geologist). In a unit comprised of interbedded permeable and non-permeable units the aquifer is defined as the stratigraphic interval to which the well is hydrologically connected (i.e. the screened or gravel packed interval). The Sespe Formation is an example of the type of geologic unit which would be subject to this definition.

As a reasonable worst case, faults are considered to be barriers to groundwater flow. The aquifer boundaries used in environmental review would reflect this assumption.

Safe Yield

Introduction

In past Thresholds manuals, potential average annual recharge to an aquifer, or "safe yield", was estimated based on a percentage of total average annual precipitation in the watershed above the aquifer under study. A figure of 4.75% of the total precipitation was assigned to the aquifer as safe yield based on values obtained from the USGS study of the Ellwood to Gaviota area by Miller and Rapp (1968). The 4.75% figure was, however, taken out of context and used incorrectly. This figure is an estimate of field recharge (direct percolation of rainwater) over an entire watershed area and does not reflect the field recharge attributable to the outcrop area of a single aquifer (or group of aquifers) within the watershed. The field recharge of any single aquifer is generally far less than that for the entire watershed. This method also did not account for induced recharge (stream seepage and subsurface underflow) due to the drop in aquifer water level with pumpage. A new methodology which accounts for sources of direct recharge (field

recharge and stream seepage) and indirect recharge (subsurface underflow) is described below. This methodology was jointly developed by the Division of Environmental Review and the County Water Agency. *(A program diskette including instructions is available from the P&D Geologist.)*

Direct Recharge

Direct recharge refers to the infiltration of surface water into the aquifer. This can occur as either field recharge (the direct penetration of rainfall) or as seepage from flowing streams.

Field recharge

Field recharge has been estimated by a variety of methods. Miller and Rapp (1968) made their estimate of 4.75% of total average annual rainfall based on groundwater discharge or baseflow out of the watersheds from Ellwood to Gaviota. Blaney (1933) measured actual recharge in an alluvial setting in Ventura County for several years and developed graphic curves ("Blaney curves") which relate annual rainfall to infiltration. Another method developed by the Soil Conservation Service involves modeling of a "soil reservoir." When the inputs to the reservoir (rainfall) exceed output (evapo-transpiration of vegetation and runoff) and soil reservoir storage capacity deep penetration to groundwater is assumed to occur. This "Soil Moisture Balance" methodology involves the use of monthly rainfall data and allows for input of site specific parameters such as vegetation type, soil type and the amount of irrigation water applied to the surface outcrop. The Blaney Curve method uses only annual rainfall data and does not allow for input of site specific data. Miller and Rapp's figure is very general and averages together aquifers and non-aquifers with different vegetation, soil types and average rainfall. Given these comparisons, Soil Moisture Balance analysis is considered the best method for estimating field recharge and will be applied to aquifer outcrop area when adequate (as determined by DER) monthly rainfall data is available. In the absence of such data one of the other two methods (Blaney Curves, Miller and Rapp) will be used.

Estimates of field recharge using the soil moisture balance method involve preparation of a computer spreadsheet which applies monthly values of rainfall, applied water (if any), runoff and potential vegetation evapo-transpiration to a model of the "soil reservoir" based on rooting depth and soil moisture holding capacity. An example of this spreadsheet is presented as Table 3. Key parameters used in this analysis are described below:

Applied water: Monthly irrigation amount applied to crop planted on top of aquifer outcrop. Monthly amounts based on 1) total annual use divided proportional to the monthly values for plant potential ET or 2) crop irrigation schedule according to Cooperative Extension or California Dept. of Water Resources.

Rainfall: Values from an appropriate nearby rain gauge(s) monitoring by the Santa Barbara County Flood Control District. (Refer to Precipitation Data Report, 1990).

Runoff Factor: The portion of precipitation which goes to runoff is not available for deep percolation. Until detailed studies are completed an average figure of 20% (80% effective rainfall) will be used. This figure is rounded from the 19% cited by Miller and Rapp (1968).

TABLE 3
Example Soil Moisture Balance Analysis Spreadsheet

VAQUEROS FORMATION, ELLWOOD CANYON
SOIL MOISTURE BALANCE ANALYSIS
Rainfall data 1941-1979 (modified from Dos Pueblos Ranch)
Oaks and brush veg. cover (Rooting depth = 14')
Sandy soil (Moisture Capacity = .07 in./in. from SCS)
Soil reservoir capacity = 11.76 inches (14' x 12"/ft x .07"/in.)
Runoff as % of precipitation = 20

