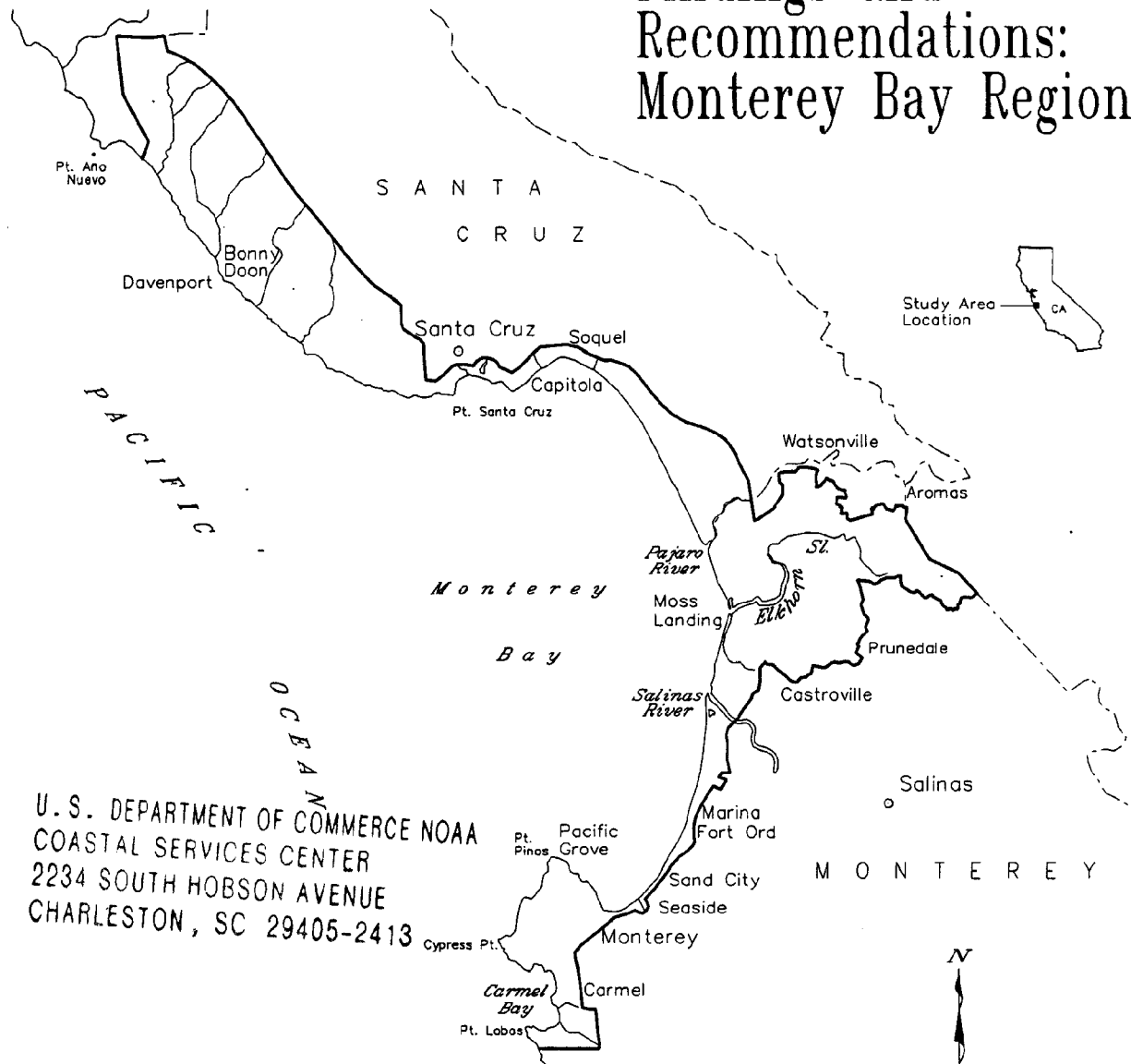

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ReCAP Pilot Project

Findings and Recommendations: Monterey Bay Region



U. S. DEPARTMENT OF COMMERCE NOAA
COASTAL SERVICES CENTER
2234 SOUTH HOBSON AVENUE
CHARLESTON, SC 29405-2413

California Coastal Commission
Regional Cumulative Assessment Project
September, 1995

Scale 1:500,000
1 inch equals approximately 8 miles
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Miles

Study Area

JVC, ACH, 9/95

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TABLE OF CONTENTS

1. INTRODUCTION.....	1
THE COMMISSION'S STRATEGY	1
THE RECAP PILOT PROJECT	2
THE RECAP REPORT	3
2. RECAP AREA REGIONAL OVERVIEW	5
REGIONAL SETTING	5
POPULATION.....	6
LAND USE	7
SUMMARY	10
3. COASTAL HAZARDS.....	13
SUMMARY	13
BACKGROUND.....	13
LACK OF REGIONAL CONSISTENCY FOR AREAS PRONE TO SHORELINE EROSION	24
<i>Analysis</i>	24
<i>Recommendations</i>	27
IMPACTS TO ACCESS FROM ARMORING ARE OFTEN OVERLOOKED	28
<i>Analysis</i>	28
<i>Recommendations</i>	29
LACK OF ANALYSIS ASSOCIATED WITH THE EMERGENCY SHORELINE ARMORING PROCESS	30
<i>Analysis</i>	30
<i>Recommendations</i>	32
INADEQUACY OF THE EXISTING SETBACK METHODOLOGY AND FRAMEWORK.....	32
<i>Analysis</i>	32
<i>Recommendations</i>	35
FUTURE PLANNING AND MANAGEMENT OF COASTAL HAZARDS	36
<i>Analysis</i>	36
<i>Recommendations</i>	38
4. PUBLIC ACCESS.....	41
SUMMARY	41
BACKGROUND.....	41
IMPROVEMENTS ARE NEEDED IN THE IMPLEMENTATION OF ACCESS MITIGATION	46
<i>Analysis</i>	49
<i>Recommendations</i>	52
IMPROVING MITIGATION OF SHORELINE PROTECTIVE DEVICES	53
<i>Analysis</i>	53
<i>Recommendations</i>	55
CONFLICTS BETWEEN PUBLIC ACCESS AND THE PROTECTION OF SENSITIVE RESOURCES ARE INCREASING	55
<i>Analysis</i>	55
<i>Recommendations</i>	58
CUMULATIVE IMPACTS TO REACHING THE COAST	58
<i>Analysis</i>	58
<i>Recommendations</i>	61

RESPONDING TO CHANGING ACCESS DEMANDS AND DEMOGRAPHICS	61
<i>Analysis</i>	61
<i>Recommendations</i>	63
FUTURE MANAGEMENT OF CUMULATIVE IMPACTS TO ACCESS	63
<i>Analysis</i>	63
<i>Recommendations</i>	67
5. WETLANDS.....	71
SUMMARY	71
BACKGROUND	73
DIRECT LOSS OF ACREAGE, FRAGMENTATION, AND HABITAT CHANGE.....	80
<i>Analysis</i>	80
<i>Recommendations</i>	87
INADEQUATE PROVISION OF BUFFER AREAS	90
<i>Analysis</i>	91
<i>Recommendations</i>	95
IMPACTS TO WETLAND HYDROLOGY	96
<i>Analysis</i>	96
<i>Recommendations</i>	105
IMPACTS TO WETLAND WATER QUALITY	106
<i>Analysis</i>	106
<i>Recommendations</i>	109
IMPACTS TO WETLAND BIODIVERSITY	110
<i>Analysis</i>	110
<i>Recommendations</i>	113
INFORMATION GAPS IN DECISION-MAKING PROCESS NEED TO BE ADDRESSED.....	114
<i>Analysis</i>	114
<i>Recommendations</i>	120
COMPREHENSIVE WETLAND PLANNING FRAMEWORK IS ABSENT	124
<i>Analysis</i>	124
<i>Recommendations</i>	130
6. INFORMATION MANAGEMENT.....	147
SUMMARY	147
BACKGROUND	148
EASIER ACCESS TO INFORMATION IS NEEDED	150
<i>Analysis</i>	151
<i>Recommendations</i>	152
AN IMPROVED SYSTEM FOR TRACKING PERMIT CONDITIONS SHOULD BE IMPLEMENTED	154
<i>Analysis</i>	154
<i>Recommendations</i>	155
GREATER INFORMATION SHARING BETWEEN AGENCIES WOULD IMPROVE COASTAL RESOURCE MANAGEMENT	155
<i>Analysis</i>	155
<i>Recommendation</i>	156
ADDITIONAL STAFFING AND/OR TRAINING IS NEEDED.....	156
<i>Analysis</i>	156
<i>Recommendation</i>	156

7. ECONOMIC EFFECTS OF RECOMMENDATIONS	159
SUMMARY	159
BACKGROUND	159
HAZARD RECOMMENDATIONS	159
ACCESS RECOMMENDATIONS.....	160
WETLANDS RECOMMENDATIONS.....	161
INFORMATION MANAGEMENT RECOMMENDATIONS	162
CONCLUSION	162
7. APPENDIX A: CHANGES IN ACCESS OPPORTUNITIES	A-1
8. APPENDIX B: QUANTIFYING PHYSICAL ACCESSIBILITY	B-1

1

INTRODUCTION

THE COMMISSION'S STRATEGY

Because of growing concern over the ability of state coastal management programs to address the impacts of cumulative growth and development, the U.S. Congress identified cumulative impacts as a priority area for improving coastal management programs nation-wide. Section 309 of the 1990 Amendments to the Coastal Zone Management Act (CZMA) provides funding and oversight to guide this effort. In response to the 1990 Amendments, the Coastal Commission completed an Assessment of the California Coastal Management Program and in March, 1992, adopted a multi-year strategy to implement program improvements in several issue areas: Cumulative and Secondary Impacts,

Wetlands, Coastal Hazards, and Public Access. The Coastal Commission's Regional Cumulative Assessment Project (ReCAP), undertaken as a pilot project in the Monterey Bay region, comprises the core of this strategy. Under ReCAP, the Commission staff assessed the cumulative impacts of development on wetlands, coastal hazards, and public access in the pilot region and developed program and policy recommendations to improve management of such impacts. The ReCAP pilot region is defined as the coastal zone extending from the Santa Cruz/San Mateo county line through Point Lobos State Park in Monterey County.

Cumulative Impacts are the combined effects of a series of development activities or natural effects.¹ Although an individual project may not greatly affect the natural or human environment, the cumulative impacts created by many different projects over time may significantly alter these environments. For example, the conversion of coastal habitat to developed land from an individual project may not seem that significant. However, twenty years of development projects may collectively degrade important habitat values.

Cumulative impacts are addressed and coastal resources managed primarily through three major processes under the California Coastal Management Program (CCMP): coastal development permitting and appeals, planning and implementation of local coastal plans (LCPs) and federal consistency review. However, the existing management framework makes effective management of cumulative impacts difficult. In the pilot region, seven local jurisdictions have certified LCPs and therefore issue most coastal permits, with the Commission retaining only limited permit and appeal authority. These jurisdictions are: Santa Cruz County, Santa Cruz City, Capitola, Watsonville, Monterey County, the City of Marina, and Sand City. The Commission approved amendments to these LCPs at least 58 times, many of which were project related. Four jurisdictions have yet to be certified and the Commission retains jurisdiction in these areas (the Cities of Pacific Grove, Seaside, Carmel-by-the-Sea, and Monterey). In addition to the CCMP, other state and federal agencies have regulatory authority affecting coastal resources under separate laws. Therefore, under the existing framework, multiple jurisdictions have varying policies and standards in different geographic areas.

Recognizing these difficulties, the CCMP relies on the periodic review of LCPs, called for in Section 30519.5, to help reconcile multiple policies and to ensure that policies remain effective in managing resources and responsive to social and cultural changes over time. However, this monitoring and program review has been accomplished in only a few cases. In the ReCAP region, Santa Cruz County and Santa Cruz City completed comprehensive revisions and updates to their LCPs. Monterey County is currently revising its

Section 30519.5 of the Coastal Act provides that at least once every five years the Commission shall review every certified LCP to determine whether the program is being effectively implemented in conformity with the policies of the Coastal Act and submit recommendations of corrective actions, if any, to the local government.

implementation ordinances. In only one case (the City of San Diego), has the Commission itself looked at the combined, long term results of numerous individual permit decisions, and suggested improvements to the LCPs in carrying out the goals of the Coastal Act.

As indicated in this report, the CCMP has accomplished much in mitigating site specific impacts through its review of specific development projects. However, addressing the cumulative impacts of these combined projects is difficult without periodic reviews. The cumulative effects of individual development proposals on the resources of the region beyond the site, beyond a political jurisdiction and beyond the coastal zone are considered in only a few permit reviews; such analysis is generally limited to major projects, where cumulative impacts analysis is mandated by the California Environmental Quality Act (CEQA). The lack of a structured information exchange among agencies further makes determining the effects of a single development proposal on regional resources difficult. Regional reviews and the data collection that results can provide the catalyst for better regional resource management by: 1) helping coastal managers see beyond the routine review of individual sites; 2) linking individual sites and development proposals to the larger regional resource trends; 3) recognizing sources and impacts from both inside and outside the coastal zone; 4) developing policy and intergovernmental tools to address cumulative and secondary impacts; and 5) helping programs realize their full potential to manage coastal resources.

THE RECAP PILOT PROJECT

Through ReCAP, the Commission seeks to develop a new framework for conducting regional periodic reviews throughout the coastal zone and to put in place information exchange mechanisms to facilitate continued monitoring of regional effects of individual development proposals. As a pilot project, ReCAP identified broad coastal trends in the Monterey Bay area to evaluate cumulative impacts over time that were not otherwise evident through "project by project" review, analyzed the major factors contributing to the cumulative impacts, and evaluated the effectiveness of coastal policies or procedures across multiple jurisdictions in responding to cumulative impacts. The results of the ReCAP pilot project include recommendations to improve coastal policies and procedures and to improve implementation of local coastal programs. Such improvements will enable both the Commission and local governments to better address cumulative impacts in their management of coastal resources.

The ReCAP team began the pilot project with a broad effort to identify regional aspects of wetlands, hazards, and access most important to the region. Once these were identified, the team created a framework for analyzing cumulative impacts. This framework was created by developing a matrix for the three priority issue areas. The matrix identified relevant policy questions, the methods and indicators by which the questions could be analyzed, the time frames and pilot area locations where these questions could be analyzed, data which should be used to analyze the questions, and the possible sources of data. In addition to the matrix development, the team completed a regional outreach to seek suggestions for how to measure and analyze these issues. Questionnaires were developed and sent to various regional parties, including technical experts in the areas. The team interviewed technical experts and key local government planning directors, officials and staff, and discussed issues with representatives of local environmental groups. In March, 1994, the team issued its Preliminary Report on Resource Status and Change, which described the current condition of the resource systems and changes documented over the past 10 years. Staff circulated the document to the Commission, local government and interested parties and conducted a workshop with staff of local and regional agencies and interested public. The Commission held a public hearing on April 12, 1994. In addition, ReCAP staff convened a seminar of wetland specialists to provide early feedback on the wetland impact analysis in May, 1994. This public input helped guide the ReCAP analysis of important policy questions. In this report, the team builds upon this earlier work.

The data used in this project came from a variety of information sources, with the major sources being Commission and local government permit actions. The ReCAP team developed a database of Commission permit activities from 1983-1993 and a database of local permits from 1986 to 1994, supplemented with detailed information on the three issues areas. The pilot project also benefited greatly from extensive and sophisticated mapping analysis developed by Santa Cruz County as part of the County's Geographic Information System. In addition, the ReCAP analysis provided some immediate assistance to Commission staff in ongoing review of LCPs and individual permits. For example, ReCAP information was used by Commission staff in working with Santa Cruz County staff on proposed revisions to the County's LCP.

The ReCAP pilot area has some of the most spectacular and important resources of coastal California. These resources are also subject to increasing pressures from growth and development. Overall, from 1970 to 1995, nearly one-quarter of a million persons were added to Santa Cruz and Monterey Counties combined -- an increase of over 65%. In terms of land use in Santa Cruz County and the northern portion of Monterey County, growth contributed to a 43% increase in urban land uses over the past two decades. From 1983 to 1993, the Commission and local government approved approximately 3,005 coastal development permits in the ReCAP pilot region. Nearly one third of these (949), were issued by the Coastal Commission. These Commission issued permits approved 765 residential units, 931 lodging units and over 300 new lots. The implementation of the CCMP in this period saw major accomplishments. As noted later in this report, the total acreage of wetland resources has not declined and major new access areas and facilities were developed. However, during this time, over 2 miles of shoreline were armored, impacts to wetlands were evident through changes in hydrology and the loss of buffers and habitat, and the ability to use available public access sites became more constrained.

THE RECAP REPORT

This document contains the results of the year-long pilot project to assess cumulative impacts and to recommend improvements in coastal policy and procedures to address these impacts. The document summarizes how resources have changed over time in the pilot region and analyzes the factors contributing to these changes. It projects possible future trends given current policies. Finally, the report outlines recommendations for program improvements in the short-term and identifies longer term program opportunities in policies or procedures to better manage cumulative impacts on a regional basis. The general economic effects of the recommendations are considered. The recommendations are not presented in any priority, but rather are organized as initial steps, some of which could be taken in the next year's work program, as well as a wide range of longer term opportunities for program improvements. The Commission staff recommends that the findings and recommendations of this pilot project guide development and implementation of future specific program improvements and provide input to review of permits and LCP amendments in the pilot area. This report can be the basis for working with local governments to develop modified policies, programs or procedures in individual LCPs to better manage cumulative impacts.

¹ California Coastal Commission, *Developing a Regional Cumulative Assessment Process for the California Coastal Zone: Issues and Concerns*, Regional Cumulative Assessment Project Working Paper No. 1, February, 1993, pg. 4.

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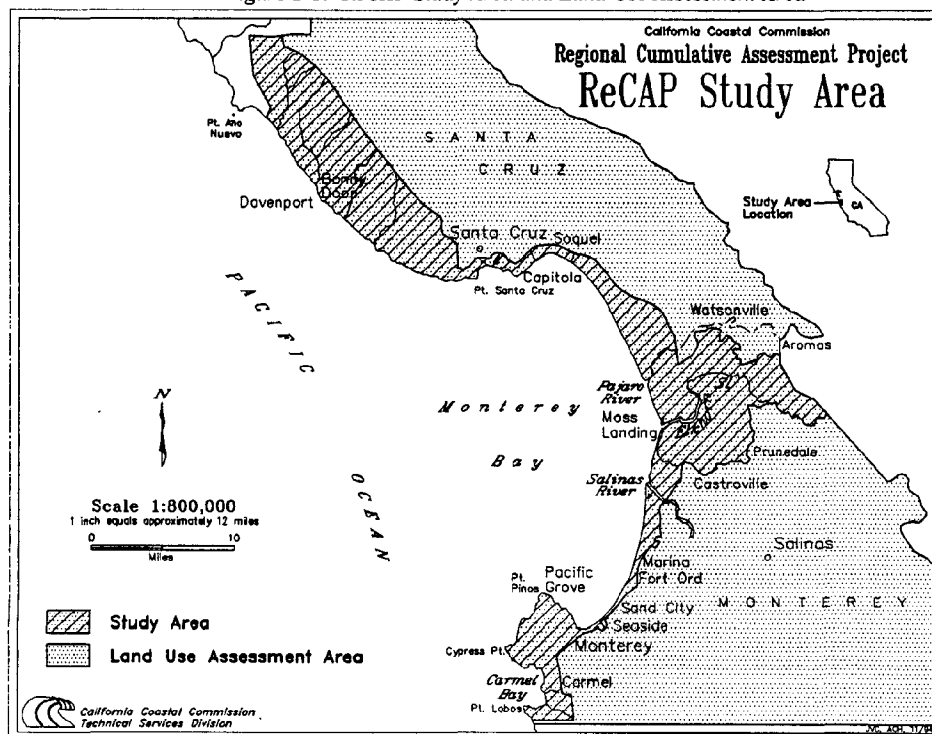
REGIONAL OVERVIEW

Evaluating the cumulative impacts of development on coastal resources requires factoring in how the coastal zone is impacted by (and impacts) the surrounding area. While the ReCAP area is bounded by the coastal zone in Santa Cruz and Monterey Counties, it is important to place it within the context of the Monterey Bay region and to consider the particular characteristics of the overall resource area of the two counties combined. In order to generate this regional perspective, this chapter presents a brief overview of population and growth trends in Monterey and Santa Cruz Counties. Clearly, these population and growth trends are prime indicators of the overall increased pressure on coastal resources -- it is this cumulative pressure over time that must be addressed within the California Coastal Management Program (CCMP).

REGIONAL SETTING

Monterey and Santa Cruz Counties are situated south of the San Francisco Bay area along California's central coast. The diverse geography of the region encompasses mountains, forests, rolling hills, agricultural lands, sand dunes and beaches. The range of natural resources in tandem with a mild climate, world-renowned scenic vistas, and a multifaceted cultural identity combine to make the Monterey Bay area a very desirable region in which to live and visit. The influx of people attracted by the area's special character has also brought with it extensive development and regional growth. Within the two-county region, the ReCAP area is defined by the coastal zone extending from the Santa Cruz/San Mateo county line through Point Lobos State Park in Monterey County (see Figure 2-1). Within these borders, the ReCAP coastline stretches 83 miles and encompasses the largely undeveloped and agricultural north coast of Santa Cruz County, the beaches in and around the cities of Santa Cruz and Capitola, a nearly unbroken 25-mile stretch of dunes, and the rocky coastline of the Monterey Peninsula and Carmel.

Figure 2-1: ReCAP Study Area and Land Use Assessment Area



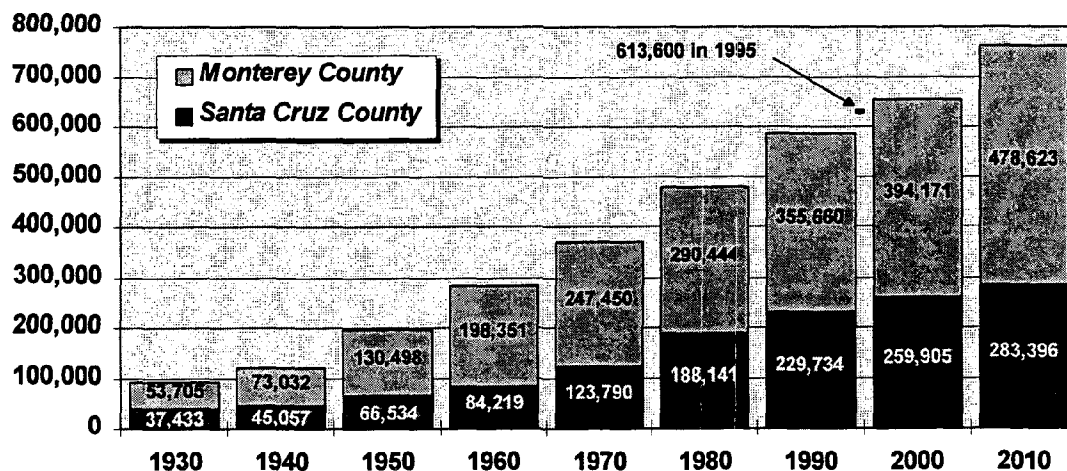
Partially isolated by the coastal ranges of the Santa Cruz and Santa Lucia Mountains, the Monterey Bay coastline is home to rare forests of redwoods, pines, and cypress, largely undeveloped dune systems, extensive slough and wetland complexes, large tracts of rare and endangered species habitat, as well as Monterey Bay itself. Providing opportunities for surfers, fishermen, divers, marine researchers, kayakers, and boaters, among others, Monterey Bay has long been a focal point for area residents and visitors alike. The Bay supports an extensive population of marine species and is site to the largest submarine canyon in North America. The unique grandeur of the region and its national significance was formally recognized in 1992 when the Monterey Bay became part of the largest federally protected marine sanctuary in the nation (Monterey Bay National Marine Sanctuary).

POPULATION

In analyzing the population changes impacting the project area, it would be useful to analyze both the population trends within the coastal zone and those of the region as a whole. Unfortunately, United States Census data is not kept in a manner which recognizes the coastal zone boundary. Because of this, and because population growth in a region will impact coastal resources regardless of which side of the coastal zone boundary the growth occurs, ReCAP chose to evaluate population growth in the overall two-county region. In fact, county-level population data is probably a more realistic gauge for measuring overall increased pressure on (and demand for) coastal resources in the ReCAP project area since these resources are used by more than just the coastal zone population.

Monterey and Santa Cruz Counties have both experienced significant growth in population since the early 1900s.¹ As shown in Figure 2-2, nearly seven times as many persons lived in Monterey and Santa Cruz Counties in 1995 as did in 1930. Clearly, this transition from small coastal counties to growing population centers has had an overall effect on resource conditions in the region. More people leads to the need for more housing, more infrastructure, and more businesses, the development of which may result in more resource impacts. As urbanization increases, the health of natural resource systems may cumulatively decline.

Figure 2-2: Population of the ReCAP Counties, 1930-2010



Source: U.S. Census of Population and Housing (1930-1990); California Department of Finance January Estimates (1995); AMBAG population projections (2000-2010)

These historical levels of population growth have been maintained since initiation of coastal management efforts in the early seventies.² Monterey and Santa Cruz Counties

combined have increased by nearly a quarter of a million persons in the past twenty-five years -- an average of nearly 10,000 persons per year.³ While Santa Cruz County is much smaller than Monterey County, both in terms of land area and overall population, both counties have grown in population by roughly the same amount since 1970.⁴ This growth represents a 65% increase in persons for the two-county region; roughly equivalent to the 62% growth in California during the same time period. This regional growth is impressive not only because there are natural barriers to growth (such as coastal mountain ranges), but also because there have been various growth management measures put in place over the years. These restraints have ranged from legislative efforts such as Santa Cruz County's Measure J in 1978 which set annual growth limits, to low-growth community opposition groups, to efforts to limit the expansion of urban services and infrastructure. The overall population in Santa Cruz and Monterey Counties declined for the first time in 1994 due to the closure of Fort Ord. However, with Fort Ord converted to the new California State University at Monterey Bay, this decline is likely to be a temporary phenomenon. In fact, according to preliminary estimates, a positive population growth rate has been reestablished for the two county area in 1995.⁵

Projections of future population growth show that the Monterey Bay region is expected to maintain the long term growth patterns evident from the historical census figures in Figure 2-2. The two counties should continue to maintain the 10,000 new persons a year pace with an increase of nearly 150,000 persons by the year 2010.⁶ Should these population projections hold true, Santa Cruz and Monterey Counties in 2010 would have more than double the number of people as were living there when the Coastal Act was passed. Such ongoing population growth will increase the regional need for housing, jobs, roads, urban services and infrastructure, water, parks and recreational areas, and overall community services. For coastal counties such as Monterey and Santa Cruz where the vast majority of residents live within a half-hour of the coastal zone, coastal zone resources are seen as a critical element in helping to meet these needs. Furthermore, with coastal zone resources themselves attracting visitors into the region, an even greater demand for services and resource pressure is likely to continue along the coast; as with any finite resource, currently impacted coastal resources will likely be even more at risk in the future.

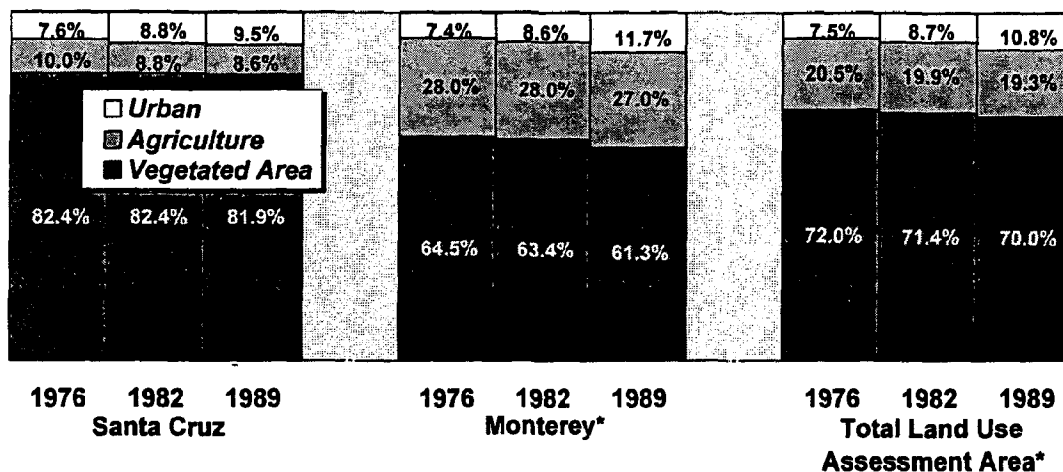
LAND USE

Ongoing population growth in the ReCAP area has been mirrored by an increase in urbanization for the Monterey Bay area. From historical surveys, it is clear that vegetated areas and areas in agricultural production have been steadily declining in the past twenty years at the hands of an ever-expanding urban and suburban landscape. Urban and suburban land use, though still a relatively small proportion of the total land use area, has increased 43% in the greater Monterey Bay area since 1976 (see Figure 2-3).⁷ This increase has been even more pronounced in the southern portion of the greater Monterey Bay area with over three-fourths of the urban and suburban acreage increase occurring in the Monterey County segment.⁸ In addition, though the offsetting decline in agricultural lands has been shared equally by the two segments, the decline in vegetated area was confined almost exclusively to the Monterey County segment.⁹ These changes would appear to point to a more extensive urban and suburban expansion in the southern portion of the Monterey Bay region. This expansion brings with it increased impervious surfacing, increased human presence, and increased encroachment into natural resource buffer areas (e.g., wetland and dune complexes).

Placing this overall urban expansion within the perspective of the CCMP and the project region, ReCAP aerial photo analysis of development patterns in the coastal zone since the 1970s confirms these overall urbanizing trends.¹⁰ Within Santa Cruz County's coastal zone, most new development has occurred within or adjacent to the urban services line (i.e., the boundary point for such infrastructure as gas, water, and sewage hook-ups), especially in the unincorporated areas of Live Oak (the area between the cities of Santa Cruz and Capitola) and the Aptos

shoreline. While the Live Oak infilling occurred within an area already considerably "urban", the expansion in 1984 of urban services into the Aptos area led to the conversion of large belts of vegetated area into the urban landform (e.g., planned development in the Seascape area). The general development pattern in Santa Cruz County's coastal zone has been a concentrated urban band extending from the City of Santa Cruz southeast to La Selva Beach; very little new development occurred in other areas of the County's coastal zone. This pattern appears to reflect a strong adherence to Santa Cruz County's LCP goal of concentrating development in already urbanized areas and protecting agricultural lands. While concentrating new development in urban areas creates cumulative impacts on such coastal resources as urban wetlands that find themselves slowly hemmed in by increased development, infrastructure, and population, it minimizes the impacts to resources in less developed areas.

Figure 2-3: Land Use Changes in the ReCAP Region, 1976-1989



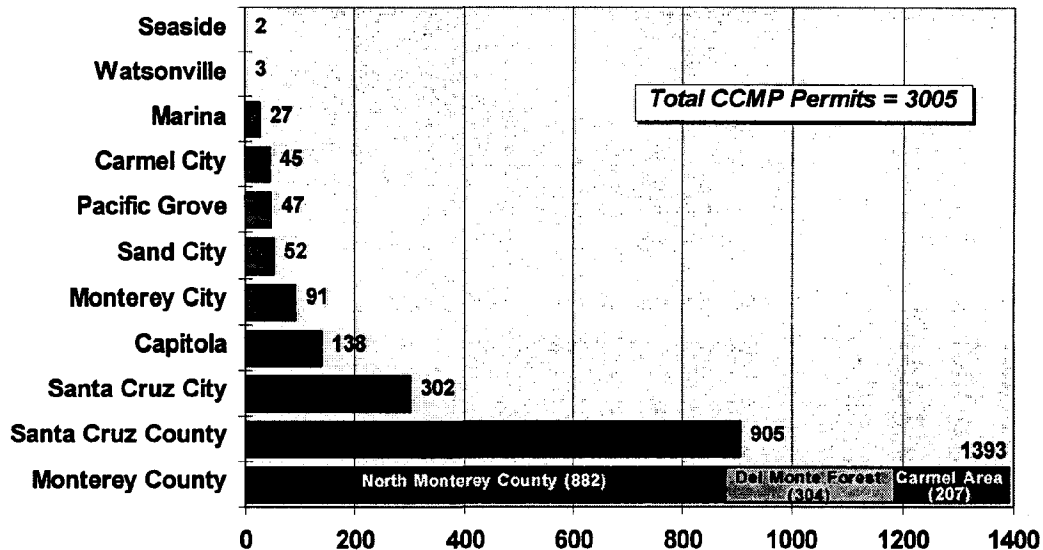
Source: DWR Quad County Summaries (* See Figure 2-1)

In Monterey County, by contrast, ReCAP aerial photo analysis confirmed that while there was significant growth in such areas as Marina and Del Monte Forest, a considerable portion of new development within the coastal zone occurred in semi-rural areas of North Monterey County -- especially in the areas north and east of Elkhorn Slough. This type of semi-urban expansion into rural areas, largely outside the reach of urban services such as water and sewer service, is clearly different from the expansion taking place in Santa Cruz County that is primarily within areas that could be considered at least partially "urban". Although per acre densities are low in North Monterey County, the amount of new development is sufficient to warrant concern about short- and long-term cumulative affects on nearby Elkhorn Slough. Sediments loosened during construction can end up as deposits in the slough, and the increase in impervious surfaces such as roads and rooftops will cause long-term cumulative changes in the hydrology of the watershed. In addition, with most of this new development dependent on septic systems for sewage disposal, there are water quality implications for nearby wetland systems. The expansion of urban and suburban development into areas with high resource value exemplifies the type of situation in which cumulative impacts can easily be overlooked because each individual project appears to have only minimal impacts.

The land use surveys and aerial photo analysis are further supplemented by CCMP permitting information within the ReCAP study region for the past decade. The data show that while new development pressures were widespread in the region, nearly 60% of the permit activity occurred in unincorporated Santa Cruz County and the northern portion of Monterey County (Figure 2-4).¹¹ With nearly 30% of all permitting activity in the region, the North

Monterey County LCP segment appears to have been the CCMP hotspot for development in the ReCAP study area.

Figure 2-4: Coastal Commission and local government permitting in the ReCAP Area 1983-1993



Source: ReCAP Database

ReCAP's analysis of future development trends in the pilot region portends continuation of these existing land use practices: primarily infill within Santa Cruz County's coastal zone and further urban expansion into the semi-rural areas of Monterey County.¹² For Santa Cruz County, a considerable amount of vacant lands zoned for urban uses (residential, commercial, industrial, or government/institutional) still exist within primarily urban areas. With few urban uses currently allowed for vacant parcels outside of the urban services line, growth pressures should continue to be felt within the urban band extending from the City of Santa Cruz to La Selva Beach. This scenario is supported by the County's own analysis showing that primary growth areas should continue to be in the Live Oak and Aptos planning areas.¹³

However, with a large amount of additional growth already approved in the Seascapes area along the southern boundary of the urban services line, there is also the potential for development pressures to extend southward. In fact, ongoing pressures to develop outside the rural/urban boundary line are already evident through a number of development proposals, particularly in southern Santa Cruz County. While funneling development within the more 'urban' areas (in Live Oak and Aptos) is more protective of rural and agricultural lands, development pressures outside the urban services line (southern Santa Cruz County) show that these less urban areas are also at risk. Overall, this planned infilling leads to the need for increased management of cumulative impacts. In urban areas, shrinking resource buffer areas, increased parking demand, and overall increased shoreline use will lead to an intensification of impacts to shoreline resources and public access. These potential impacts will require comprehensive planning efforts focusing on defined 'systems' (e.g. public access plans, wetland and watershed ecosystem planning, coastal hazard area management plans, etc.).

Within Monterey County's coastal zone, while limited infilling of urban areas is expected, ReCAP's analysis of vacant lands in the region points to a number of areas with the potential for conflicts between development and natural resources. For example, much of the vacant land in the Elkhorn Slough area is zoned for residential use, albeit at low densities. With good access to the job market in the Santa Clara Valley and San Jose via Highway 101, demand

for residential development in this area is likely to continue. The Del Monte Forest LCP segment also has large vacant areas planned for residential and golf course development. The redevelopment of Fort Ord has the potential for creating resource conflicts on large remnants of native habitats as well as on beaches and bluff areas that had heretofore been closed to public access. The dune habitats of the county are also at risk, with the largest areas of undeveloped shoreline in the ReCAP region zoned for urban uses located in the shoreline dunes of the Cities of Marina and Sand City. Given the fragile nature of these resource systems, a high priority in the southern portion of the ReCAP region should be placed on developing policies that manage and/or avoid cumulative impacts within sensitive areas (e.g., refining performance criteria for particular resource systems, developing management plans for particular resource areas, directing development away from sensitive areas, etc.).

SUMMARY

The population figures for the Monterey Bay region demonstrate that there has been substantial historical growth in Santa Cruz and Monterey Counties with projections indicating that this growth will continue in the future. The two counties' combined population increased nearly seven-fold since the early 1900s, with an increase of nearly one-quarter of a million persons since 1970 alone. Future population projections estimate that this rate of increase of nearly 10,000 persons per year will be maintained, with nearly 150,000 new persons being added to the two county region by the year 2010. This ongoing population growth highlights the regional need for increased housing, jobs, roads, urban services and infrastructure, water, parks and recreational areas, and other community services. With coastal zone resources seen as a critical element in helping to meet these regional needs, individual LCPs must be able to address these regional, 'greater than local' needs.

In terms of overall development trends, an increasing populace has contributed to a 43% increase in the urban landform for the greater Monterey Bay area over the past twenty years. Within the coastal zone of Santa Cruz County, this development appears to have been primarily concentrated in existing urbanized areas within the urban services line. For Monterey County's coastal zone, a considerable amount of development appears to be due to urban expansion into semi-rural areas in and around Elkhorn Slough; CCMP permitting history shows that nearly 30% of all permits issued in the past decade in the ReCAP area were issued in the North Monterey County LCP segment. In terms of future trends, Santa Cruz County's coastal zone can expect development to be funneled to areas within the urban services line in the Live Oak and Aptos planning areas. For the coastal zone in Monterey County, areas of potential growth appear to be in and around areas of coastal resources such as wetlands, dunes, and forests. While there are different policy implications for these differing development trends within the two counties, incorporating management of both resource 'systems' and cumulative impacts into LCP policy is crucial for ongoing resource protection in the Monterey Bay area.

¹ These population figures are developed from: 1) for 1930-1970, U.S. Census of Population and Housing as found in *California Statistical Abstract*. California State Senate, published 1958, 1970, and 1971; 2) for 1980 and 1990, U.S. Census of Population and Housing as found in *Annual Planning Information Santa Cruz Metropolitan Statistical Area 1993* and *Annual Planning Information Salinas-Seaside-Monterey Statistical Area 1993*. California Health and Welfare Agency, Employment Development Department, Labor Market Information Division, 1993; 3) for 1995, population estimates from *City and County Summary Report of January Population and Housing, Report E-5*, State of California, Department of Finance, Demographic Research Unit, 1995; 4) for 2000 and 2010, population projections from *1994 Regional Population & Employment Forecast*. AMBAG, 1994.

² Proposition 20, the Coastal Initiative (1972) and the California Coastal Act (1976).