	Month	Applied Water	Rainfall (Inches)	Runoff factor (.9 = 10% runoff)	Effective rainfall (inches)	Initial Soil Moisture (Inches)	Total Available Moisture (Inches)	Potential ET (Inches)	Final Soil Moisture (Inches)	Water Yield
1940	Aug	0	0	0.8	0	0	0	8.71	0	0
	Sept	0	0	0.8	0	0	0	5.25	0	0
	Oct	0	0.95	0.8	0.76	0	0.76	2.07	0	0
	Nov	0	0.54	0.8	0.432	0	0.432	1.21	0	0
	Dec	0	11.26	0.8	9.008	0	9.008	1.21	7.798	0
	Jan	0	12.22	0.8	9.776	7.798	17.574	1.64	15.934	4.174
	Feb	0	10.37	0.8	8.296	11.76	20.056	2.87	17.186	5.426
	Mar	0	14.79	0.8	11.832	11.76	23.592	4.54	19.052	7.292
	Apr	0	6.94	0.8	5.552	11.76	17.312	6.17	11.142	0
	May	0	0.01	0.8	0.008	11.142	11.15	8.33	2.82	0
	June	0	0	0.8	0	2.82	2.82	7.79	0	0
	Jul	0	0.04	0.8	0.032	0	0.032	8.64	0	0
1941	Aug	0	0.01	0.8	0.008	0	0.008	8.71	0	0
	Sept	0	0	0.8	0	0	0	5.25	0	0
	Oct	0	1.12	0.8	0.896	0	0.896	2.07	0	0
	Nov	0	0.56	0.8	0.448	0	0.448	1.21	0	0
	Dec	0	6.31	0.8	5.048	0	5.048	1.21	3.838	0
	Jan	0	1.01	0.8	0.808	3.838	4.646	1.64	3.006	0
	Feb	0	0.95	0.8	0.76	3.006	3.766	2.87	0.896	0
	Mar	0	2.22	0.8	1.776	0.896	2.672	4.54	0	0
	Apr	0	4.03	0.8	3.224	0	3.224	6.17	0	0
	May	0	0	0.8	0	0	0	8.33	0	0
	June	0	0	0.8	0	0	0	7.79	0	0
	Jul	0	0	0.8	0	0	0	8.64	0	0
1942	Aug	0	0	0.8	0	0	0	8.71	0	0
	Sept	0	0.04	0.8	0.032	0	0.032	5.25	0	0
	Oct	0	1.82	0.8	1.456	0	1.456	2.07	0	0
	Nov	0	0.78	0.8	0.624	0	0.624	1.21	0	0
	Dec	0	1.72	0.8	1.376	0	1.376	1.21	0.166	0
	Jan	0	16.21	0.8	12.968	0.166	13.134	1.64	11.494	0
	Feb	0	5.32	0.8	4.256	11.494	15.75	2.87	12.88	1.12
	Mar	0	3.69	0.8	2.952	11.76	14.712	4.54	10.172	0
	Apr	0	1.16	0.8	0.928	10.172	11.1	6.17	4.93	0
	May	0	0.04	0.8	0.032	4.93	4.962	8.33	0	0
	June	0	0	0.8	0	0	0	7.79	0	0
	Jul	0	0	0.8	0	0	0	8.64	0	0
	•									
	•									
	•									
1977	Aug	0	0	0.8	0	0	0	8.71	0	0
	Sept	0	0	0.8	0	0	0	5.25	0	0
	Oct	0	0	0.8	0	0	0	2.07	0	0
	Nov	0	0	0.8	0	0	0	1.21	0	0
	Dec	0	6.1	0.8	4.88	0	4.88	1.21	3.67	0
	Jan	0	11.39	0.8	9.112	3.67	12.782	1.64	11.142	0
	Feb	0	14.81	0.8	11.848	11.142	22.99	2.87	20.12	8.36
	Mar	0	14.77	0.8	11.816	11.76	23.576	4.54	19.036	7.276
	Apr	0	2.83	0.8	2.264	11.76	14.024	6.17	7.854	0
	May	0	0	0.8	0	7.854	7.854	8.33	0	0
	June	0	0	0.8	0	0	0	7.79	0	0
	Jul	0	0	0.8	0	0	0	8.64	0	0
1978	Aug	0	0	0.8	0	0	0	8.71	0	0
	Sept	0	1.12	0.8	0.896	0	0.896	5.25	0	0
	Oct	0	0	0.8	0	0	0	2.07	0	0
	Nov	0	3.55	0.8	2.84	0	2.84	1.21	1.63	0
	Dec	0	1.58	0.8	1.264	1.63	2.894	1.21	1.684	0
	Jan	0	6.16	0.8	4.928	1.684	6.612	1.64	4.972	0
	Feb	0	6.81	0.8	5.448	4.972	10.42	2.87	7.55	0
	Mar	0	5.95	0.8	4.76	7.55	12.31	4.54	7.77	0
	Apr	0	0	0.8	0	7.77	7.77	6.17	1.6	0
	May	0	0	0.8	0	1.6	1.6	8.33	0	0
	June	0	0	0.8	0	0	0	7.79	0	0
	Jul	0	0	0.8	0	0	0	8.64	0	0
	TOTAL =		918.21						TOTAL=	62.674
	ANN.AVG.=		23.5438462	inches/yr				ANN. AVG. RECHARGE	in./year	1.60702564
									AFY/acre	0.1339188

Moisture Capacity: This figure refers to the ability of a particular soil type to hold water by capillary force. It is measured in inches of water per inch of soil. The figure used in the analysis will be that listed for the aquifer outcrop area in the SCS soil survey for Santa Barbara County. If an SCS value is unavailable, a value determined by the DER geologist will be used.

Rooting Depth: Vegetation rooting depth equals the thickness of the soil reservoir. The values used are based on USGS reports, information provided by the farm advisor and other studies.

Soil reservoir capacity: This figure is the product of the moisture capacity times the rooting depth. It represents the total amount of water (in inches) that can be held in the soil reservoir. If additional water is added beyond this amount it is presumed to percolate to groundwater.

Potential ET: The potential evapo-transpiration (ET) annual curve used in the analysis will be based on USGS reports, evapo-transpiration measurements at CIMIS stations, vegetation water use studies by the State Department of Water Resources or other related studies.

Water yield shown in the last column on Table 3 represents the amount of water available to the soil reservoir in excess of the moisture holding capacity of the soil reservoir and the potential ET of the vegetation. The monthly values are averaged over a long period of time (decades) to obtain a figure for average annual recharge in AFY per acre of aquifer outcrop. This figure is multiplied times the aquifer acreage and rounded to the nearest 1 AFY to obtain average annual field recharge.

Stream Seepage: Under native conditions (no pumping) bedrock aquifers in mountain areas (e.g. the Santa Ynez Mountains) have water levels at or near the elevation of the streambed. During and after the rainy season, water which has infiltrated into the aquifer as field recharge, discharges into the creek (baseflow). Seepage from streams does not occur because the aquifer is full and, at times, spilling. A drop in aquifer water level due to well pumpage will induce recharge from stream flows as well as reducing (or eliminating) baseflow out of the aquifer.

Magnitude of potential stream seepage depends on stream flow rates, streambed geometry, a seepage rate and the length of stream which crosses the aquifer outcrop. The County Water Agency (CWA) has developed a model which relates all of these factors and provides an estimate of long-term average annual recharge attributable to stream seepage. This model is based on 39 years of daily flows recorded at the USGS gauging station in San Jose Creek. It contains a function which calculates daily stream width (wetted surface width) at various flow rates over the 39 year period for a given channel geometry. Using this function and a stream seepage rate in gallons per day per square foot of wetted surface area a potential annual average seepage figure (in AFY) can be obtained. The information needed to perform this analysis on any particular aquifer is listed below:

TABLE 4a - Example of Recoverable Water Worksheet

SAN JOSE CREEK WATERSHED RECOVERABLE WATER WORKSHEET

(FOLLOWS PROCEDURE DEVELOPED IN USGS PROFESSIONAL PAPER 417-E)

Altitude Range (ft, MSL)	WtrshdArea (Acres)	Area % of Wtrshd	Rainfall (P) (in inches)	Potential ET (E, in.)	P/E	R/E	Recovrable Water (R)	Adjusted R (= K*R)	Watershed Loss (L)
2500 – 3000	510	14.5%	30.00	54.00	0.56	0.103	5.54	7.20	22.80
2000 – 2500	1020	28.9%	29.00	55.50	0.52	0.085	4.74	6.16	22.84
1600 – 2000	637	18.1%	28.00	56.00	0.50	0.075	4.18	5.43	22.57
1200 – 1600	361	10.2%	27.00	56.00	0.48	0.067	3.73	4.86	22.14
800 – 1200	297	8.4%	25.50	55.20	0.46	0.058	3.22	4.19	21.31
400 – 800	404	11.5%	24.00	53.50	0.45	0.053	2.84	3.70	20.30
150 – 400	297	8.4%	22.00	51.00	0.43	0.047	2.39	3.11	18.89
TOTALS	3526	100.0%							
Weighted Avgs.			27.30	54.79			4.11	5.34	21.96

ADJUSTED RECOVERABLE WATER = 5.34 inches (weighted average over watershed).
WATERSHED AREA = 3526 acres.
WATERSHED RUNOFF IS ESTIMATED @ ..... 1569 Acre Feet / Year.