³ Monterey and Santa Cruz Counties' combined population increased by 242,360 persons from 1970 to 1995 (an average of 9,694 persons per year). These figures developed from: 1) for 1970, U.S. Census of Population and Housing as found in *California Statistical Abstract 1971*. California State Senate, 1971; 2) for 1995, population

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- estimates from *City and County Summary Report of January Population and Housing, Report E-5*. State of California, Department of Finance, Demographic Research Unit, 1995.
- ⁴ Ibid. Santa Cruz County's population increased by 118,810 people while Monterey County's population increased by 123,550 people from 1970 to 1995.
 - ⁵ Monterey and Santa Cruz Counties' combined population decreased by 2,693 persons from 1993 to 1994 and increased by 3,759 persons from 1994 to 1995. Population estimates for 1993, 1994, and 1995 from *City and County Summary Report of January Population and Housing, Report E-5*. State of California, Department of Finance, Demographic Research Unit. Published 1993, 1994, 1995.
 - ⁶ Monterey and Santa Cruz Counties combined population is expected to increase by 148,419 persons from 1995 to 2010. These figures developed from: for 1995, population estimates from *City and County Summary Report of January Population and Housing, Report E-5* Ibid. For 2000 and 2010, population projections from *1994 Regional Population & Employment Forecast*. AMBAG, 1994.
 - ⁷ Based on California Department of Water Resources (DWR) land use surveys from 1976, 1982, 1989. While DWR is primarily interested in water-management related land use categorizations that generally focus on agricultural breakdowns, the figures also allow for a gross characterization of the urban landform. ReCAP has chosen to analyze a land use area slightly larger than the coastal zone in Monterey and Santa Cruz Counties in order to place land use issues within the regional context. The ReCAP land use area results in a total acreage breakdown that encompasses all of Santa Cruz County and 18.5% of Monterey County (See Figure 2-1).
 - ⁸ Ibid. Monterey County accounted for 16,704 (or 75.7%) of the 22,075 acres converted to the urban landform from 1976 to 1989 in the ReCAP land use area.
 - ⁹ Ibid. Santa Cruz County accounted for only 1,337 (or 9.0%) of the 14,788 acres of vegetated area lost from 1976 to 1989 in the ReCAP land use area.
 - ¹⁰ ReCAP photo analysis based on 1978 and 1993 aerial photographs of the coastal zone in Monterey and Santa Cruz Counties.
 - ¹¹ ReCAP Database, Administrative and Local Permit Sub-modules; for an in-depth discussion of the CCMP permitting history in the ReCAP study region, see: Lester, Charles. *Draft Coastal Development Permitting for the Monterey Bay Region Status and Trends Report 1973-1993*. California Sea Grant Program, 1994.
 - ¹² Through the ReCAP aerial photo analysis, vacant lands were identified and compared with current zoning and general plan/LCP policies on a parcel by parcel basis.
 - ¹³ Over 6,600 additional housing units are possible at build-out within the urban services line, mostly in the Live Oak and Aptos planning areas. As detailed in *County of Santa Cruz General Plan Update Background Report, Preliminary Draft*. Santa Cruz County Planning Department, Fall 1991.

3

COASTAL HAZARDS

SUMMARY

This chapter summarizes ReCAP's investigation of shoreline hazard response -- protection of upland development by armoring, the permitting associated with existing armoring, the impacts from armoring, the policies which address shoreline protection, and the likely changes which will happen to the shoreline in the future assuming existing trends and policies continue. A major finding of this effort is that current coastal policies support the use of public shoreline and public resources to protect private property and if the current situation continues, more and more of the public shoreline will be lost as a public resource. While only an eighth of the ReCAP coastline is now armored, over a third of the ReCAP coastline has the land use and physical characteristics which could require armoring in the future. None of this includes the shoreline already protected by groins, jetties and breakwaters. There are substantial portions of coastline which can be affected by the land use and armoring policies which are in effect.

Most property owners consider shoreline armoring only after they perceive a threat to their development and believe that without armoring, their home or business will be damaged or destroyed. In many cases, the hazards posed by storms and coastal erosion can be serious. Statewide, on average, shoreline hazards cost \$100 million annually, either from damage due to storms and erosion, or for shoreline armoring and modification designed to protect against storms and erosion.¹ Breakdown for the ReCAP area is not available; however, a substantial amount of public and private funds are being expended routinely to address coastal hazards.

The ReCAP Coastal Hazards team examined in detail the concerns that: (1) there is no consistent regional approach to address areas prone to shoreline erosion, (2) impacts to shoreline access from armoring are often overlooked, (3) armoring is often put in place during emergency storm events which may have significant impacts to the coast but which has little overall analysis, and 4) the building setbacks for much of the shoreline development in urban portions of the ReCAP pilot area are often inadequate. Examination and analysis of these concerns led to recommendations for improvements in the procedures for developing regular permit conditions, issuing emergency permits, and establishing setbacks. Recommendations also include efforts to introduce a more regionally based plan for shoreline protection. While the recommended changes in procedures could provide some immediate improvement in the management of coastal hazards, longer-term efforts could require changes to Coastal Act policies. The hazards team identified a number of changes and revisions to the Coastal Act itself which could modify or clarify the overall direction for safe development in areas of high coastal hazards. Individually, or in combination, these recommended changes and modifications would provide coastal planners with tools and resources to plan for future shoreline hazards and safe development.

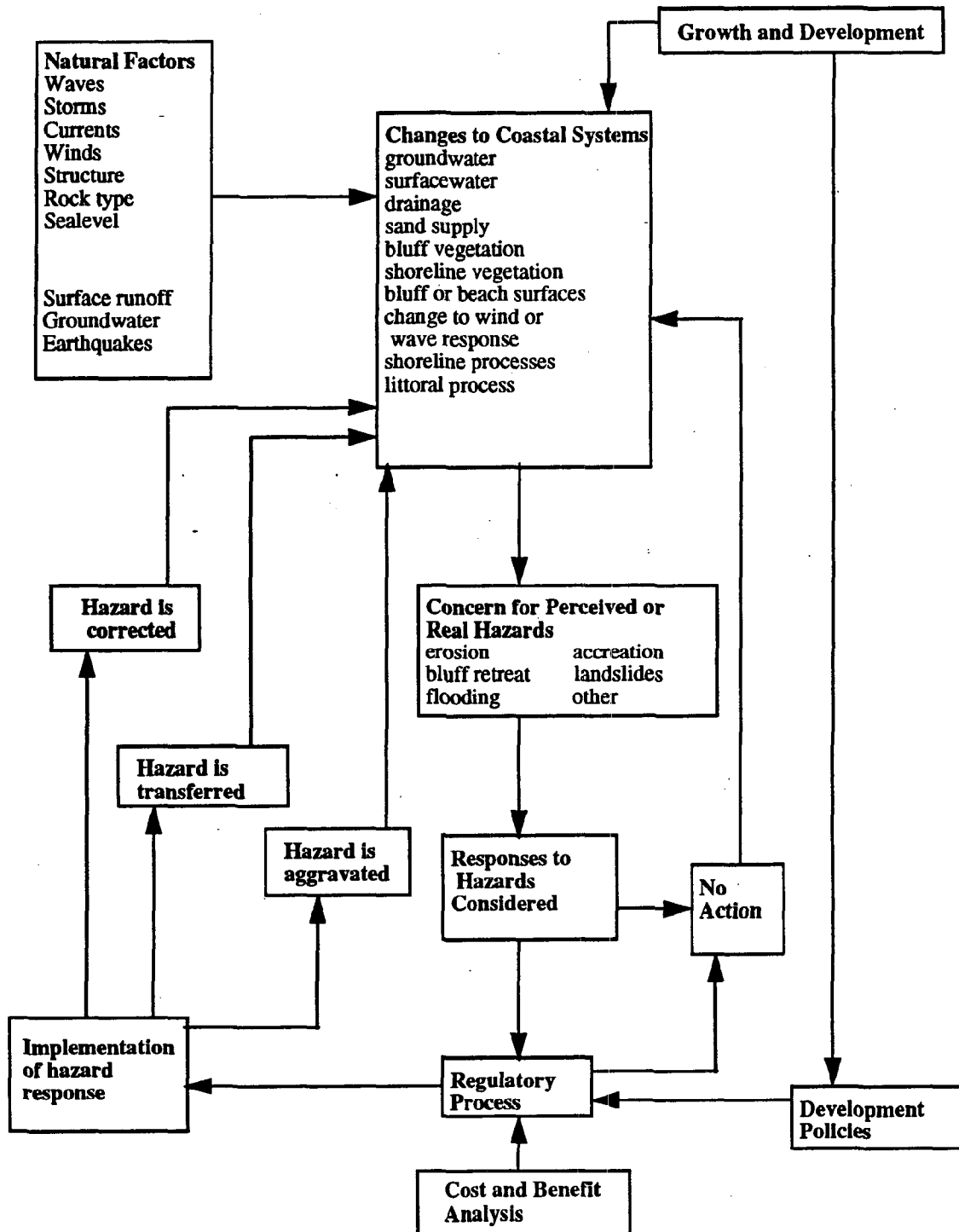
BACKGROUND

Methodology Used to Address Coastal Hazards

Coastal erosion is a natural phenomenon which occurs along much of the Santa Cruz and Monterey County shorelines. Coastal and upland erosion provides most of the current day beach material. Like other natural processes, such as flooding or earthquakes, erosion is considered a

Figure 3-1: Hazards System Diagram

SOURCES OF IMPACTS TO HAZARDS



hazard due to the interaction between development and the natural process. ReCAP identified four variables to evaluate the cumulative impacts from policies designed to minimize hazards from coastal erosion: identification of changes to the natural system, recognition of the hazard, determination of responses to the hazard, and assessment of the costs and benefits of the responses including determination of changes to the natural system resulting from the response. Figure 3-1 is a conceptual model for coastal hazards which outlines many of the components of coastal hazards and identifies their interactions.

Policies Governing Shoreline Armoring Activities

The California Coastal Act (Coastal Act) is a major, state-wide law establishing a regulatory program that governs coastal hazard response, development along the shoreline, and the use of shoreline armoring. The major Coastal Act policies which address coastal hazard response are found in the following sections: Section 30253 which addresses the overall stability of new development; Section 30235 which provides for protection of existing development along the shoreline when it is threatened by shoreline erosion; and Section 30610 regarding the rebuilding of existing development that has been destroyed by a natural disaster. These three sections give somewhat conflicting direction regarding response to coastal hazards and reliance on shoreline armoring. Section 30253 sets standards that require that new development:

- (1) Minimize risks to life and property in areas of high geologic, flood, and fire hazard.*
- (2) Assure stability and structural integrity, and neither create nor contribute significantly to erosion, geologic instability, or destruction of the site or surrounding area or in any way require the construction of protective devices that would substantially alter natural land forms along bluffs and cliffs.*
(Emphasis added)

This policy has been the basis for requiring technical reports (geologic reports, wave run-up analysis, slope stability or site inundation studies, to name a few) for new development in areas of high hazard to ensure that the proposed project, as designed, can be relatively safe over its lifetime. The Coastal Commission and most of the Local Coastal Programs (LCPs) in the pilot area address the safety of new development along coastal bluffs through setbacks which require that the new structure be a sufficient distance from the edge of the coastal bluff that the structure will not be threatened by bluff retreat or natural erosion during the life of the structure. The Commission provides for use of setbacks through inclusion of suggested setbacks in the Statewide Interpretive Guidelines. At the local level, setbacks are provided by detailed discussion in the LCPs. Most LCPs in the ReCAP area require that setbacks be sufficient to protect the structure for a 50 year economic life and require a minimum setback distance based on either site-specific geology reports or use of the Area of Demonstration.²

One requirement of Section 30253(2) is that new development should be stable without the construction of protective devices to minimize hazards. However, once a new structure has been built, it is an existing structure and Section 30235 of the Coastal Act permits existing structures to use shoreline armoring to protect against shoreline erosion. Some permits for new development have included conditions which make clear that the development was approved only with the understanding that shoreline armoring would never be needed. Section 30235, applied to most existing development, states in full:

Revetments, breakwaters, groins, harbor channels, seawalls, cliff retaining walls, and other such construction that alters natural shoreline processes shall be permitted when required to serve coastal-dependent uses or to protect existing structures or public beaches in danger from erosion, and when

designed to eliminate or mitigate adverse impacts on local shoreline sand supply.

*Existing marine structures causing water stagnation contributing to pollution problems and fish kills should be phased out or upgraded where feasible.
(Emphasis added)*

All the LCPs for the pilot area, in conformance with the Coastal Act, allow shoreline armoring where it is necessary to protect existing development, coastal dependent uses or public beaches. While the pilot area LCPs all take a fairly similar regulatory approach to stability of new development, the pilot area LCPs have several different approaches to the review and regulation of protection for existing development. All LCPs require that an application for a shoreline protective device be supported by technical or geologic reports; several jurisdictions encourage the use of rip-rap whenever possible and allow vertical walls only when rip-rap cannot provide adequate protection or when there are seawalls on adjacent properties. The City of Santa Cruz allows seawalls at the toe of a seacliff only when all other alternatives are infeasible. The City of Capitola allows shoreline protective devices only if non-structural alternatives are infeasible. Other localities establish some performance standards for shoreline protection, such as minimizing impacts on sand supply or to public access, but do not provide guidance as to the preferred armoring type. The different approaches used in the LCPs reflect some of the differences in shoreline hazards and responses to these hazards which exist throughout the ReCAP pilot area.

Section 30610 of the Coastal Act indirectly addresses protection of shoreline development through the reconstruction of structures that have been destroyed by natural disaster. The policy provides that if the replacement structure is in the same location as the destroyed structure and not more than 10% larger or higher than the destroyed structure, no coastal development permit (CDP) is required for the replacement structure. If the replacement structure will be further back from an eroding bluff or higher above the flood elevation than the destroyed structure, the replacement will not be exempt and a CDP must be obtained. While an intent of this policy is to prevent permit delays following a disaster event, its implementation may have cumulative impacts by precluding the examination of risk reducing alternatives. In cases where seawalls have been destroyed by natural events, this policy may perpetuate the reliance on an inadequate seawall design; in cases where bluff top structures have been destroyed by storms, this policy may perpetuate the use of inadequate setbacks. If the permit process is the only mechanism for an analysis of the stability of the replacement structure, property owners can rebuild without any analysis of the future risks of such activity.

The City of Santa Cruz, the County of Santa Cruz, and the Carmel area LCPs have policies addressing reconstruction of structures destroyed by natural disaster. The other LCPs in the ReCAP area do not give any guidance on how such projects will be handled. The City of Santa Cruz and the Carmel Area LCPs follow Section 30610 completely and the County of Santa Cruz LCP bases the requirements for reconstruction on the value of the losses. If the losses exceed 50% of the value, the reconstruction is treated the same as new development, requiring a technical report and deed restriction. (Such reconstruction does not have to demonstrate long-term stability without shoreline protection, as would be required were Coastal Act Section 30253(2) to apply).

In general, the guidance provided by the Coastal Act and LCP policies relating to shoreline armoring is to try to site new development to avoid the need for any type of protective device; however, if development is threatened by erosion, shoreline armoring will be allowed to protect the development, with efforts made to minimize the impacts from the protection. In terms of reconstruction policy, except for those areas covered by the Santa Cruz County LCP, if the hazard is sufficient to actually cause damage to the development, a similar structure can be rebuilt in the same location without a CDP; however, relocation or redesign for greater safety

would likely require complete review and a CDP. These policies together have established a long-term reliance on shoreline armoring to protect private and public development.

Resource Conditions

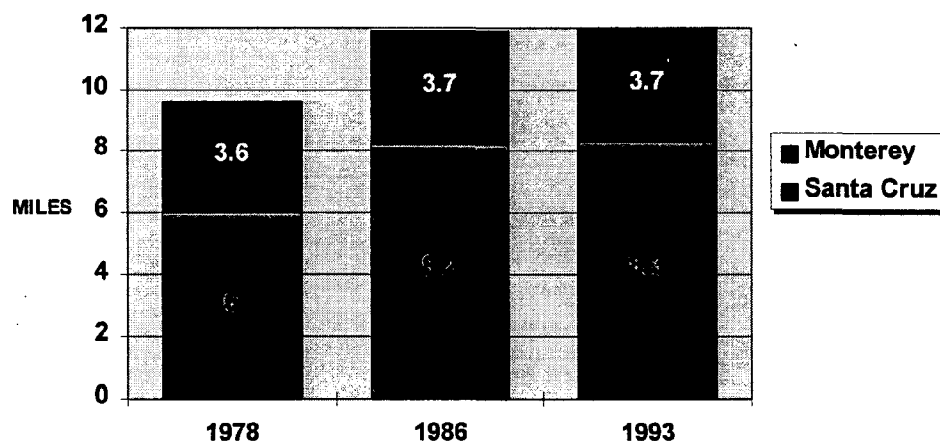
The pilot area, from the San Mateo/Santa Cruz county line south through Point Lobos in Monterey, offers a variety of shoreline types and is an excellent area to examine the concerns of cumulative impacts of shoreline erosion and responses to erosion. There are three separate littoral cells within the pilot region, shown in Figure 3-2. The shore characteristics range physically from beaches and dunes to lagoons and steep granite cliffs; the upland uses range from low and high density residential and commercial to parks and agricultural lands.

Figure 3-3 (page 21) shows the locations of shoreline armoring throughout the ReCAP pilot area, based on a review of aerial photographs from 1978, 1986 and 1993. Due to the cost of, and impacts from, armoring, it is rarely undertaken in areas where there is not now or has not been a pressing need for protection. As can be seen from Figure 3-3, armoring has concentrated mainly in those developed areas which combine highly erosive shoreline material with a high instance of storm wave attack. The section of coast from Corcoran Lagoon to Soquel Point, for example, is completely armored except for one small lot, approximately 60 feet wide.³ Areas where the shoreline material is very resistant to wave erosion and areas which have some natural protection from storm waves have had very little armoring activity.

There has been an historic demand for shoreline protection throughout the ReCAP pilot area, beginning in Santa Cruz County. In 1971, the U.S. Army Corps of Engineers (ACOE) undertook an inventory of the California shoreline and found approximately three miles of armored shoreline in the ReCAP area, all located in the City of Santa Cruz from Natural Bridges to Soquel Point. Small areas south of this were armored, but the amounts were too little to tabulate.⁴ The ACOE did not identify any protection in Monterey County. As part of the ReCAP analysis, aerial photographs of the pilot area for 1978, 1986 and 1993 were examined for armoring. This review differed from the work done by the ACOE and, without knowledge of the techniques used by the ACOE, the results can not be compared quantitatively; nevertheless, a qualitative comparison shows substantial increases in the amount of armoring throughout the ReCAP pilot area between 1971 and 1978.

As shown in Figure 3-4, by 1978, there were approximately 9.6 miles of armoring in the ReCAP area -- 6 miles in Santa Cruz County and 3.6 miles in the ReCAP portion of Monterey

Figure 3-4: Shoreline Armoring in the ReCAP Region, 1978, 1986 and 1993



Source: Aerial Photo Interpretation, Jon VanCoops, California Coastal Commission, 1994.