GEOLOGIC INDEX:

Category	% of wtrshd	Index
A (* 10)	7%	70
B (* 100)	0%	0
C (* 0)	92%	0
D (* 100)	1%	100
E (* 10)	0%	0
F (* 20)	0%	0
G (* 40)	0%	0
TOTAL GEO INDEX =		170

The TOTAL GEO INDEX indicates a K value of . 1.3
(see CHART on page E21 of 417-E).

TABLE 4b - Example of Recoverable Water Worksheet

SAN ONOFRE CREEK WATERSHED RECOVERABLE WATER WORKSHEET

(FOLLOWS PROCEDURE DEVELOPED IN USGS PROFESSIONAL PAPER 417-E)

(File "onofre2.wk3")

Altitude Range (ft, MSL)	WtrshdArea (Acres)	Area % of Wtrshd	Rainfall (P) (In Inches)	Potential ET (E, In.)	P/E	R/E	Recovrable Water (R)	Adjusted R (= K*R)	Watershed Loss (L)
2000 – 2600	264	20.8%	22.00	55.40	0.40	0.036	1.99	2.59	19.41
1600 – 2000	222	17.5%	21.00	56.00	0.38	0.030	1.67	2.17	18.83
1200 – 1600	271	21.3%	20.00	56.00	0.36	0.025	1.42	1.85	18.15
800 – 1200	305	24.0%	19.00	55.20	0.34	0.022	1.24	1.61	17.39
400 – 800	158	12.4%	18.00	53.50	0.34	0.021	1.12	1.45	16.55
150 – 400	51	4.0%	17.00	51.00	0.33	0.020	1.03	1.34	15.66
0 – 150	0	0.0%	16.00	51.00	0.31	0.017	0.85	1.10	14.90
TOTALS	1271	100.0%							
Weighted Avgs.			19.98	55.17			1.49	1.93	18.05

ADJ. RECOVERABLE WATER = 1.93 Inches (Watershed weighted mean runoff depth).
WATERSHED AREA = : 1271 Acres.
CALCULATED WATERSHED RUNOFF IS ..... 205 Acre Feet / Year.
WATERSHED RUNOFF IS ESTIMATED @ ..... 215 Acre Feet / Year.

GEOLOGIC INDEX:

Category	% of wtrshd	Index
A (* 10)	7%	70
B (* 100)	0%	0
C (* 0)	93%	0
D (* 100)	0%	0
E (* 10)	0%	0
F (* 20)	0%	0
G (* 40)	0%	0
TOTAL GEO INDEX =		70

The TOTAL GEO INDEX indicates a K value of 1.3
(see CHART on page E21 of 417-E).

SAN JOSE CREEK MULTIPLIER = 0.136243
Aquifer name Vaqueros
Aquifer length along stream (L) = 300
Effective aquifer length along stream = 600
(Up to 300' added to (L) for subsurface underflow)
POTENTIAL STREAM RECHARGE = 11.80314
(see Stream Seepage Curves)

1. Stream flows: Average annual runoff in the watershed above the aquifer under analysis is estimated using the procedure developed by Crippen in USGS Professional Paper 417-E (1965). This method accounts for elevation, watershed area, potential evapo-transpiration, the isohyetal distribution of rainfall and rock type. The average annual runoff ("recoverable water") estimated by this method for San Jose Creek in Goleta was compared to the actual average runoff measured by the USGS daily flow gauge on that creek over a 39-year period (1940-79). The "Crippen estimate" of 1569 AFY (Table 4a) was very close to the 1576.8 AFY measured by the gauge. However, the gauged values are approximately 5% lower that they would be under native conditions because of stream diversions and minor percolation losses to the Goleta Groundwater Basin upstream of the gauging station. Thus, the average annual flows used for the seepage analysis will be the Crippen calculated value increased by 5%. Table 4b is an example recoverable water worksheet for San Onofre Creek. The estimated average annual flows for a watershed are distributed on a daily basis over the 39-year modeling period using the daily gauged flows at San Jose Creek. The runoff at a watershed under study (Crippen plus 5%) is divided by the 1576.8 AFY measured at the San Jose gauge to obtain a "San Jose Creek Multiplier". This multiplier is applied to the gauged daily flows at San Jose Creek to obtain a model of daily flows at the aquifer under analysis.

   The point along the stream where flows are estimated (the downstream limit of the "watershed") will be placed near the downstream contact or limit of the aquifer 20% of the distance from that point to the upstream contact of the aquifer. This location is incorporated into the seepage modeling discussed below.

2. Streambed geometry: The streambed geometry incorporated into the model is based on field measurements of the creek in Ellwood Canyon at the northern outcrop of the Vaqueros Formation. This channel geometry is considered representative of creeks on the South Coast. Narrower channels occur in some areas which would allow for less seepage per unit of flow. Ellwood Canyon geometry will, however, be used unless site specific data is available.

3. Seepage factor: A seepage factor of 10 gallons per day per square foot of wetted surface area is used in the analysis. This factor is based on measurements of seepage made during controlled releases down Mission Creek in the City of Santa Barbara (Martin, 1984). This factor is used as the best available information but may be higher than the actual rate for consolidated rock aquifers. A figure of 15 gpd/ft^2 was measured in river gravels by the County Water Agency. Such gravels are far more permeable (orders of magnitude) then bedrock aquifers or the alluvial sediments in Mission Creek.

4. Streambed length: This length is measured from the upper to the lower geologic contacts of the aquifer along the streambed as delineated on the USGS topographic map.

A table of monthly flow values calculated with the stream flow model for San Onofre Creek is presented in Table 5 based on the multiplier determined with the recoverable water worksheet. A table of seepage values is presented in Table 6. The seepage figures are generated from the estimated flows, the stream length and the seepage factor and streambed geometry parameters discussed above. The relationship between average annual potential stream seepage and the San

Jose Creek multiplier is presented graphically on Figure 2. The stream seepage curves shown on this graph plot the multiplier versus the average annual potential seepage per 100 feet of aquifer exposed along the stream for various total effective exposure lengths. The different curves required for each value of effective aquifer exposure length reflects the fact that the stream flows in the downstream parts of an aquifer are reduced by percolation into the upstream parts the aquifer. As aquifer exposure length increases the average percolation per 100 feet of that exposure length progressively declines. The curves shown on Figure 2 are based on estimated flows at a point located 20% of the distance from the downstream contact or limit of the aquifer to the upstream contact of the aquifer. All analyses will incorporate this parameter.

In summary, once the appropriate multiplier and stream length are known, the potential seepage is readily estimated from the curves on Figure 2. For purposes of environmental review all values are rounded to the nearest 1 AFY.

A geologic circumstance which occurs in some canyons is where a thin body of alluvium partially fills the valley over the bedrock aquifer under study. It can be reasonably argued that clay layers within the alluvium prevents seepage of stream water into an underlying aquifer. It can also be reasonably argued that the alluvium enhances the potential recharge by increasing the area of hydrologic connection through which stream flow or underflow in the alluvium could recharge a bedrock aquifer. It would require detailed long term records of stream flows, water levels and pumpage along with several monitoring wells to document either effect. This data is rarely, if ever, available. For purposes of environmental review, the model-derived value will be used as the estimate of potential seepage from stream flow and underflow.

Indirect Recharge

A drop in aquifer water level due to pumpage can induce underflow from adjacent consolidate rock units. Given that most of the sandstone aquifers in the county are either bounded by or interbedded with generally impermeable shales and mudstones, underflow cannot be counted on to provide substantial amounts of recharge. The stratified nature of the bedrock formations requires that water would have to flow across the bedding planes and through the least permeable stratigraphic layers. Increments of safe yield would be added by dropping water levels over an area of the adjacent formation such that additional direct recharge from rainfall or stream seepage be accessed. To account for potential recharge due to subsurface underflow, the area accessed by a well will be considered to extend 300 feet (measured horizontally) into the formation upgradient of the aquifer, as defined using the guidelines in this manual, if that formation contains water-producing horizons (e.g. fractured sandstones). The estimation of field recharge and potential stream seepage will be adjusted to allow for larger aquifer surface area and greater effective aquifer stream length.

TABLE 5

Estimated monthly flows @ San Onofre Creek
based upon SBCWA San Jose Creek flow model.

Estimated monthly STREAM FLOW at San Onofre Creek, Vaqueros Formation:

San Jose multiplier = .13624
Formation exposure length (feet) = 600; Channel Geometry = Ellwood Creek.