Littoral Cells in the ReCAP Study Area

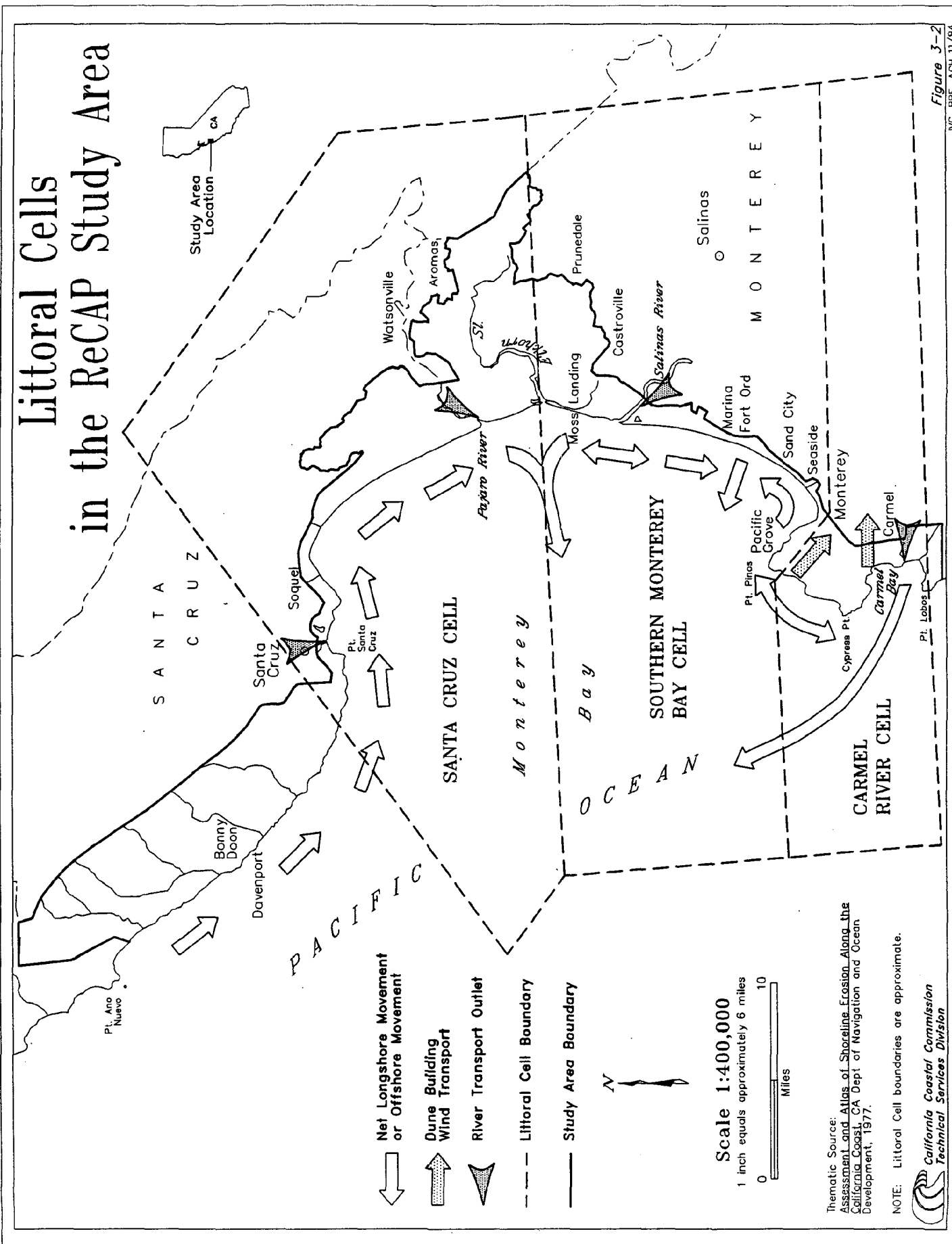


Figure 3-2
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County. By 1986, a total of 11.9 miles were armored, with 8.2 miles in Santa Cruz County and 3.7 miles in the ReCAP portion of Monterey County. By 1993, additional armoring in Santa Cruz County increased the amounts of armored shoreline to 8.3 miles for Santa Cruz County and 12 miles for the entire ReCAP area. None of these estimates include lengths of beaches protected by breakwaters, jetties or groins, nor do the figures for length reflect the maintenance and additions of rock to existing walls. Much of the increase in armoring between 1978 and 1986 is thought to have been constructed in response to the storms in the late 1970s and early 1980s.

Almost all of the shoreline protection in the ReCAP area is provided by rip-rap or rock rubble revetments, with only about 1.1 miles of protection from concrete or timber seawalls without rock. Rock is often less expensive than a vertical wall and is considered by many to be more "natural" looking -- possible reasons for the preference given to rip-rap by some of the LCPs in the ReCAP pilot region. However, rock takes up much more land or beach area than a vertical wall and, when constructed on a public beach, can replace area used for access and recreation. In some locations in the ReCAP area, access to shorefront property is so difficult that the shoreline protection design is more dependent on the means of placing the structures than on the coastal characteristics.⁵

ReCAP staff undertook a review of aerial photographs and land use plans to identify potential areas of future growth and shoreline armoring in the pilot area. Much of the shoreline land within the urban service areas has been developed and the only areas with a significant amount of vacant urban shoreline are Sand City, Marina, and Del Monte Forest. In both southern Santa Cruz County and northern Monterey County, there are large holdings of shoreline property that are zoned agricultural. Some of the agricultural lands have levees for protection from flooding but none now have any seawalls or revetments for protection from erosion. This is likely to continue since erosion seems to be small in many of the areas of agricultural land and armoring for a large agricultural parcel would be very expensive. Unless there is major rezoning of agricultural shoreline lands, the key shoreline hazard concerns in the pilot area will come from repair and maintenance of existing armoring and new armoring to protect either existing development or new development on infill lots.

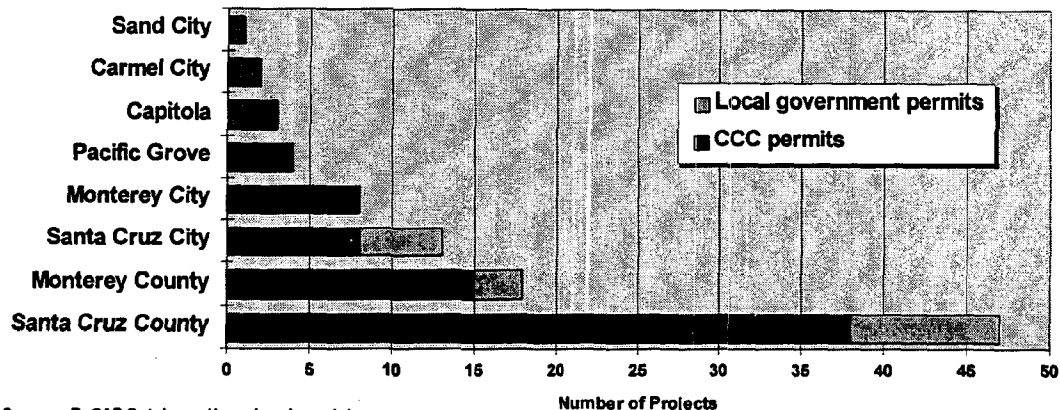
From this rough review of existing land use patterns and shoreline characteristics, the ReCAP team estimated that up to a third of the entire ReCAP area shoreline, combining developed or developable land, has a significant rate of erosion. If current armoring practices continue, ultimately as much as 19.3 miles of the Santa Cruz County shoreline and 8.4 miles of the ReCAP portion of Monterey County could be armored to protect either private development or public works and infrastructure (including development immediately landward of public beaches as has happened in the Live Oak area of Santa Cruz County for protection of East Cliff Drive). This would more than double the length of armoring that exists in the ReCAP area today.

Permit Activity from 1983 to 1993 Related to Shoreline Armoring

Just as the examination of the shoreline conditions over time shows increases in armoring in the pilot area, a review of the permit activity in the ReCAP area from 1983-1993 shows approval of numerous permits for shoreline protection. Many shoreline protection projects were revised during the permit review process, and many projects had conditions attached to the approval to mitigate impacts; one project was initially denied but after several appeals was approved with conditions. One hundred shoreline protection permits were approved for the ReCAP region during this time period: 4 for beach nourishment projects and 96 for some form of seawall, bulkhead, revetment, or cave filling. All four beach nourishment projects were approved by the Commission and were associated with dredging projects.⁶ Of the 96 armoring projects, 79 were approved by the Commission and the remaining 17 were approved by ReCAP area local governments.⁷

Figure 3-5 shows the geographic location of the approved armoring projects. The majority of approved seawall projects from 1983-1993 have taken place in the northern portion of the ReCAP pilot region. The permit database indicates that 47 seawall projects were in the

Figure 3-5: Approved Seawall Locations by LCP Jurisdiction, ReCAP Region 1983-1993



Santa Cruz County LCP jurisdiction alone. When the approved seawalls in the Capitola and Santa Cruz City LCP jurisdictions are summed with those in Santa Cruz County (representing all approved seawall activity along the Santa Cruz County shoreline), nearly 66% of all seawall project activity in the ReCAP pilot area was located in the northern portion of Monterey Bay.

The shoreline protection placed as a result of the 100 approved permits from 1983-1993 was primarily a response to private development interests: 59% of the approved projects were to protect private residential, commercial, or industrial development, 15% to protect institutions or harbors, 21% to protect public works or public recreation interests, and the remaining 5% to protect some other type of development.⁸ While 30 of the 96 armoring permits were approved for new seawalls or revetments, 63 were for some form of repair, maintenance, or expansion to an existing shoreline structure and 3 projects were unclear as to their associated activity. One reason for the high number of permits involved with modifications of existing structures is that most of the armoring in the pilot region is made up of rip-rap revetment which requires regular additions of rock for the structure to function effectively.

Table 3-1 (page 23) identifies some cumulative effects of the armoring that have been permitted from 1983 to 1993 -- many of the activities that have contributed to the current 12 miles of armored shoreline. Table 3-1 also shows the lengths of the approved seawalls as well as tons of rip-rap placed over the time period of 1983-1993. Unfortunately, complete records of lengths and tonnage were not readily available. Of these 96 projects, 40 had some length recorded and 38 had some tonnage of rip-rap recorded. Using the cases where these project attributes were noted, totals and averages overall as well as for respective years are presented. It is clear that the permit activity following the 1983 storms accounts for the majority of armoring activity, making over 50% of the noted length and over 40% of the rip-rap tonnage. Overall, more than 2 miles of approved seawall activity and over 65,000 tons of approved rip-rap were identified in the ReCAP area from 1983 through 1993. (Since these values were developed from only a portion of all the permits approved from 1983 to 1993, actual lengths and tons will be higher). On average, where project attributes were noted, a typical approved ReCAP pilot area armoring project involved 345 linear feet of coastline and 1,714 tons of rip-rap; further breakdown shows that for private development in the form of residential, commercial, or industrial uses, a typical average project was slightly smaller at 227 linear feet and 1205 tons of

1. Whidbey Bluffs
2. Duwamish Landing
3. De Anza Mobile Home Park
4. West Cliff Drive – Natural Bridges State Park to Point Santa Cruz
5. Point Santa Cruz to Cowell Beach
6. Dream Inn
7. Santa Cruz Boardwalk
8. Santa Cruz Harbor Entrance

Rock rubble revetment, 600', 2100', 2100'
Rock rubble revetment, 100', 100', 100'
Rock rubble revetment, 100', 100', 100'
Rock rubble revetment, 2050', 2450', 2850'
Rock rubble revetment, 2700', 2700', 2700'
Concrete seawall, 300', 700', 2000'
Concrete seawall, 3000', 3000', 3000'
West jetty 1350', 1350', 1350'
East jetty 750', 750', 750'
Rock rubble seawall, 1000', 1300', 1300'

Rock rubble seawall, 250'/825'/825'
Rock rubble seawall, 1600'/1700'/1700'*

Concrete, rock rubble seawalls, 700'/800'/800'

Concrete seawalls, 1000'/1000'/1000'

Rock rubble revetment, 1700'/1700'/1700'

Grain, 7000'/8500'/8500'

Rock rubble revetment, 800'/1400'/1400'

Timber seawall, 500'/500'/500'

22. Moss Landing Harbor
23. Fort Ord
24. Foot of Tingo Ave., Sand City
25. Holiday Inn
26. Foot of Surf Way, Del Monte Beach
27. Monterey Harbor

North jetty, 1500'/1500'
South jetty, 1250'/1250'

Rock rubble revement, seawall, 2500'/2500'

Rock rubble seawall, -/540'/540'

Rock rubble breakwater, 1750'/18

Stone, concrete seawall, rock rubble revetment

Concrete seawall, 100'/100'/100'

Rock rubble revetment, 750'/750'/750'

Rock, concrete seawalls, 1500' / 1500' * / 1500'

1000

Oct. 1977

phy. Scale 1:12,000, 1978, 1986, and 1993

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Regional Cumulative Assessment Project Shoreline Armoring

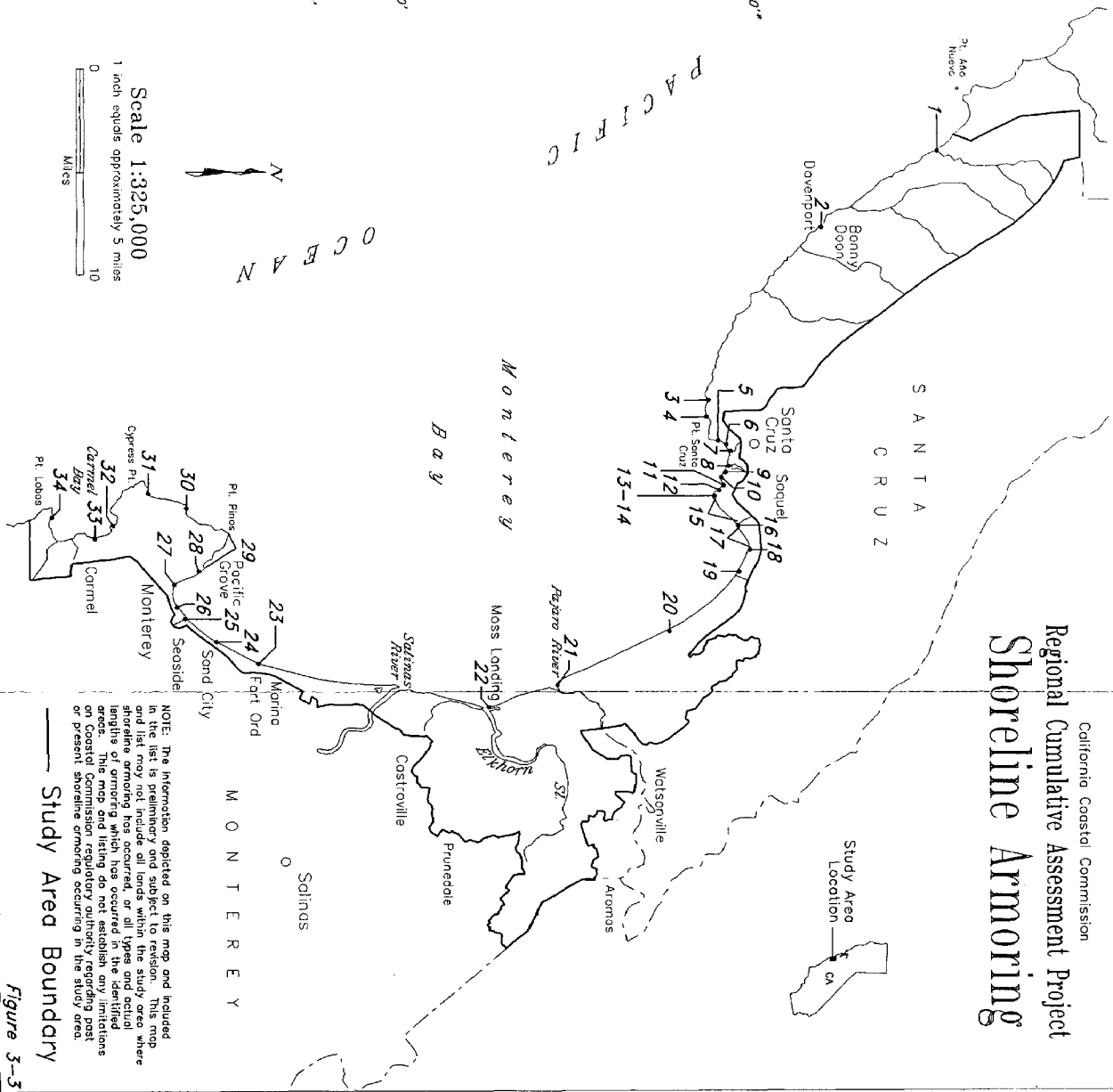


Figure 3-3

rip-rap.⁹ Since many of the residential applicants applied as groups, these figures do not reflect averages for individual residential parcels.

Table 3-1: Shoreline Armoring Permitted in the ReCAP Region, 1983-1993

Year	Number of projects approved	Number with attributes noted		Totals		Averages	
		Structure length noted	Rip-rap tons noted	Length (feet)	Rip-rap (tons)	Length (feet)	Rip-rap (tons)
1983	35	17	21	7122	26321	419	1253
1984	10	3	6	498	18479	166	3080
1985	3	1	0	60	n/a	60	n/a
1986	3	1	0	20	n/a	20	n/a
1987	9	7	4	3175	12050	454	3013
1988	3	2	1	1380	1200	690	1200
1989	4	0	1	n/a	5000	n/a	5000
1990	13	4	3	882	948	221	316
1991	2	0	0	n/a	n/a	n/a	n/a
1992	4	1	1	50	900	50	900
1993	10	4	1	605	250	151	250
83-93	96	40	38	13,792	65,148	345	1,714

Source: ReCAP Database, Hazards sub-module

Future demands for shoreline protection will depend on trends in development along the shoreline, erosion potential of the shoreline, and frequency of storm events. It is not possible to graph historic demand and extrapolate since the conditions that establish the demand will continue to change. ReCAP's predicted trend for future armoring was based on assumptions regarding the amounts of development which may be threatened in the future by erosion. In Santa Cruz County, 19.4 miles of upland shoreline are privately owned and 17.8 miles are publicly owned; in the ReCAP portion of Monterey County, approximately 16.3 miles of upland shoreline are privately owned and 24.5 are publicly owned. In the total ReCAP area, there are 35.7 miles of shoreline which have been or may be developed with private upland development, and much of this has required, or eventually may require, shoreline armoring.

A study by the ACOE provides a second identification that new portions of shoreline may be armored in the future. As part of a study on shoaling at Santa Cruz Harbor,¹⁰ the ACOE studied the section of Santa Cruz coast from Seabright Beach to New Brighton State Beach for shoreline geology, status of existing protection and current hazard level from erosion. Although large stretches of this 4.8 miles of coast have been armored, the study identified several areas where continued erosion can be expected to endanger development and structures in the future. If the shoreline is unprotected or has inadequate protection and the historic erosion rate is moderate or high, the study identified the area as liable to need future protection. Based on this screening effort, 1.9 miles of coast were considered in need of future protection. Of these 1.9 miles, 0.7 miles would be required to prevent road closures or relocation of utilities and 0.4 miles would be required to protect homes or apartments from erosion; almost 0.8 miles would be to protect vacant coastal land. Some of the proposed protection were efforts to restore the functioning of the natural groins at Pleasure Point and Peeper's Beach, enhance the beach building ability of these areas, enhance recreational opportunities and add 82,500 square feet of

beach total;¹¹ no estimates were made of the recreational losses which would result from the encroachment of 1.9 miles of seawalls and revetments.

HAZARDS PROBLEM ONE

Lack Of Regional Consistency For Areas Prone To Shoreline Erosion

Many coastal areas contain a variety of shoreline protective devices. There is little attempt, in most cases, to design shoreline armoring to address regional resources or constraints. Adjoining properties, with similar wave climate and geology, have a variety of protective 'solutions' all represented to be appropriate to the site. The only review for protective structures provided by the Coastal Act is that the structures be "designed to eliminate or mitigate adverse impacts on local sand supply" (Section 30235); no regional consistency is required.

ANALYSIS

In the ReCAP area, the geology of certain "regions" varies considerably. Geologic conditions for the coast of Santa Cruz County include a moderately resistant mudstone in the northern cliffed areas and sedimentary formations of sandstone and siltstone in the southern portion. Monterey County's north coast consists of mostly beach and dune features -- relatively young dunes such as the Marina Dune complex, as well as older dunes such as the inland portions of the former Fort Ord military reservation. The southern portion of Monterey County's coastline consists of mostly resistant granite rock with interlying sandy pocket beaches. Generally in the Monterey Bay pilot area, with the exception of few specific localities, the coastline is eroding, losing large quantities of sand naturally to the offshore submarine canyons and some to the inland dune systems.