WtrYear	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Totals
1940-41	0	0	52	159	255	306	201	22	11	7	5	4	1022
1941-42	3	4	31	11	4	6	34	7	2	1	0	1	104
1942-43	2	3	3	246	49	76	13	6	2	2	1	1	404
1943-44	2	2	8	3	71	43	6	6	2	1	1	1	146
1944-45	2	30	4	4	56	15	6	3	1	1	0	0	121
1945-46	0	1	29	2	4	24	5	3	0	0	0	0	69
1946-47	0	41	30	1	1	3	1	1	0	0	0	0	79
1947-48	0	0	0	0	0	3	2	0	0	0	0	0	4
1948-49	0	0	2	1	1	24	1	9	1	0	0	0	38
1949-50	0	2	6	7	16	3	2	1	0	0	0	0	37
1950-51	0	1	1	2	1	2	1	1	0	0	0	0	9
1951-52	0	0	13	298	8	125	20	8	3	1	3	2	483
1952-53	3	10	33	21	3	4	4	4	2	0	0	1	84
1953-54	0	3	3	20	10	13	6	5	1	0	0	0	62
1954-55	0	2	7	16	6	5	8	11	2	0	0	0	58
1955-56	0	1	99	128	18	7	21	23	3	1	1	0	303
1956-57	0	0	1	22	36	12	19	14	2	1	0	0	107
1957-58	1	2	44	31	167	158	235	12	4	3	2	1	659
1958-59	1	1	2	15	37	4	2	2	2	1	0	0	65
1959-60	0	0	1	8	10	5	8	2	0	0	0	0	35
1960-61	0	11	4	6	2	2	1	0	1	1	1	0	28
1961-62	0	3	8	5	404	25	5	3	2	1	1	0	458
1962-63	2	2	2	3	35	12	10	5	4	1	1	1	77
1963-64	1	10	3	7	3	4	9	2	1	1	0	0	42
1964-65	1	4	30	11	2	6	79	4	3	1	1	1	143
1965-66	1	172	114	27	11	5	3	2	1	1	1	0	337
1966-67	1	11	196	192	25	32	72	15	5	2	3	2	556
1967-68	2	7	6	4	4	17	11	2	1	1	0	0	54
1968-69	1	2	3	273	203	65	42	12	10	3	3	3	620
1969-70	2	5	4	13	33	60	3	1	2	1	0	0	125
1970-71	1	16	21	8	4	5	3	4	3	1	0	0	66
1971-72	1	2	51	7	3	2	1	1	1	0	0	0	71
1972-73	1	26	2	88	180	84	12	11	5	2	1	1	413
1973-74	1	4	7	62	5	26	8	3	3	2	1	1	123
1974-75	1	2	44	3	94	97	9	5	3	2	0	0	261
1975-76	1	1	2	1	32	14	3	3	1	0	0	4	63
1976-77	4	3	2	18	2	3	1	10	1	0	0	0	46
1977-78	0	0	20	205	213	312	62	17	7	4	5	10	855
1978-79	7	8	8	16	31	54	13	5	4	3	1	1	149
Average	1	10	23	50	52	43	24	6	2	1	1	1	215

NEWSEEP: HTB revision of 06/02/92.

TABLE 6

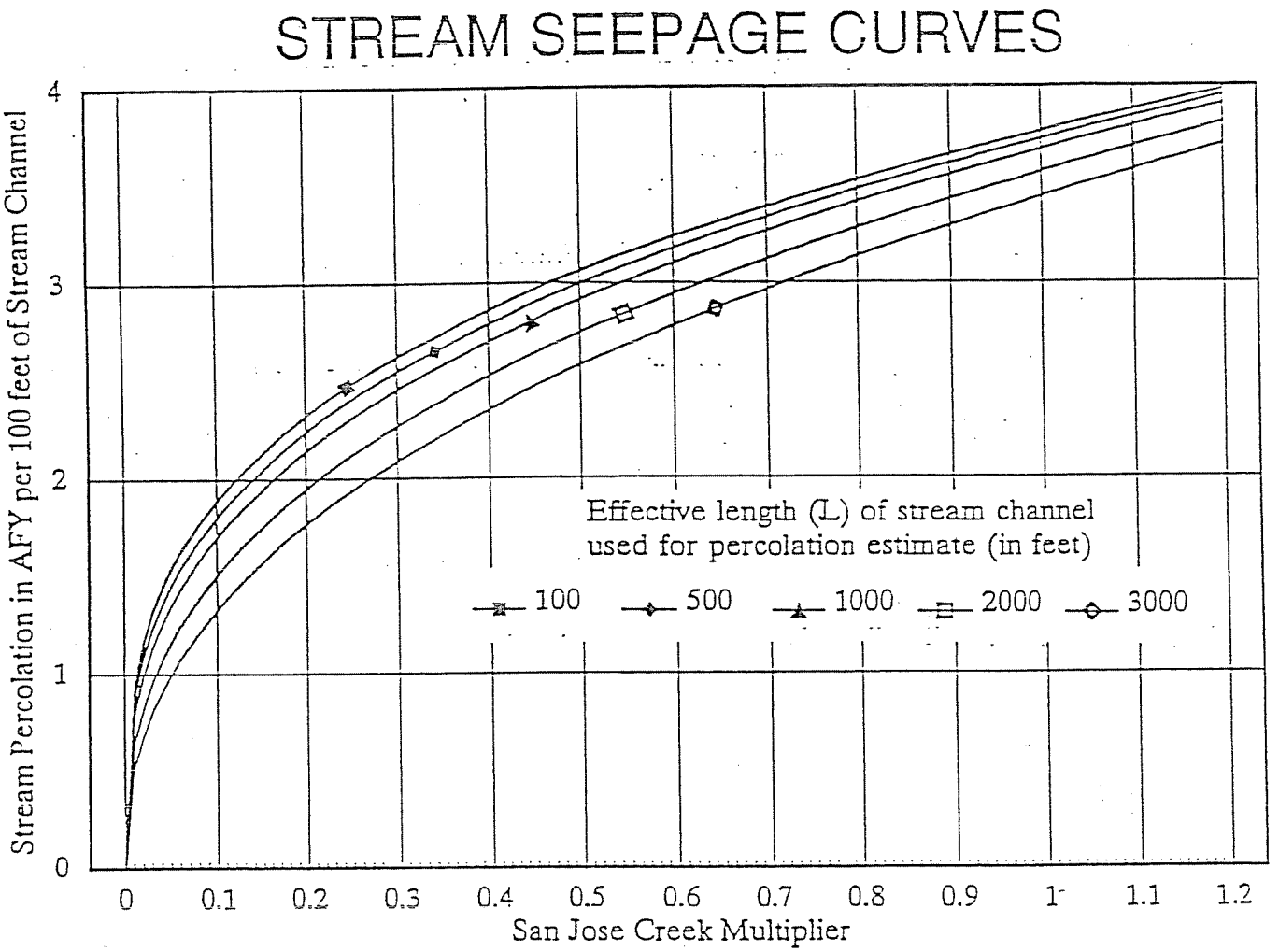
Estimated monthly stream seepage (percolation)
based upon SBCWA San Jose Creek flow model.