While the ReCAP pilot area offers a variety of shoreline types, many smaller portions of the shoreline have common features. Segments of the bay's shoreline may be broken down into "regions" while considering such factors as geology, wave conditions, and natural sand budget, to name a few. At a large scale, the shoreline can be divided into littoral cells which share common characteristics of sediment sources and transport. On a smaller scale, there are stretches of coast bounded by lagoons or headlands which have a similar geology and wave climate. These common factors should affect the types of armoring which will be most effective for a portion of shoreline; however, in many portions of the ReCAP area, the strategies used to provide shoreline protection differ greatly from one property to the next, in spite of the apparent physical similarities between the sites.

Shoreline protective measures in portions of the ReCAP pilot area generally lack any regional scheme for dealing with erosion. For example, in many coastal permits for projects within Santa Cruz County, geologic analyses often consider regional wave conditions and/or tectonics, but rarely do these reports consider sand budgets or regional sand supplies. Santa Cruz Harbor was constructed before the Coastal Act came into effect and thus it never received review through the California Coastal Management Program (CCMP); however, this project illustrates both the regional effects which can accompany a single project and the importance of a regional overview of projects which may modify shoreline processes. Since the harbor has been constructed, an expansive beach has developed upcoast of the jetties where there once had been significant erosion; downcoast areas as far as Capitola have experienced profound decreases in

sand supplies and increased shoreline retreat. Since construction of the harbor, there have been at least six regional studies investigating ways to address these downcoast effects.¹²

The Live Oak area of Santa Cruz County illustrates a second situation which can arise when individual projects are undertaken without a regional overview to guide shoreline activity. Much of the shoreline has been armored; numerous protective efforts exist in close proximity to each other and review of permit activity shows repeated activity at some sites. Figure 3-6 shows a mosaic of permit activity for one small section of coast within Live Oak along Opal Cliffs. This plethora of armoring and permit activity makes comprehensive review difficult -- work has been done through the emergency process, through regular Commission issued permits and through local permits. Within this 3,000 foot long section of shoreline, properties have been protected with gunite, vertical walls, rip-rap and concrete cylinders. Some properties were issued two or three permits for different armoring activities, properties received permits for one type of protection and different armoring was actually constructed, new properties have been added to existing permits through the amendment process, and several properties received local permits without any conditions for access.

A regional overview of this segment of coast could have identified the major factors contributing to erosion and identified an effective strategy for the "region" to address natural shoreline processes. Such an overview might identify recommended treatments for various areas, such as where revetments may be most effective, areas where vertical walls may be most effective, areas where surface treatment of the bluff (gunite, rock bolting, etc.) may be most effective, and finally, areas where beach nourishment or sand management may be most effective. Applicants could use this general direction to design a site-specific solution. As a second type of regional overview, some local governments have prepared "standard" designs for shoreline protection which can be used in specified areas.¹³ Applicants can use these designs in the specified areas or identify different efforts for protection which better suit the site-specific conditions.

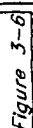
The existing situation in Live Oak, however, presents a piecemeal confusion of protective measures. From an engineering perspective, the weakest points in shoreline armoring are normally the ends and the junctions between different styles of protection (rock adjacent to concrete to gunite, for example). Such ends and junctions occur frequently in the Live Oak area, and while no engineering evaluation has been prepared, the potential for weaknesses in the protection would be greatly reduced by a regional approach to controlling erosion in the area. In addition, the general look and aesthetic of the area would change if adjoining properties had shoreline protection efforts with a similar visual effect.

A final support for a regional overview of shoreline activity comes from an earlier analysis of coastal hazards by Gary Griggs, James Pepper and Martha Jordan, in which they find,

Since these decisions are usually made on a project-by-project basis, they tend to be evaluated independently, without any systematic consideration of the aggregate or cumulative effects either within or among jurisdictions. Within such a decision-making context any given project can be viewed as small and thus easy to rationalize in terms of approval. Cairns (1986) calls this endemic failure to take into account the aggregate effects of environmental management "the tyranny of small decisions".¹⁴

A regional overview for individual shoreline activity would provide coastal planners and analysts a perspective on how an individual project would fit into the overall cumulative approach to shoreline management.

Opal Cliffs, Santa Cruz County



Without a regional overview, the piecemeal approach to shoreline protective devices will continue to impact shoreline processes and resources. The attempt to minimize coastal hazards with various devices (seawalls and numerous rip-rap structures), combined with naturally occurring coastal processes, requires a closer examination of their cumulative impacts. Piecemeal solutions to coastal erosion problems are not generally effective and have the potential to create further problems. Often overlooked are the regional effects of such shoreline protection. Where a regional coastal erosion problem exists, a regional solution should be developed and implemented.

The ReCAP pilot area has had many years of experience with a variety of armoring devices. It should be possible to study the on-site impacts, possible downcoast impacts and maintenance records for these structures and determine which types are most effective in different areas. From such information, local governments would be able to make sound decisions about the types of armoring which would be allowed in the future.

RECOMMENDATIONS

Program Improvements

- Develop procedural guidance for defining and delineating all areas of high coastal hazards in the pilot area coastline; these areas should then further be broken down into smaller regions that share the same geologic and ocean processes. These “regional” or “sub-regional” breakdowns of the pilot area coastline should consider, but not be limited to, such factors as geology, wave conditions, and sand budget situation. Regions would not necessarily be bounded by city or county jurisdictions, but would follow the bounds established by the physical characteristics of the coast.
- Prepare procedural guidance for the development of regional shoreline erosion and bluff retreat management plans suitable for implementation by ReCAP area LCP jurisdictions that are broken down by the defined geologic sub-regions taking into account the specific geologic and geographic constraints of the subject area and incorporating concerns and regulations governing protective devices along the shoreline as well as the sand budget situation within the specified “region”. The framework for this guidance would include, but not be limited to:
 - Standard engineering plans defining the specific types of armoring which would be acceptable for specific areas, and where appropriate, identification of the types of armoring which should never be considered for certain areas.
 - Standard alternatives feasibility analysis worksheet that would be a required element of all hazard response projects and that would require applicants to go through a series of steps to assure that hard protective devices were only created as a last resort. The analysis may require, but not be limited to, the use of technical evaluations of the site (geotechnical reports, engineering geology reports, etc.), an examination of all other options (removal, relocation, “do nothing”, sand replenishment, etc.), and a conclusion that a shoreline protective device would be the “best option” (most protective of the public trust, best long term solution, etc.) for the subject site.
 - Standard conditions and monitoring requirements that may include discussion of mechanisms to ensure shoreline protection effectiveness and public safety with

provisions for the removal of ineffective or hazardous protective structures as well as programs to address beach replenishment and sand supply.

Opportunities In the Longer Term

- Provide guidance for the development of regional programs for managing and expanding shoreline sand resources through such mechanisms as aggressive beach nourishment, especially for areas where beach sand loss exceeds supply.
- Provide guidance for ReCAP area LCP jurisdictions to address major watershed projects -- both in and outside the coastal zone -- for impacts to shoreline sand supply issues, particularly in areas with sediment deficits.
- Pursue expanding Section 30235 of the Coastal Act governing protective devices to require that protective efforts be compatible with both regional conditions and with the protective efforts used for properties in the same shoreline region.

HAZARDS PROBLEM TWO

Impacts To Access From Armoring Are Often Overlooked

Incremental impacts to beach areas, access and the general character of the shoreline have occurred from approval of permits for shoreline armoring. Over the ReCAP time period, there have been measurable losses in beach access through increases in the length and area extent of shoreline armoring, but many permits have been approved without any conditions directed at access impacts.

ANALYSIS

Public access concerns are not always addressed in permits for shoreline armoring. Review of approved shoreline armoring in the ReCAP region from 1983-1993 identified that many projects raised some access issues, such as blocking or encroaching on lateral or vertical access, but not all such permits contained access mitigation: 8 of the projects involved some type of improvement to access facilities, and no access mitigation was needed with the project; 36 projects were required, through conditions, to improve access either through an easement, dedication, or improvements to access facilities; 45 projects had no permit conditions requiring mitigation of access impacts, but the information in the ReCAP database was not of sufficient detail to determine the types or extents of access concerns which were raised by these projects. It is likely that many of these permits with no access related condition were for repair and maintenance of existing structures. For such permits, the access concerns were likely to be the perpetuation of impacts resulting from the original structures; the major impacts to access would have resulted from the initial construction and would have been addressed in the original permit action, if the structure was built during the time of the Coastal Act. However, if any of these projects were for new structures or the physical expansion of existing structures, they would have added new constraints to access which should have been considered. Since access impacts from shoreline armoring can be significant and long-term, when access issues are raised by a project involving shoreline armoring, the individual and cumulative impacts to access should always be addressed.

Much of the pilot area coastline has been developed and over 12 miles have been armored, as of 1993. As noted earlier in Figure 3-3, portions of this armoring occurred prior to the Coastal Act, LCP certification and the time frame for the ReCAP study. Assuming that a vertical seawall extends 4 feet onto the beach and revetments or rubble walls extend 20 feet onto the beach, the existing 12 miles of armoring occupies over 1 million square feet or 25 acres of beach, not including other beach level development, such as homes, which occupy the protected beach (for example, the development at Seascape). If, as projected, 35.7 miles of shoreline may eventually rely on shoreline armoring for erosion protection, the loss of beach area could increase to 65 acres. Even with the inclusion of mitigating lateral and vertical access dedications where appropriate, clearly the loss of recreational access will be severe.

Shoreline armoring alters the shoreline and shoreline processes in several ways. An immediate and noticeable effect will be the physical encroachment or occupation of the shoreline as mentioned above. If a section of beach is covered by revetment rock, the beach is no longer available for beach access. A trail may be developed on top of the revetment, and while there may be great benefit from such a trail, the access opportunity would be different than that which had been provided by the beach area.

A more long-term impact from armoring will be its interference with long-term shoreline retreat. A primary function of well designed shoreline protection is that it protect upland development by halting or slowing future landward migration of the backshore. If the seaward edge of the beach continues to erode, the available beach width will become more and more narrow and will eventually disappear. Waves will run up on the revetment or to the toe of the seawall and all beach access will be eliminated. Finally, if the back beach area is a source of sand to the littoral system, efforts to armor the back beach will prevent this material from reaching the littoral zone and nourishing beach areas downcoast. Thus, armoring can alter access opportunities in a number of ways.

RECOMMENDATIONS

Program Improvements

- Prepare procedural guidance for the development of standard access conditions to be implemented through the regional shoreline erosion and bluff retreat management plans (see Coastal Hazards Problem #1). These conditions may include, but not be limited to, discussion of the following mechanisms for ensuring public access:
 - traditional easements such as lateral or vertical access, and non-traditional easements such as "rolling easements" which move landward as the beach area disappears and trail easements that may be landward, or on top of, shoreline armoring.
 - in lieu fee programs to provide for regional access development and/or sand replenishment.

Opportunities In the Longer Term

- Pursue expanding Section 30235 of the Coastal Act governing protective devices to acknowledge the singular and cumulative negative effect that individual armoring projects can have on public coastal access and require all shoreline protective devices be designed to avoid or mitigate impacts to public coastal access.
- Provide guidance for the development of regional programs for:

- undertaking aggressive beach nourishment programs to replace armored beach areas in order to maintain, and increase, public coastal access.
- pursuing an acquisition strategy for privately-held coastal lands (especially areas that are adjacent to public beaches), where any existing armoring could be removed and public recreational areas could be expanded.

HAZARDS PROBLEM THREE

Lack Of Analysis Associated With The Emergency Shoreline Armoring Process

A large amount of shoreline armoring in the ReCAP pilot area has been put into place under "emergency" circumstances, either during or immediately following storm events. The emergency process allows for this armoring to take place with little regulatory review of the project, such as would be required through the standard permit process. Without this project review, shoreline protective devices are created and/or altered with:

- minimal technical analysis/engineered design
- minimal review of potential alternatives
- minimal review of adverse impacts on coastal access.

ANALYSIS

The ReCAP database showed that many of the issued armoring permits were emergency permits, many in response to the 1982/83 storms. Out of the 96 armoring permits, 24 (or 25%) were emergency permits; 5 new shoreline protective devices were permitted through the emergency process and 19 existing structures were maintained. Eighteen of the 24 emergency permits were issued during the severe 1983 storms, with many issued directly in the field.¹⁵ All 24 emergency permits were issued by the Commission, so nearly one-third of all Commission-issued armoring permits were issued as emergency permits. These same 24 emergency projects resulted in at least 24,000 tons of additional shoreline armoring.¹⁶

Section 30611 of the Coastal Act states that the intent of emergency permits is to allow a rapid, non-permanent response "to protect life and public property from imminent danger." Section 30611 concludes with the limitation that it does not "authorize permanent erection of structures valued at more than twenty-five thousand dollars (\$25,000)." Unfortunately, there are few inexpensive, temporary "stop-gap" measures for shoreline erosion and storm protection, and in most situations the emergency action ends up being a permanent structure.

Once the critical nature of an emergency situation has been recognized, emergency requests are generally granted due to concerns over public safety. While emergency permits usually require follow-up, regular permits to ensure detailed technical review and allow the incorporation of conditions for monitoring, maintenance or mitigation of impacts to public access, only a few of these emergency permits had associated regular permits.¹⁷ It is the formalizing CDP process that would allow for the standard regulatory scrutiny of the project which, in turn, would provide technical analysis of the structure, analysis of non-structural alternatives, and mitigation of impacts to public shoreline resources. Many of the emergency permits were repair and maintenance waivers for existing shoreline protection permitted prior to

the time period assessed by ReCAP; therefore, although those regular permits did not appear as part of the ReCAP database, they would serve as the associated regular permit to the emergency permit.

Emergency armoring projects in the pilot area have typically occurred in high hazard areas that have a high likelihood of storm driven events reoccurring in the future, leading to an ongoing "emergency cycle". For example, in the Live Oak/Opal Cliffs area, an area of known high hazard and extreme erosion, over 40% of all recent armoring permits have been approved through the emergency process.¹⁸ Live Oak/Opal Cliffs is discussed in Hazards Problem #1 and Figure 3-6 as an example of an area with little coherent approach to armoring; within approximately 3,000 feet of beach, there are four distinct approaches to armoring and several spots where two or three protective measures have been tried, one on top of or in front of the other. In the absence of defined regional hazard management plans, the shoreline armoring put in place with an emergency permit will typically result in haphazard placement of protective materials in the specific geographic locations that are most in need of sound shoreline protective devices.

Some emergency permits were to add rock to existing revetments. Such actions, in non-emergency situations, would be considered routine repair and maintenance. These projects would require only baseline technical review and engineering rather than detailed technical review and evaluation of alternatives. For a variety of reasons it seems that many property owners postpone maintenance until a storm event. Emergencies are the worst time to undertake proper and effective maintenance since the size and amount of rock may be dictated by availability rather than engineering design and the locations which are protected will be those which are easy to reach. Normally, these areas do not receive any more attention until the next emergency. Regular permit follow-up for these "emergency" situations could plan for future inspections and maintenance needs and break the cycle of crisis-based shoreline management.

The areas of high hazards that are currently susceptible to shoreline erosion and high wave impact are expected to continue to be the hardest hit by both episodic storm events and long term erosion. Without any regional shoreline planning prior to the emergency situation, these same known hazardous areas will continue to see a collection of individual responses to what is essentially a regional issue. The less "costly" emergency process (minimal filing requirements, expediency of review, minimal project analysis, lack of required mitigation, etc.) encourages an emergency response, so, absent program changes, large amounts of armoring will continue to be put in place through the emergency process. The end result is short-term protection of individual properties in a manner that may not have been analyzed for technical adequacy or for impacts to coastal access.

Concern about the use of the emergency process is not unique to the ReCAP area. One of the key recommendations from the coastal hazards study by Griggs, Pepper and Jordan was to strengthen the policies governing emergency protection projects.¹⁹ Statewide, there is no consistent follow-up of emergency actions nor assurance that emergency actions will either be upgraded for permanent protection or removed following the emergency.

The main issue for the processing of emergency shoreline protection permits is one of ensuring that there is adequate review of the proposed project in terms of alternatives, technical analysis, and public beach access, while accommodating the time constraints inherent in an emergency situation. The emergency permit process needs to, as much as possible, agree with and complement the review and analysis available through the regular permit process. The emergency process must be improved to ensure standard review of the project after the immediate crisis has ended. As part of a longer term effort, the mechanisms for an emergency process should be included in comprehensive regional hazard plans that would define emergency situations, outline acceptable designs and responses for emergency shoreline protection and develop detailed review steps for foreseeable emergency actions.

RECOMMENDATIONS

Program Improvements

- Prepare procedural guidance for the development of emergency shoreline erosion and bluff retreat response plans suitable for implementation by ReCAP area LCP jurisdictions through the regional shoreline erosion and bluff retreat management plans (see Coastal Hazards Problem #1). These plans would pertain to the issuance of emergency shoreline armoring permits; sub-components of procedural guidance should include direction for the development of:
 - general engineering plans for different types of emergency armoring which would be acceptable for specific areas and would accommodate the potential for redesign and/or removal.
 - standard emergency permit conditions and monitoring procedures to ensure that emergency armoring complies with the same level of requirements as armoring projects going through a standard permit review in a non-emergency setting; mechanisms may include, but not be limited to, emergency fees, bond, and/or fines as well as a formalized removal criteria and process.
 - program of public awareness altering coastal residents to the dangers that may be posed by winter storms and how to respond in the event of an emergency.

HAZARDS PROBLEM FOUR

Inadequacy Of The Existing Setback Methodology And Framework

Setback distances incorporated into shoreline development approved in the ReCAP pilot area are not adequate in all cases to protect structures over the course of their lifetimes without the introduction of a hard protective device. Furthermore, the determination of "adequate" setback distances, relying greatly upon erosion rates that often overlook episodic erosion, does not always result in adequate long-term setbacks. This problem is particularly evident in high hazard areas that are already partially or substantially developed.

ANALYSIS

Throughout the ReCAP pilot area, the LCP policies use bluff top setbacks or shoreline setbacks in an attempt to ensure that new development will be at minimal risk from erosion, storm waves and bluff retreat. Typically these setback distances for ReCAP area LCP jurisdictions make use of a 50 year economic lifetime setback, often established as 40 or 50 feet from the bluff edge or beyond the point of maximum wave run-up, with provisions for allowing smaller setbacks if geologic conditions so warrant.²⁰ Structural setbacks are meant to minimize risk from these hazards by allowing natural processes to take place without threatening any structures on the subject property. The idea is that if the structures are far back from the shoreline, natural erosion and storm events will not adversely impact them and shoreline protective devices will not be necessary during the lifetime of the structure. Unfortunately,

setbacks do not address risk to all structures since setbacks can only minimize risk on a lot large enough to accommodate both the necessary setback and the development. Also, setbacks do not minimize risks to existing development, to new development on lots too small to accommodate both a safe setback and development, or to any development which lasts longer than its theoretical economic life.