Estimated monthly STREAM PERCOLATION, San Onofre Creek Vaqueros Formation:

San Jose multiplier = .13624
Formation exposure length (feet) = 600; Channel Geometry = Ellwood Creek.

WtrYear	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Totals
1940-41	0.0	0.0	1.1	2.7	3.5	3.9	3.4	2.0	1.6	1.4	1.2	1.1	22.0
1941-42	1.1	1.1	1.7	1.6	.9	1.1	1.9	1.4	.8	.7	.4	.7	13.3
1942-43	.7	1.0	1.1	2.3	2.0	2.7	1.7	1.3	.9	.9	.5	.6	15.6
1943-44	.9	.8	1.2	1.0	2.0	1.9	1.2	1.3	.9	.6	.5	.4	12.8
1944-45	.8	1.4	1.2	1.2	1.3	1.4	1.3	1.1	.4	.6	0.0	.1	10.9
1945-46	.1	.7	1.4	.8	.8	1.1	1.1	1.0	0.0	0.0	0.0	0.0	7.0
1946-47	0.0	1.2	1.5	.6	.4	1.0	.7	.7	0.0	0.0	0.0	0.0	6.1
1947-48	0.0	0.0	0.0	0.0	.1	.4	.6	0.0	0.0	0.0	0.0	0.0	1.1
1948-49	0.0	0.0	.3	.7	.4	1.3	.5	.7	.5	0.0	0.0	0.0	4.4
1949-50	0.0	.1	.8	1.1	1.1	1.1	.9	.4	.2	0.0	0.0	0.0	5.7
1950-51	0.0	.4	.8	.9	.7	.8	.3	.6	0.0	0.0	0.0	0.0	4.6
1951-52	0.0	0.0	.8	3.1	1.4	2.7	1.9	1.5	1.0	.5	1.1	.9	14.7
1952-53	1.0	1.4	1.9	1.8	.8	1.2	1.1	1.1	.8	.1	.3	.6	12.1
1953-54	.1	.9	1.1	1.1	1.0	1.2	1.3	1.3	.3	.1	0.0	0.0	8.5
1954-55	0.0	.8	1.3	1.4	1.1	1.2	1.1	1.5	.7	.1	0.0	0.0	9.3
1955-56	0.0	.7	1.9	2.1	1.7	1.4	1.8	1.8	1.0	.8	.6	.2	14.1
1956-57	0.0	.3	.6	1.5	1.4	1.3	1.4	1.6	.7	.5	0.0	0.0	9.4
1957-58	.4	.9	1.4	1.5	2.8	3.2	3.3	1.6	1.1	1.1	.9	.7	18.8
1958-59	.7	.7	.8	1.4	1.8	1.1	.9	.8	.8	.5	0.0	.3	9.8
1959-60	.2	.4	.6	1.3	1.3	1.2	1.0	.9	.2	.1	.2	.1	7.5
1960-61	0.0	1.3	1.1	1.2	.8	.8	.5	.4	.5	.5	.4	0.0	7.4
1961-62	.1	.7	1.2	1.1	3.5	2.1	1.3	1.0	.9	.7	.6	.3	13.7
1962-63	.9	.8	.8	1.0	1.5	1.5	1.4	1.3	1.1	.8	.7	.6	12.4
1963-64	.8	1.2	1.1	1.2	1.0	1.1	1.2	.8	.7	.6	.1	0.0	9.8
1964-65	.6	1.0	1.5	1.5	.9	1.1	2.3	1.1	1.0	.7	.6	.6	12.9
1965-66	.4	2.1	1.9	1.9	1.5	1.2	1.1	1.0	.7	.6	.6	.4	13.5
1966-67	.7	1.1	2.5	2.4	1.9	2.0	2.8	1.7	1.2	.9	1.0	.9	19.2
1967-68	.9	1.2	1.3	1.1	1.0	1.5	1.5	.9	.7	.5	.2	.3	11.1
1968-69	.7	.9	1.1	2.8	3.2	2.7	2.2	1.7	1.5	1.1	1.0	1.0	19.9
1969-70	.8	1.2	1.2	1.6	1.7	1.9	1.0	.8	.9	.6	.2	.3	12.1
1970-71	.5	1.0	1.5	1.4	1.1	1.2	1.0	1.2	1.0	.6	.3	.2	10.9
1971-72	.6	.9	1.8	1.4	1.0	1.0	.7	.7	.6	.2	.2	.3	9.2
1972-73	.6	1.4	1.0	2.0	3.0	2.9	1.6	1.6	1.2	1.0	.7	.8	17.7
1973-74	.4	.8	1.0	2.1	1.2	2.0	1.4	1.0	1.1	.9	.7	.7	13.4
1974-75	.5	.8	1.5	1.1	2.3	2.4	1.4	1.3	1.0	.9	.3	.1	13.6
1975-76	.5	.7	.9	.8	1.4	1.5	1.0	1.0	.5	.2	.2	.8	9.6
1976-77	1.1	1.0	.9	1.4	.8	1.1	.7	1.2	.7	.3	.1	.1	9.5
1977-78	0.0	.1	.5	2.8	3.1	3.8	2.6	1.9	1.4	1.2	1.3	1.6	20.3
1978-79	1.4	1.4	1.5	1.7	1.9	2.1	1.6	1.3	1.1	1.0	.8	.4	16.2
Average	.5	.8	1.2	1.5	1.5	1.7	1.4	1.1	.8	.5	.4	.4	11.80