Setbacks are generally determined by an analysis of erosion rates along the coast; unfortunately, erosion rates can be somewhat elusive. Among the numerous factors influencing erosion rates (e.g., regional wave conditions, geologic conditions, sand budgets, and structural development), one of the least understood and applied is episodic storm events. Coastal engineers recognize the episodic nature of shoreline erosion; however, most setback regulations are developed assuming steady, incremental erosion. While average annual seacliff erosion rates in the ReCAP pilot region are commonly calculated at about one-half to one foot per year, these rates must take into account episodic events that may or may not have been recorded for specific areas or for specific time-frames. With these gaps in the historical record, as well as the potential for an episodic event to be viewed as a rare occurrence with little probability of repetition, average erosion rates may not represent the actual erosion process that is taking place. As an example, during the winter storms of 1983, a top portion of a seacliff in Santa Cruz eroded about 46 feet; this episode alone almost completely devoured the minimum adequate setback required in the LCP.²¹

Table 3-2 shows some of the difficulties in attempting to quantify erosion rates and setback distances. As shown, if analysts had theoretical data showing shoreline change back to 1954, they would likely estimate an erosion rate of 2 feet per year and would anticipate that a 100 foot setback would be the minimum necessary setback for 50 years of stability. If the available theoretical data record only went back to 1970, the same site would be estimated to have an erosion rate of only 1 foot per year and a minimum necessary setback of 50 feet would be considered acceptable. If, in an effort to be conservative, the analysts were to add to the minimum setback a distance equal to the maximum single event of retreat, an analyst using the records from 1950 to 1990 would use the 30 foot retreat event from 1968, while an analyst using the records from 1970 to 1990 would only add a 10 foot retreat event. Thus, an acceptable setback for this theoretical site could range from 60 to 130 feet, depending on the extent of the data record used to develop the retreat properties. And since both setbacks are based on historic data, there is no certainty that either prediction will agree accurately with future events.

Table 3-2: Difficulties in Calculating Setbacks

<u>Data Record: Episodic Bluff Retreat Events</u> 20' of retreat in 1954 10' of retreat in 1959 30' of retreat in 1968 10' of retreat in 1971 10' of retreat in 1987	Theoretical Retreat Rates			
	Time Period	Total Measured Retreat	Erosion Rates	50-year Setback
	1950-1990	80'	2 ft./yr.	100'
	1960-1990	50'	1.67 ft./yr.	83'
	1970-1990	20'	1 ft./yr.	50'

The amount of pre-Coastal Act development along the shoreline in Santa Cruz and Monterey Counties has substantially impacted setback effectiveness in the ReCAP region, as has the high amount of development concentrated in urban service areas. In urban areas, most development is an "infill" situation where the setback may be based not on the distance necessary to protect the structure from threat during its life, but rather on the setback of the adjacent structures, established as a "stringline" from these structures. "Stringlines" are setbacks

determined by a line drawn between development on adjacent properties, rather than by a standard setback distance. Ownership of a legal lot of record presumes a right to develop the property regardless of the coastal hazards that are present. Unless setback policies change to address the issue of infill development directly, areas of existing development will eventually be built-out based upon a stringline approach that disregards hazards constraints and sites development as near to the shoreline as possible, as is evident in the majority of the surrounding parcels. Under this scenario, infill projects allowed in high hazard areas based upon historical land use decisions will eventually require the same level of shoreline armoring as their neighbors.

For reconstruction after a natural disaster, Section 30610 of the Coastal Act allows reconstruction in the same footprint as the original structure without a CDP, precluding any analysis of potential alternatives -- regardless of the hazards involved. In fact, a conscientious applicant who attempts to set back the building envelope of a reconstruction parcel from the original footprint due to hazard constraints may be penalized by the imposition of CDP requirements. In each case, hard protective devices may be necessary in order to protect the structures prior to fulfillment of their economic lifetimes. The following examples illustrate the actual implementation of these setback policies:

- **New development case:** Two properties were being developed in an extremely hazardous area, with project sites directly on sandy beach. Due to the fact that the development was considered infill, not only were setbacks not considered (a string-line approach was followed with respect to setback distance) but armoring was approved in tandem with the new residences in seeming opposition to Section 30253(2) of the Coastal Act. The Commission found that the "project area is nearly built out with beach front residences so that it does not appear reasonable to prohibit the development of the few remaining vacant lots despite the very real hazards from flooding and wave action."²² Both permits did contain conditions for lateral easements, as well as waivers of Commission liability, among others.
- **Reconstruction case:** A reconstruction project was approved that not only allowed re-siting of the project in the same site as the original structure but also allowed for additional structural expansion towards the bluff edge. This project, being sited in an area of known geologic hazards,²³ eventually required a new shoreline protective device.²⁴

Finally, even when a full 50-year setback is used, the value of coastal land and the lack of alternative coastal locations makes it unlikely that structures along the coast will be retired after 50 years or the completion of their theoretical economic life. When structures are setback using a 50 year economic life, they can be expected to "outlive" their setbacks and eventually require armoring for long-term protection from erosion. ReCAP did not collect information on building ages for development along the coast; however, from field investigations and informal surveys it seems that a number of coastal buildings are 40 to 60 years old. If the generally accepted estimate of economic life reflected actual structural life, most of these buildings would have been removed. The 50 year economic life does not reflect the actual lifetime of a structure or the length of time a coastal site will be occupied. (Note: Statewide, 46% of the coastal jurisdictions using setbacks based upon economic lifetimes used either 75 or 100 years.)²⁵

If new development continues to be permitted in high hazard areas, setbacks should function as they are intended to: allowing for natural processes to continue without the adverse impacts that would be associated with the introduction of hard protective devices. By instituting a setback based upon a 75 or 100 year economic lifetime and by using long-term average annual erosion rates, a more realistic time span for retirement can be set for development. If setbacks are based upon a practical economic lifetime for the structure, shoreline armoring will be

unnecessary with the removal of these structures at the end of their economic lives. In tandem with implementing this setback along the coastline, the regulatory program would require procedural modifications to manage development in these high hazard areas setting forth specific development criteria and requirements.

In order to better address reconstruction policy, the consideration of alternative strategies and/or sites should be encouraged. A potential reconstruction project may need to analyze the viability of the site due to the same hazard constraints to which new development would be subjected. Options may run from an alternative building envelope on the subject property all the way to acquisition of the subject parcel and transfer of development credit programs. One response to the problem may be to modify the policy of permit exemptions to exempt reconstruction provided that the structure is moved away from the hazardous constraints to the greatest degree feasible, rather than sited in the same footprint or location. For example, the policy language may say that reconstruction would not require a CDP if the structure is located on a new footprint landward of the previous building site, at the site most protective of resources (e.g., most landward, setback for a 100 year lifetime, not necessitating future shoreline protection, etc.). In this way, landowners would continue to be allowed to reconstruct without a CDP and hazard constraints would be better (although still not fully) addressed.

The Coastal Hazards study by Griggs, Pepper and Jordan recommends that "all development proposals, including reconstruction or remodeling that increases the square footage of the structure by more than 25 percent, must be evaluated on the basis of safety from all coastal geologic hazards," and should be permitted "only when safety from wave impacts and inundation throughout the projected 100-year lifetime of the structure can be demonstrated without reliance on a protective device."²⁶

RECOMMENDATIONS

Program Improvements

- Prepare procedural guidance on the benefits and uses of expanding development setbacks for ReCAP area LCP jurisdictions from the current 50 year economic lifetime to either 75 year or 100 year lifetime; sub-components of procedural guidance should include direction for:
 - the development and delineation of mapped 75 year and 100 year setback lines making use of long-term average annual erosion rates based on chronic and episodic erosion.
 - mechanisms for updating mapped 75 year and 100 year setback lines every 5 to 7 years. The mechanisms would include guidance on compiling ongoing information on long-term shoreline erosion, from such sources as project-specific geotechnical reports, for incorporation into the setback delineation.
 - procedures for managing development within the mapped setback zones including, but not limited to, urban/rural boundary distinctions, alternative setback distances (including stringline setback criteria) and processes for regulating structural development, shoreline protection, and subdivisions.

Opportunities In the Longer Term

- Pursue modifications of Section 30610 of the Coastal Act regarding reconstruction of property damaged or destroyed by ocean waves or erosion to allow for a new building

envelope relocated landward of the previous footprint; reconstruction without a coastal development permit would be allowed provided that the new site is reviewed for environmentally sensitive habitat and identified view corridors maintaining the same size and use constraints as are now present in Section 30610.

- Provide guidance for the development of strategies to address development constraints in areas of high coastal hazards including, but not limited to:
 - procedures on the use of waivers of public liability and other types of hold-harmless clauses as deed restrictions that require property owners to assume all responsibility for high hazard properties, and to waive access to disaster relief funds and other coastal hazard-related, subsidized economic assistance.
 - identification and utilization of structural design criteria that allow for the construction of structures that can be easily moved and removed should coastal hazard conditions warrant relocation at some future date.
 - procedures for incorporating full permit review for all structures between the first public road and the sea that are damaged by wave action, bluff retreat, shoreline erosion, or any other coastal hazards (such as tsunamis, earthquakes, fires, flooding, etc.).
 - utilization of transfer of development credit programs to compensate for coastal development that is infeasible due to site-specific coastal hazards constraints.

HAZARDS PROBLEM FIVE

Future Planning and Management of Coastal Hazards

In the ReCAP pilot area, development has been located in high hazard areas immediately adjacent to eroding shorelines. New development in the region is likely to continue this practice and locate on the remaining coastal lots. Once located in these areas of high hazard, this development can be expected to be threatened by shoreline erosion. The traditional response in the ReCAP region to such a threat is to construct shoreline armoring to halt the erosion, thus encroaching onto public beach areas in the process and shifting much of the cost of risk reduction from the private development to the public.

ANALYSIS

When development is allowed in areas of high coastal erosion, it should come as no surprise that those developments will eventually require protection if their shoreline locations are to be maintained. This armoring of the coastline is typically put in place at substantial public cost, both in terms of subsidies such as low-interest loans, disaster relief funds, and joint public/private ventures as well as public loss of beach area, beach access, and coastal aesthetics.²⁷ With ocean processes and geologic instability contributing to an actively eroding California coastline, coastal parcels today are more at risk than ever before.²⁸ Since the current state of coastal hazards planning does not systematically restrict development in areas of high hazards, inappropriate development may continue to be sited along the shoreline. Given the

current coastal hazards policy framework in California, costly shoreline armoring will be required in order to maintain the development's perilous perch.

On the state regulatory level there appears to be a dichotomy between Sections 30253 and 30235 of the Coastal Act regarding the level of safety expected for siting new versus existing development. Since many LCPs repeat these sections, the CCMP provides confusing guidance on coastal hazards and shoreline armoring. While Section 30253(2) requires the stability of new development without future reliance on protective devices, Section 30235 provides that a recently built beach level or bluff top structure will be allowed the exact protective devices that 30253 disallowed before the structure was built. If the structure was truly built to not necessitate future shoreline protective devices (as per 30253), little or none of the development built since the Coastal Act should require protective devices. Section 30235 allows seawalls to protect existing structures where "existing" has been taken to mean the time at which the application for armoring is made. While other states have used cutoff dates coinciding with enabling legislation for their definition of "existing" structures (for example, existing as of January 1, 1977), or have legislation that prohibits armoring or any construction seaward of a legislatively enacted setback line, California has not taken these types of steps to limit armoring.²⁹ For Sections 30235 and 30253 to function symbiotically, there needs to be a cut-off date that treats pre-Coastal Act development differently than post-Coastal Act development due to different regulatory policies being in effect (i.e., pre-Coastal Act development was not subject to Section 30253 and thus may require shoreline protection while post-Coastal Act development should have been constructed in such a way as to meet Section 30253 requirements for stability and not require protective devices).

At a federal level, some programs contribute to the incremental increase in reliance on shoreline armoring for coastal properties. A federal agency that has a large impact on coastal hazard management in California is the Federal Emergency Management Agency (FEMA), which provides insurance for coastal properties and low-interest loans for emergency armoring and rebuilding following a disaster. FEMA assistance to private property owners who have built in areas of high coastal hazards provides a direct public subsidy to private development. Throughout the entire state, shoreline protection and repair of damaged structures has averaged over \$100 million annually.³⁰ This is a significant expenditure of public and private funds for shoreline development, with little, if any, overall direction on the ultimate intent of these efforts.

While the construction of new armoring seems to have slowed since enactment of the Coastal Act, additional armoring has occurred in the ReCAP area with both regular and emergency permits approved by the Commission. Much of the ReCAP area coastline, with the exception of approximately 14 miles of shoreline close to the Pajaro River and small isolated locations totaling another 6 miles, has been identified as having either critical or non-critical erosion.³¹ Over 55 miles of coastline in the ReCAP area are considered erosional. Over time, more and more "non-critical" erosion will become "critical" as protective setbacks become too small to continue to afford protection. In time, it can be expected that most privately held developed coastal property, and some publicly held coastal property, will be threatened by erosion and property owners will apply for some form of shoreline armoring. This type of future armoring will be increased by future development of coastal lands or the conversion of coastal agricultural lands to more development-intense land uses.

If current regulations for armoring continue, it can be expected that eventually much of the coast will be armored, either with vertical walls or rip-rap revetments. Future demands for armoring can be expected from existing and future development, both future development on existing lots of record and on future subdivided lots. While some future demand for armoring may be prevented by careful review of any new subdivisions to ensure adequate, long-term setbacks for all coastal lots, such efforts will not be effective for many existing lots of record or existing development. ReCAP review identified that 12 miles of existing shoreline is now

armored and a rough review of land use patterns and shoreline characteristics has identified over 27 miles of shoreline which may ultimately be armored under existing policies.

Currently the ReCAP area encourages the use of rip-rap, which would occupy vast areas of public beach. With a conservative estimate of 20 feet of encroachment onto public beach by a rip-rap wall and 4 feet of encroachment by a vertical wall, the current armoring occupies approximately 25 acres of public beach; should the future armoring estimates hold true, 27.5 miles of new revetment would eliminate over 65 acres of shoreline from public use (comparable in scale to losing all of Moss Landing or Natural Bridges State Beach). In addition, as the shoreline continues to erode, the beach in front of these walls will become smaller and ultimately the walls will be in the surf zone with little or no usable beach. Access stairs will drop into the surf and the only accessible beach will be along small sections of coast without erosion or at public parks.³² Ultimately too, this loss of beach will limit the ability of property owners to repair and maintain their seawalls.

Land use planning with an emphasis on coastal hazards avoidance would identify those areas of rapid coastal erosion and high ocean impacts where it is not appropriate to site public or private development. These high hazard areas will eventually require some type of hazard response at considerable public expense. It is clear that coastal land-use planners and regulators need to develop new ways for looking at the issues of coastal hazards.

RECOMMENDATIONS

Opportunities in the Longer Term

- Pursue amendments to Section 30235 of the Coastal Act to:
 - limit the permitting of permanent shoreline protective devices to include only the main development on the property (excluding minor buildings, ancillary structures, etc.) and to development which had occurred and for which there were an issued building permit as of the effective date of the amendment. No permanent shoreline protective device would be permitted for development receiving a building permit after the effective amendment date.
- Pursue modifications of Section 30253 of the Coastal Act to:
 - add a requirement that specifies that all new development be sited and designed to avoid, over the full life of the development, the construction of any type of shoreline armoring that would prevent or hinder natural shoreline erosion and bluff retreat.
- Pursue modifications of Section 30610 of the Coastal Act to:
 - prohibit any remodeling project adjacent to an eroding coastline from expanding seaward regardless of the size of the remodeling.
 - require full permit review if the rebuilding of property damaged or destroyed by ocean waves or erosion occurs in the same footprint; require only a review for environmentally sensitive habitat and identified view corridors if the rebuilding occurs either entirely outside the new development setback or at the most landward portion of the property, if location landward of the new development setback line is not possible, maintaining the same size and use constraints as now used.
- Pursue research that examines and analyzes the policy implications of the public subsidy of private development along the California coastline due to coastal hazards and the

implementation of the Federal Emergency Management Agency process and disaster relief funds.

- ¹ Griggs, Gary, James Pepper and Martha Jordan, *California's Coastal Hazards: A Critical Assessment of Existing Land-Use Policies and Practices*, California Policy Seminar Report, Berkeley, Page xix. 1992.
- ² The Area of Demonstration is taken from the California Coastal Commission, "Statewide Interpretive Guidelines", as of December 16, 1981 (Supersedes May 5, 1981 edition). The "Area of Demonstration" is within the area of a 20 degree angle from the toe of a cliff or within 50 feet of the face of the bluff of cliff, whichever is greater.
- ³ Approximately 4,000 linear feet of this shoreline is protected with rip-rap extending, conservatively, 20 feet from the bluff face. This is a highly used recreational beach and yet this protection alone encroaches onto more than 1.8 acres of beach.
- ⁴ US Army Engineer Division, South Pacific, Corps of Engineers, San Francisco, *National Shoreline Study: California Regional Inventory*. August 1971.
- ⁵ Comments provided by Norbert Dall. December 12, 1994 at Santa Cruz workshop.
- ⁶ ReCAP database, Hazards sub-module.
- ⁷ In addition to the 79 Commission approved structures for the 1983-1993 time period, there were two other permits approved by the Commission involving shoreline armoring: one involved the removal of rip-rap and the second involved conditions stating that a hard protective structure would not be allowed in the future. As these projects did not result in additional armoring being approved, they have been excluded from this analysis. [Note: only one Commission reviewed permit involving shoreline protection was denied from 1983-1993; this project was eventually approved.]
- ⁸ ReCAP database, Hazards sub-module.
- ⁹ ReCAP database, Hazards sub-module.
- ¹⁰ US Army Corps of Engineers, San Francisco District, *Santa Cruz Harbor and Vicinity Shoaling: General Investigation Study, Reconnaissance Report*. January 1994.
- ¹¹ Ibid.
- ¹² Ibid.
- ¹³ Ventura County is one such area, with standard designs for vertical walls and maps that identify the coastal locations where each design has been found to be appropriate.
- ¹⁴ Griggs, Pepper, and Jordan. Page 31. 1992.
- ¹⁵ ReCAP database, Hazards sub-module.
- ¹⁶ Only fifteen of the emergency permits recorded the number of tons of rip-rap placed, thus the 24,000 ton figure likely underestimates the actual amount of rock placed through the emergency process.
- ¹⁷ ReCAP database, Hazards sub-module.
- ¹⁸ Permitting figures from the ReCAP database, Hazards sub-module; Live Oak/Opal Cliffs characterization as described in: Griggs, Gary and Lauret Savoy, eds. *Living with the California Coast*. Duke University Press. Pages 186-187. 1985.
- ¹⁹ Griggs, Pepper and Jordan, Recommendation #6, Pages 191 and 192. 1992.
- ²⁰ Of ReCAP area certified LCP jurisdictions, only Santa Cruz City does not define the 50-year economic lifetime setback, instead using an undefined economic lifetime (See Coastal Commission document "Overview of Local Coastal Programs Relating to Hazards and Shoreline Development").
- ²¹ The Santa Cruz County LCP generally requires a 50 foot setback for development along the coast.
- ²² From California Coastal Commission staff reports for coastal development permits 3-81-149, 3-81-149-A, 3-81-150, and 3-81-150-A.
- ²³ Live Oak area of Santa Cruz County.

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- ²⁴ From California Coastal Commission staff reports for coastal development permits 3-81-055 and 3-81-055-A, and Santa Cruz County permit findings for permit 87-0556 (California Coastal Commission identification number 3-SCO-87-094).
- ²⁵ Griggs, Pepper, and Jordan. Page 130. 1992.
- ²⁶ Griggs, Pepper and Jordan. Pages 187 and 188. 1992.
- ²⁷ Griggs and Savoy. Pages 47-48. 1985.
- ²⁸ It has been estimated that out of California's 1,100 miles of coastline, 86% is "actively eroding". Griggs, Pepper and Jordan. Page xix. 1992.
- ²⁹ In Oregon, state law prohibits hard shoreline protective structures for property developed after January 1, 1977. In Florida, buildings developed within "Coastal Construction Control Lines" must meet state standards for surviving a 100 year storm event; buildings approved by the state cannot apply for protection since they have been designed to avoid the need for protection.
- ³⁰ Griggs, Pepper, and Jordan. Page xix. 1992.
- ³¹ U.S. Army Engineer Division, South Pacific, Corps of Engineers, San Francisco, *National Shoreline Study: California Regional Inventory*, August 1971. From this 1971 inventory by the ACOE, erosion was critical if "experienced judgment indicated that prospective damage prevented and benefits from tangible and intangible values may justify action to halt erosion (Page 3). "Areas with roads or houses in danger from erosion are classified as non-critical erosion if it is economical to abandon or move the facilities." (Page 23).
- ³² Anecdotal evidence points to these types of scenarios as already occurring within the ReCAP pilot area (e.g., Pleasure Point/Opal Cliffs area of Live Oak in Santa Cruz County).