NEWSEEP: HTB revision of 06/02/92.



Curve Formulas

Symbols: Y = Average stream percolation per 100 feet of stream channel.
X = San Jose Creek Multiplier
L = Effective length of stream channel

$$Y = A(X^B)$$

$A = aL^2 + bL + c$ ($a = -6.27 \times 10^{-9}$; $b = -9.54131 \times 10^{-5}$; $c = 3.7822$)

$B = aL + b$ ($a = 3.896525 \times 10^{-5}$; $b = .296611$)

Figure 2 - Stream seepage curves based on the San Jose Creek flow model.

Summary and Discussion

The safe yield value assigned to a consolidated rock aquifer will be the sum of the estimated field recharge and potential stream seepage as calculated by the above methods. An alternative to the above "inventory" analysis is the Pumpage vs. Change-in-Storage method. This method involves observing change in the amount of water stored in an aquifer over a long-term base period representing average hydrologic conditions. The change in storage is compared to the amount pumped and the difference is attributed to recharge. If sufficient site-specific, long-term water level and pumpage data is available for the aquifer under study (as determined by the DER geologist) the Pumpage vs. the Change-in-Storage method will be used. Desired data for a Pumpage vs. Change-in-Storage analysis would include detailed records of pumpage volumes and water levels at several points in the watershed for a period of at least ten years. This date is rarely available. Meaningful information on yield can be obtained, however, with detailed records over a shorter period. Three years of such records could allow for analysis of one or more of the three elements of recharge (field recharge, stream seepage and underflow). As an example, three years of data during a drought may only provide information on subsurface underflow. The estimated underflow would be added to the field recharge and stream seepage values calculated by the standard methods to obtain a safe yield figure. Available information on recharge obtained from site-specific geologic or well data will be considered in all analyses.

WELL INTERFERENCE THRESHOLD

The impact of a net increase in pumpage, either from an existing well or a new well is potentially significant if:

1. The production rate of a pre-existing nearby well as presently constructed would drop as a result of interference (cone of depression) to a level which would not support the existing use on that parcel or would not support a planned use for which a discretionary or ministerial permit has been granted.

2. The proposed new pumpage would result in a substantial degradation of water quality such that an existing use on a nearby parcel or a planned use for which a discretionary or ministerial permit has been granted could no longer be supported.

This impact will be analyzed by the DER geologist during case review using standard hydrogeologic methods (e.g. Theis Equation).