4

PUBLIC ACCESS

SUMMARY

Cumulative impacts to coastal access result from the overall loss of coastal recreation opportunities. Defined broadly, these opportunities include not only the physical availability of beach sites, but also the ability to reach and utilize those sites. In the ReCAP area, most impacts have occurred: (1) due to incomplete mitigation of development projects, (2) as a result of physical beach loss due to the construction of shoreline protective devices, and (3) due to overall increases in use of recreational sites. The increase in use of beach areas leads to overall congestion, strains on the available facilities, and impacts to site quality, all of which affect use of recreational sites. In addition, increasing use often leads to impacts on sensitive habitat.

One goal of the California Coastal Management Program is to ensure maximum coastal access in balance with coastal resource protection. In the ReCAP region, the overall supply of physical access to and along the coast improved significantly since 1981, due to the addition of several new accessways and improvements to existing access sites. Many of these improvements result from conditions required by the Commission or local governments to mitigate impacts on access from individual development projects. The availability of coastal access for physically challenged users also increased. In addition, both the California Department of Parks and Recreation and the Monterey Regional Park District purchased land for public use, which has enhanced coastal access.

However, cumulative impacts to coastal access opportunities are evident throughout the region. In part, this is because required mitigation of development projects impacting coastal access is often incomplete. For example, a primary tool used to mitigate impacts is the use of an offer to dedicate an access easement for public use; of the 92 offers required at this time, only one has been currently opened and available for the public in the ReCAP region. Thus, one of the major implementation tools for addressing impacts to public access is not fully mitigating those impacts. Several of ReCAP's recommendations will result in improving the effectiveness of current mitigation efforts.

In addition, as overall growth and demand for access continue, even if the maximum supply of physical access is available for public use, impacts to other aspects of access will become increasingly critical, particularly with regard to parking and transit accessibility, the availability of support facilities, the overall quality of the recreational experience. The impacts to these other variables often cannot be easily tied to a specific development project, and therefore become difficult to fully mitigate through a project-by-project review of development proposals. Improvements in how permit review analyzes public access and improved regional planning for access will help address these cumulative impacts. A number of ReCAP's recommendations, including the development of beach and regional management plans, are designed to initiate these improvements.

BACKGROUND**Policy Framework**

Due to the historic importance of coastal recreation in the ReCAP area, providing for and managing public coastal access into the future is vital. A primary mandate of the Coastal Act, to

provide maximum access to and along the shore, is required by the California Constitution under Section 4, Article 10. After the Coastal Commission certifies a jurisdiction's Local Coastal Plan (LCP), the local government assumes responsibility for implementing the Coastal Act's goals and objectives on a local level, including providing maximum public access. Access is also managed by some nongovernmental managers and the California Department of Parks and Recreation (DPR). DPR is required to develop a comprehensive recreational policy for California; this policy incorporates coastal areas, although the plans do not specifically discuss coastal recreation. In the pilot region, DPR manages 11 coastal units; a twelfth (Lighthouse Field State Beach) is owned by DPR, but managed by Santa Cruz City.

To ensure maximum public access, the Coastal Commission and local governments must both protect existing access and ensure the availability of *future* access commensurate with a growing demand. Several policies in the Coastal Act serve to meet this objective: the Coastal Act requires that development will not interfere with the public's right to the sea (Section 30211); specifies the need to protect ocean front land suitable for recreational use (Section 30221); and requires the protection of upland areas to support coastal recreation, where feasible (Section 30223). Most of the LCPs in the region specify various projects to enhance the physical supply of coastal access and require access dedications as a mechanism to mitigate access impacts from new development along the shore.

However, the objective of providing coastal access must often be achieved consistent with other Coastal Act objectives: ensuring public safety (Section 30212); protecting sensitive habitat and species (Sections 30212, 30214); protecting agricultural use (Section 30212); and protecting private property rights (Section 30214). As a result of these objectives, access may not be appropriate at every street end or may need to be managed. As development and population increase, the need to balance these objectives in determining how to "maximize" access will also increase.

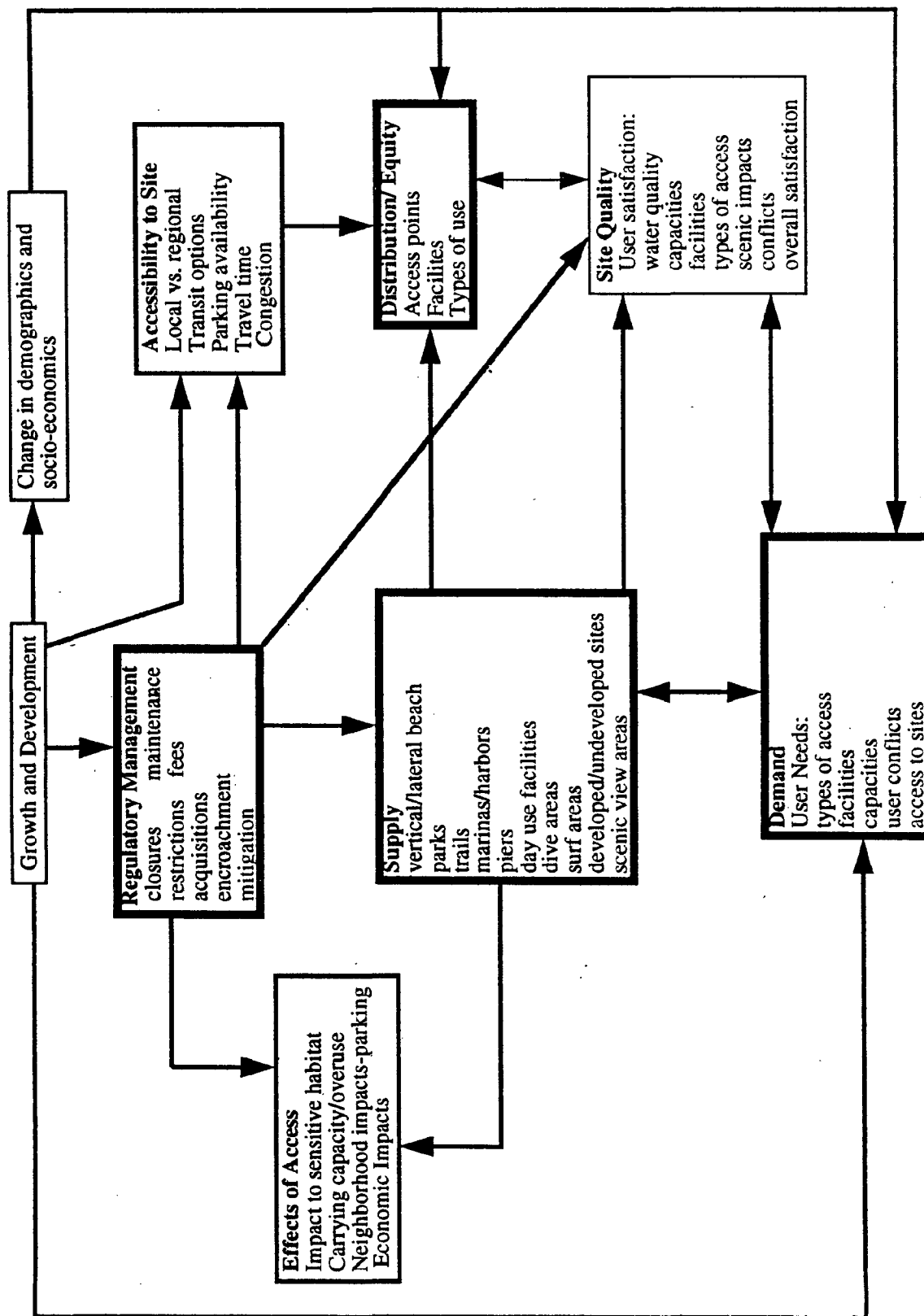
There are a variety of ways to define coastal access and to assess cumulative impacts to access. Coastal access is generally viewed as an issue of physical supply. The supply of access can be described as lateral access (access across a beach), vertical access (access from the upland street or bluff to the beach), trails above the coast (for example along a blufftop), or upland trails that lead to the coast. ReCAP focused primarily on an assessment of lateral and vertical access immediately along the shoreline. It should be noted however that upland trails form a vital component of an access network.

While the physical supply of access is a primary factor in assuring access opportunities, an access program cannot view the issue of supply in isolation of a number of other factors, as illustrated in Figure 4-1. These variables include: availability of transit to beaches; parking availability; providing other necessary support facilities, such as restrooms and picnic areas; addressing user demands and conflicts; and maintenance of a diversity of coastal recreational experiences. Impacts to any one of these variables may ultimately affect the availability and use of the physical supply of access. For example, without adequate parking or alternative transportation, users will have difficulty reaching an access site. Similarly, a lack of adequate support facilities or a site that is perceived as over-crowded may make a site less desirable for some users. In other cases, the development of extensive support facilities, which often draws a larger number of users, may not be appropriate. Therefore, managing coastal access and ensuring that growth and development does not cumulatively impact the resource, involves managing not only the physical supply of access, but all the other variables that contribute to ensuring maximum coastal access.

The Coastal Act and LCPs have policies directed at several of these other variables. The Coastal Act identifies the need to enhance access to the coast by providing transit service and/or adequate parking (Section 30252), the need for support facilities (Section 30223), and the need to

Figure 4-1: Access System Diagram

SOURCES OF IMPACTS TO ACCESS



distribute facilities throughout the coastline (Section 30212.5). Most of the LCPs also recognize the need for beach parking and alternative transit options.

Resource Condition

Available data indicate that beach use has increased in the ReCAP area. Figure 4-2 and Figure 4-3 show levels of use for the City of Santa Cruz and DPR beach areas in the region.¹ Using a linear regression, these figures indicate a 45% increase in use for Santa Cruz City beach

Figure 4-2: Santa Cruz City Beach Use, 1982-1993

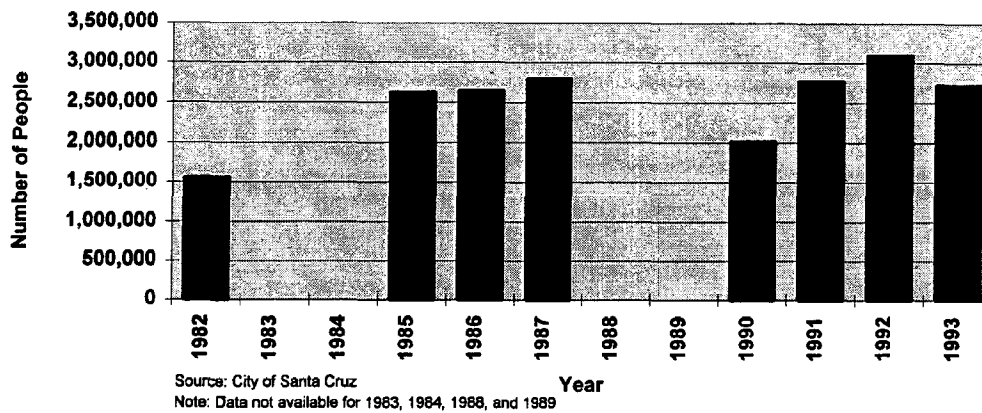
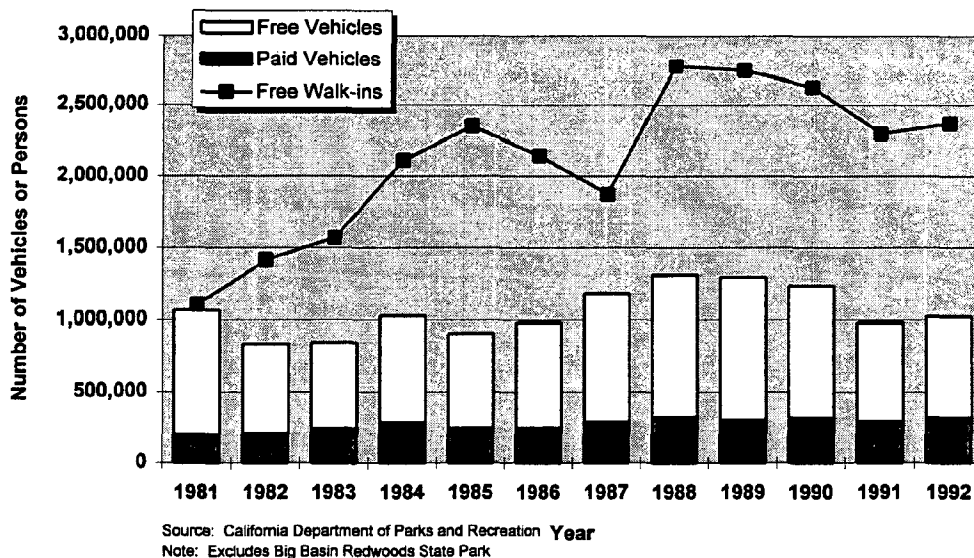


Figure 4-3: Use in Coastal State Park Units, 1981-1992



between 1982 and 1993. For State Parks, the increase in use is 83% in walk-in users, 18% in vehicles which pay no fee, and 55% in paid vehicles during approximately the same time period. If numbers of vehicles are converted to numbers of people, using DPR conversion factors,² the overall increase in use for the region's State Parks is approximately 50%. Comparison of this increase in use with the growth in population in the Santa Cruz and Monterey Counties indicates that beach use grew twice as fast as population increase during the same time period.³ Since at

least part of the growth in use is apparently from tourism, planning for adequate coastal access must address use issues beyond the local area, particularly issues such as parking and transit availability.

Coinciding with this overall increase in use is a rise in specialized sports, particularly, surfing, jet-skiing and other use of thrill craft, wind surfing, diving, hang-gliding, mountain biking on trails and on sandy beaches, equestrian riding, kayaking, and diving.^{4,5,6,7,8} Demand for boating facilities has also increased. Both Santa Cruz and Monterey harbors have historically been unable to meet demand for berths, and both have extensive waiting lists.^{9,10} With an increase in use and a diversification of activities in fairly confined areas, conflicts between users also become more common.^{11,12,13} This trend of increasing use and diversifying activities leads to many of the cumulative impacts evident in the region.

Increasing use generally leads to demand for additional supply, although an increase in supply may in itself generate more use by drawing more people to the area. Overall, the supply of lateral and vertical access in the pilot region has increased since 1981, both through the opening of several new beach areas and new stairways, and through significant improvements to existing areas of use by formalizing paths. (See Figure 4-4 on page 47 for location of access sites identified by ReCAP.) Numerous other projects enhanced access by providing easier lateral access along the coast; these include the Monterey-Pacific Grove Recreation Trail, the Spanish Bay Recreation Trail, improved access to the Santa Cruz Harbor, bike paths in Santa Cruz, and trails along several wetlands. (See Appendix A for detailed access improvements in the ReCAP area.)

Table 4-1: Shoreline Areas in ReCAP Region that do not Meet LCP Vertical Access Standards in 1994

Area	Miles (approx.)
Southern end of Natural Bridges	.3
West Cliff Drive except area near Almar St. stairs	1.5
Northern end of Cowell Beach	.15
Opal Cliffs Drive except at Key Beach (private, pay beach)	.6
Southern end of Capitola Beach to, and including, northern end of New Brighton State Beach	.5
Potbelly Beach, Las Olas Drive area	.35
Rio Del Mar area: Beach Drive and Via Gaviotta	.5
La Selva Beach area	.25
South of Manresa State Beach to area around Monterey Bay Academy	.8
South of Palm Beach and northern part of Zmudowski State Beach	1.3
South of Zmudowski State Beach and north part of Moss Landing State Beach	.45
Monterey Dunes Colony and near Salinas River Wildlife Refuge	1.9
Northern Marina Dunes area	.95
Fort Ord	4
Naval Postgraduate School area	.2
Hopkins Marine Research area	.6
Segment at Carmel River State Beach	.1

Note: For ease of reference, common names of beaches are used when possible. Beach names in this table do *not* mean that vertical access is completely unavailable at these beaches; vertical access is unavailable only along the *sections* of beaches noted above.

In order to meet the demand for the region and minimize overburdening of sites, vertical access sites should be distributed throughout the area. One measure of whether access is distributed and maximized is to compare available access opportunities with established standards. Both the Santa Cruz County and Monterey County LCPs have adopted standards for

vertical access for urban and rural areas.¹⁴ Based on these standards, approximately 75% of the ReCAP coastline that is physically suitable for public access currently provides such access; only about 15 miles of the shoreline that could support access, do not¹⁵ (see Table 4-1, previous page). However, although *vertical* access is not provided at these areas, many have good lateral access.

A second key issue in assessing the adequacy of public access is determining if improvements are keeping pace with population growth, use, and/or new development in the area. As noted in the Regional Overview section of this report, the ReCAP area has experienced significant development and population growth since 1981. Much of this growth has probably contributed to an overall increase in recreation use, even though much of the new development may not be in the coastal zone. Most areas in the ReCAP region show a general correlation between increased population and/or development and improved access. Physical access in Santa Cruz County improved approximately 36%, while access in Monterey County improved approximately 8%, leading to an overall increase for the region of approximately 21%. (For a full discussion of this analysis and how access was quantified, see Appendix B.)

Overall growth and development in the Monterey Bay area is expected to continue, although the amount of new development in the coastal zone may be minimal as the amount of vacant land diminishes. The use of access areas will also likely continue to increase, due both from increasing use within the region as population growth increases and from continued tourism from other areas. However, the amount of additional physical access possible is limited. Many beaches in the pilot region that currently do not support coastal access are unlikely to be able to support it in the future, due to geographic constraints or conflicts with other uses. Santa Cruz County currently provides access at approximately 88% of maximum possible; Monterey County currently provides access at approximately 59% of maximum. Overall, the ReCAP region provides access at 71% of maximum possible.¹⁶ (For a complete discussion of how maximum access was calculated; see Appendix B.) While these figures indicate the possibility of some additional access, particularly with the future development of coastal access at Fort Ord, ultimately the supply will become saturated. At that point, adding another stairway will have minimal benefits for coastal access. As use continues to grow, factors such as accessibility *to* sites and maintaining the quality of access sites will play an increasingly vital role in ensuring that maximum access is available to the population.

Since the above analysis indicates that the physical supply of access has generally kept pace with growth and development in the region, ReCAP focused additional analysis on some of the other variables that affect access. Based on available data and discussions with local recreation managers, ReCAP focused on: (1) the effectiveness of mitigation measures; (2) impacts from seawalls; (3) possible resource/access conflicts; (4) impacts to parking and accessibility to the coast; (5) access issues with regards to changing demands and demographics; and (6) the need for a more regional approach to access planning.

ACCESS PROBLEM ONE

Improvements Are Needed in the Implementation of Access Mitigation

To be fully effective in mitigating impacts to access from development, offers-to-dedicate must be recorded, accepted, and available for public use. Additional mechanisms may also be needed in the future to supplement the offer-to-dedicate process.

Santa Cruz County

NORTH SANTA CRUZ COUNTY COMPLEX

1. Big Basin State Park; Woodell Creek Beach
2. Greystone Rock Beach
3. Scott Creek Beach
4. Davenport Landing Beach
5. Davenport Beach
6. Panther Beach
7. Berry Doon Beach
8. Yellowbank Beach
9. Laguna Creek Beach
10. Red, White, and Blue Beach
11. Wilder Ranch State Park Beaches
12. Long Marine Laboratory *
13. Natural Bridges State Beach

WEST CLIFF DRIVE COMPLEX

14. West Cliff Overlook
15. Almar Avenue Stairway
16. Lighthouse Field State Beach
17. Pelton Avenue Stairway
18. Steamer Lane Stairway
19. Monterey Street Stairway
20. Conell Beach
21. Neely's Lagoon City Park
22. Santa Cruz Municipal Wharf
23. Santa Cruz Beach and Boardwalk
24. San Lorenzo River Bike Path
25. Santa Cruz Harbor
26. Twin Lakes State Beach
27. Sunny Cove
28. Corcoran Lagoon
29. Moran Lake Beach
30. Rockview Drive Overlook
31. Pleasure Point Beach and Overlook
32. East Cliff Drive Access Points
33. East Cliff Drive Overlooks
34. Coal Cliffs Beach

CAPITOLA COMPLEX

35. Hooper Beach
36. Capitola Wharf
37. Capitola City Beach
38. New Brighton State Beach

SOUTH SANTA CRUZ COUNTY COMPLEX

39. Pottery Beach *
40. Special State Beach
41. Rio del Mar Area
42. Hidden Beach
43. Seaside Accessway
44. Lunenburg Beach *
45. La Selva Beach *
46. Morro State Beach
47. Pico del Mar Area
48. Sand Dollar Accessway
49. Sunset State Beach
50. Pajaro River Bike Path
51. Pajaro Dunes Area

MONTEREY COUNTY

NORTH MONTEREY COUNTY COMPLEX

52. Zuniowski State Beach
53. Moss Landing State Beach
54. Kirby Park
55. Ekhon Slough Wildlife Areas
56. Moss Landing Harbor
57. Moss Landing Marine Laboratory
58. Salinas River State Beach
59. Monterey Bay Dune Colony
60. Salinas River Wildlife Area

MARINA COMPLEX

61. Dunes Drive Access
62. Marina State Beach
63. Locke Padden Park

SAND CITY/MONTEREY COMPLEX

64. Fort Ord *
65. Sand City Access Way
66. Roberts Lake
67. Monterey State Beach
68. Laguna Grande
69. Naval Postgraduate School beach area
70. Monterey State Beach (Windows on the Bay)
71. Monterey Beach Park
72. Del Monte Beach

MONTEREY CITY COMPLEX

73. Monterey Municipal Wharf #2
74. Monterey Marina
75. Monterey Fisherman's Wharf
76. Monterey Coast Guard Pier
77. Shoreline Park - East
78. Breakwater Cove
79. San Carlos Beach
80. Avenas Beach
81. McCrete Beach

PACIFIC GROVE COMPLEX

82. Hopkins Marine Laboratory
83. Berwick Park and Beaches
84. Shoreline Park - West
85. Lower's Point Park and Beaches
86. Perkins Park and Beaches
87. Monterey Peninsula Recreational Trail
88. Pt. Pinos Lighthouse Reservation
89. Asilomar State Beach

DEL MONTE FOREST COMPLEX

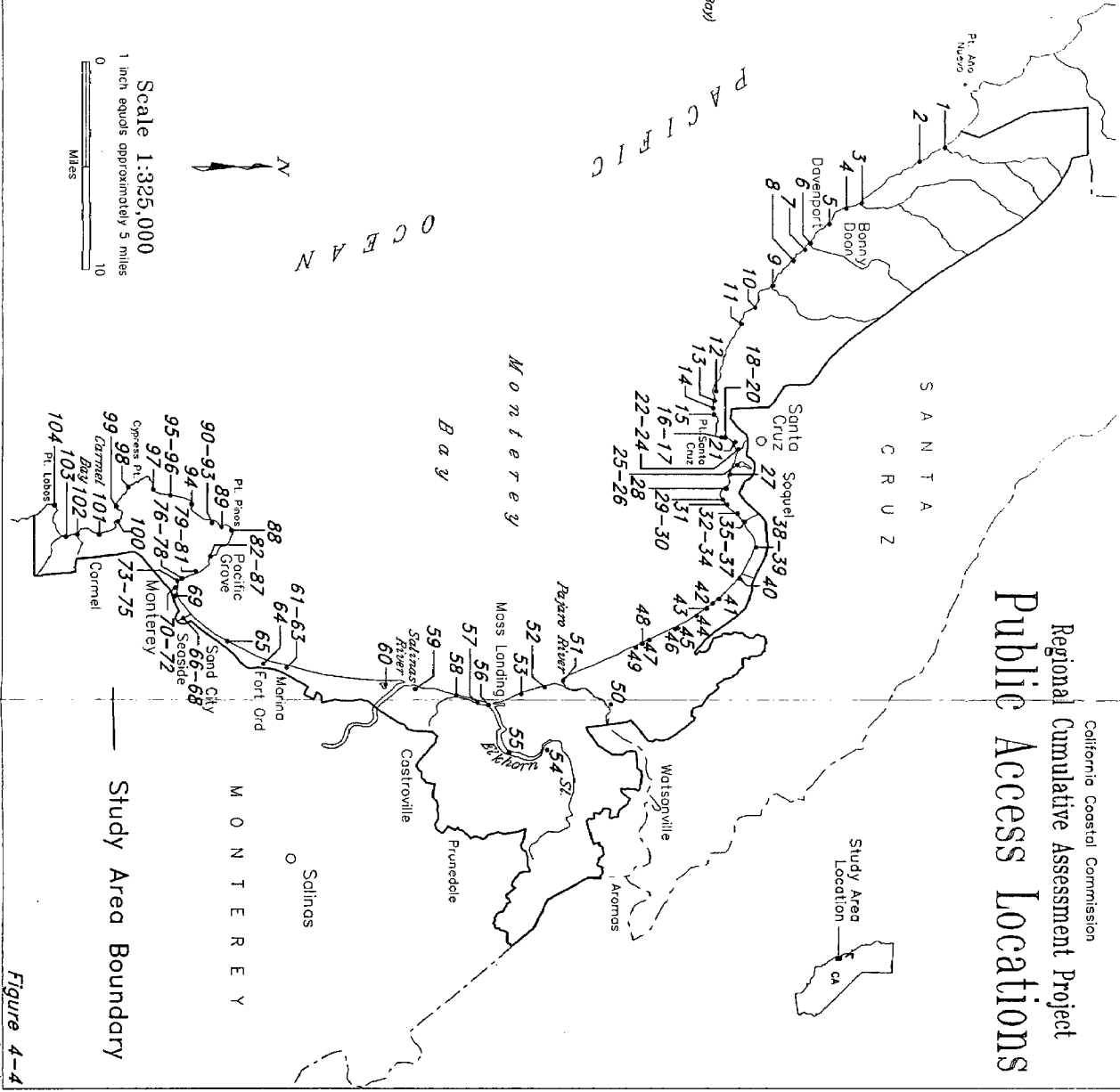
90. Spanish Bay Recreational Trail
91. Spanish Bay Shoreline Pedestrian Trail
92. Moss Beach - North
93. Moss Beach - South
94. Point Joe Overlook
95. Bird Rock Beach
96. Seal Beach
97. Farnsfield Beach
98. Midway Point Overlook
99. Pescadero Point Overlook
100. Silverwater Cove

CARMEL COMPLEX

101. Carmel City Beach
102. Carmel River State Beach
103. Carmel River Beaches

POINT LOBOS COMPLEX

104. Point Lobos State Reserve



California Coastal Commission
Regional Cumulative Assessment Project
Public Access Locations

Figure 4-4

APR. 11/94

ANALYSIS

Impacts to the physical supply of access from development may be evident through encroachment onto beach areas, blockage of accessways, and overall increases in use. One of the major tools that the Commission and local governments use to mitigate impacts on the physical supply of public access from new development is a condition requiring an offer-to-dedicate (OTD) a public access easement. OTDs are generally required only for development between the first public road and the sea. Although specific language varies, LCPs generally require an OTD as a mechanism to implement access mitigation. A lateral easement (along the beach) is generally required to compensate for the impacts to public use when development encroaches onto a public beach or impacts existing public access; a vertical easement is generally required when development would block access to the beach from the upland road or bluff. The easements themselves, however, do not ensure the availability of public access: once recorded as an OTD, the offers must then be accepted for management, and opened and managed by a public agency or acceptable nongovernmental association before the land becomes available for public use. LCPs do not currently require local governments to accept offers. Review of the OTD process in the ReCAP area indicates that: (1) the OTD recordation process and acceptance needs improvement; (2) exemptions limit the use of OTDs; (3) a review of whether OTDs are on public or private land is often not done; and (4) additional mechanisms may be needed in the future to supplement the OTD process. All these issues, discussed separately below, point to improvements needed to increase the effectiveness of OTDs in mitigating impacts on the physical supply of access.

Recordation and Acceptance of OTDs

Under the Coastal Act, the Commission has required 42 lateral and 23 vertical OTDs in the ReCAP region to mitigate the impacts of new development. Under the LCPs, local governments required another 6 lateral and 8 vertical OTDs¹⁷ (see Table 4-2, page 50). In general, the Commission and local governments required OTDs for shoreline protective devices, commercial development, subdivisions, and occasionally single family residences. Additional permits granted by the Commission and local governments incorporate access to the beach into the project and therefore are not conditioned with OTDs.

Generally, when the Commission or local government requires an OTD for mitigation of a development project, the condition language requires that the OTD be recorded prior to issuance of the coastal development permit. In some cases, the applicant will choose not to pursue an approved project, and will not need to meet conditions of a permit or obtain the permit. Since it is difficult to determine from Commission filing logs which permits have actually been issued, ReCAP attempted to verify issuance of coastal development permits using local government approvals. After a project is approved by the Commission, but prior to issuance of a coastal development permit, applicants must receive local building or grading permits. For those projects that required an OTD, but did not have one recorded, ReCAP attempted to determine if these local permits were issued. For those that did receive local permits, ReCAP assumed that the coastal development permit was also issued, and the OTD requirement would be in effect. For projects not receiving local permits, ReCAP assumed that the coastal development permit was also not issued, and since the new development would not be pursued, compliance with the OTD condition was not required.

Of the 79 projects requiring an OTD, eight had no building or grading permits issued; local permits for five projects could not be verified. Excluding the eight projects that had no local permit, 24 projects, approximately 30% of those projects requiring an OTD, did not have one recorded (36 lateral, 23 vertical).¹⁸ Of those recorded, some were done only after an enforcement action to ensure compliance with permit conditions. The impacts from the remaining projects have not yet been mitigated, resulting in a cumulative loss of beach access. To improve recordation of OTDs, the Commission and local governments need to improve

information tracking on projects with easement requirements. ReCAP has initiated steps to improve previous Commission access inventories to better track OTD requirements.

Table 4-2: Lateral and Vertical OTDs Required by Coastal Commission and Local Governments

Location	Lateral	Vertical
Davenport	1	2
Santa Cruz	17	6
Aptos	3	2
Capitola	9	1
Live Oak Area, Santa Cruz Co.	1	4
Rio del Mar	3	
South Santa Cruz County		2
North Monterey County	1	2
Moss Landing	3	
Marina	1	
Monterey	4	2
Pacific Grove	1	
Pebble Beach	3	8
Carmel	1	2
TOTAL	42	23

Note: Numbers do not include amendments with an easement requirement where the original permit was also conditioned with an easement.

Further, until the OTDs are actually opened, the impacts from the development are not fully mitigated as the land is still not available for public use. To date, only six of the recorded OTDs have been accepted by a managing agency and only one vertical accessway is actually open for public use.¹⁹ One barrier for local governments or private associations, including non-profit organizations, in accepting OTDs is a concern over potential liability; both Santa Cruz County and the City of Pacific Grove have indicated that liability is a concern in managing access areas.^{20,21} Section 831.4 of the State Government Code provides limited immunity for public entities managing land for public recreation. Non-profit organizations are protected under similar immunities for accepting coastal access easements if they enter into an agreement with the State Coastal Conservancy. Despite these immunities, concern over the extent of protection remains. Guidance via case law is limited; because of this uncertainty, liability will likely remain a concern limiting the acceptance of OTDs.

It is unlikely, however, that resolving the issue of liability will completely address the hesitancy of agencies to accept OTDs. Perhaps more of a constraint is the need to maintain an accessway once it is accepted, and the associated costs involved. This issue was identified early in the access program as a constraint to accepting OTDs, and remains an issue today.^{22,23} Given the current problem of funding maintenance programs, the reluctance to open new accessways will probably continue until agencies or governments are assured of sufficient funding or alternatives.

Exemption from OTDs

In reviewing development proposals for impacts on access, the Commission and local governments may exempt development proposals from requiring OTDs when access would conflict with public safety, habitat, agriculture or military use, or where "adequate access" exists nearby. Since 1983, the Commission and local governments exempted a total of 291 permits from OTD requirements in the ReCAP region. For many of these developments, the

Commission and local governments did not require other access mitigation. Of the exemptions, 151 were exempt due to a finding of adequate access.²⁴ However, the Coastal Act provides no guidance for what constitutes “adequate access”. The Statewide Interpretive Guidelines suggest that adequate access cannot be found laterally along any beach. For vertical access, analysis of whether adequate access exists should consider: (1) the amount of public use; (2) availability of support services; and (3) the location of pocket beaches.²⁵ Only two LCPs provide any guidance as to the amount of vertical access that is appropriate: the Santa Cruz County LCP requires vertical access every 1/4 mile in rural areas and every 650 feet in urban areas; the North Coast segment of Monterey County LCP requires vertical access every 1/4 mile.

Review of adopted permit findings generally discuss only whether vertical access is physically located nearby a proposed development, but do not take into account increasing use of a site, availability of facilities, or the quality of a site, all of which cumulatively affect access. Multiple development proposals will often cite the same accessway to indicate that an area has “adequate existing access”. For example, eight permits cited the 26th Avenue accessway in the Live Oak area as a reason for not requiring additional access mitigation to address impacts of new development. None of the permit findings analyzed the cumulative impacts from multiple development projects, the effect on the site from past increases in use due to adjacent development, any growing need for facilities -- especially parking -- due to increased use, or when new development begins to overburden the site. All of these factors affect whether an existing accessway is truly “adequate”.

Further, local governments exempted a number of permits from access mitigation due to findings of development being too dense to accommodate access, lots being too small to accommodate access, and sites not being designated as access sites in an LCP. However, in areas of dense development, the demand for access is probably high. Continued development will increase the demand for access and will overburden other access sites if additional access is not provided. One method of addressing these impacts is to develop a program of in-lieu fees for maintenance of existing accessways near the site location, the development of support facilities, or the development and maintenance of other accessways. For example, a policy in Sand City’s LCP states that where a dedication of access is not feasible, payment of an in-lieu fee for development and maintenance of other accessways should be done.

Public vs. Private Land

In order for an OTD to provide mitigation for development, the OTD should be on land that is not already publicly owned. To determine whether OTDs were being recorded against already public land, ReCAP reviewed permit files for a State Lands determination of the boundary between public and private land. This determination would indicate if projects, and the mitigating OTDs, were on public, state owned lands. Only 18 of the 40 projects conditioned with a lateral easement also required a determination by State Lands. For six of those projects, State Lands determined that the development was probably not on public land, but did not make a final determination. For these projects, it is likely that the OTDs are also on private land, thereby providing mitigation for the impacts from development. Of the remaining projects requiring State Lands review, seven had no determination in the file, and five files were not located in the Santa Cruz office. (Due to limited resources, staff was not able to check missing files in archives.) Since State Lands review is not completed for most of the projects, ReCAP could not determine the extent to which these OTDs are recorded on already public land.

Additional Planning Mechanisms Needed

Even though conditioning a permit to require an OTD is one of the primary methods to mitigate impacts on access, additional mechanisms may be needed in the future to supplement the OTD process. Recent court cases have emphasized the need to fully document impacts from development projects in order to mitigate those impacts. Due to the nature of cumulative

impacts, documenting the contribution of a single project to the overall impacts on access can be difficult. As buildout of a region and use of an area continues, the cumulative impacts on access continue; it is these impacts both to the physical supply of access and to other variables that comprise an access system which cannot be solely mitigated through review of permits and conditions requiring an OTD.

Further, the use of OTDs, even in cases where impacts can be fully documented, is likely to decrease. Staff review of aerial photos and land use maps reveals few vacant lots or areas of future subdivisions between the first public road and the sea. Further, since most of the pilot region conforms to access standards set forth in the LCPs, new development would likely be exempt from access requirements if adequate access nearby is determined under current procedures. Therefore, the Commission and local governments will have fewer cases where access impacts can be mitigated through project specific review and the use of access easements. The lack of available shorefront parcels, however, does not necessarily mean a decline on impacts to coastal recreation and access; inland subdivisions and development will continue to draw additional people to the existing accessways, as will continued tourism.

Given the limitations in the ability of OTDs to address the cumulative impacts to access, additional mechanisms should be developed to supplement this program. Ultimately an increase in vertical access easements or actual access points would have minimal benefit as the supply reaches saturation. When the availability of physical access is maximized, the question becomes one of managing an increasing and concentrated use, rather than increasing supply. The use of OTDs cannot address these issues. Development of a regional plan for public coastal access could help ensure continued access and could ensure that a number of other variables are addressed. The development of such plans is discussed under Access Problem #6. However, OTDs should continue to be used to mitigate site specific impacts to the physical supply of access.

RECOMMENDATIONS

- Revise Commission and local government procedures to improve the efficacy of existing mitigation measures, including measures to ensure recordation of all offers to dedicate prior to issuance of permits.
- Develop a regional strategy for improving mitigation of access impacts. This strategy should include measures to accept and open all lateral Offers to Dedicate easements, identify priorities for accepting and opening existing vertical Offers to Dedicate easements, and require new access mitigation through OTDs. This strategy should be one component of a regional management plan (discussed under Access Problem #6).
- Provide guidance for developing in-lieu fee programs or other mechanisms for the operation and maintenance of existing offers to dedicate access easements.
- Improve permit review procedures to address measures for obtaining State Lands Commission determination of the boundary of public and private lands as part of filing requirements.
- Improve permit review procedures to include guidance for considering cumulative impacts in the determination of whether access mitigation is exempt due to sensitive resources, public safety or adequate access nearby. Provide a guidance document and revise LCPs to require in lieu fees or other mechanisms, where appropriate, for support

facilities and maintenance of access sites when impacts to access result from factors other than a lack of physical supply.

ACCESS PROBLEM TWO

Improving Mitigation Of Shoreline Protective Devices

The use of shoreline protective devices negatively impacts shoreline access by encroaching onto beaches, leading to a loss of recreational beach area. Current mitigation efforts to minimize these impacts are not fully effective.

ANALYSIS

As noted in Section 3 of this report, shoreline protective measures cover an estimated 25 acres of beach²⁶ along 12 miles of coastline in the ReCAP region (8.3 miles in Santa Cruz County and 3.7 miles in Monterey County). Permits granted since 1978 under California's coastal management program represent approximately 20% of this total. Between 1983 and 1993, the Commission and local governments in the pilot region approved 96 permits for armoring. Although shoreline protective devices are found throughout the pilot area, they are concentrated from the City of Santa Cruz to Seacliff State Beach and in the Monterey City-Pacific Grove area. These areas also tend to be areas of high recreational use. The shoreline from Corcoran Lagoon Beach to Moran Lake Beach, along Pleasure Point, and along Opal Cliffs Beach is significantly affected by armoring, and provides an example of the impacts on public access. Approximately 1.4 acres of beach have been lost in this area, due to encroachment of armoring. Near Pleasure Point, rip-rap extends to the edge of the beach, making lateral access around the point impossible. Along Opal Cliffs, sections of armoring are strewn along the beach itself, degrading the quality of the beach and leading to public safety concerns. At the same time, use has probably increased in the area, due to general population increases in the region, the extent of tourism, and new development in the region. Review of aerial photographs reveals a significant amount of development in this region between 1979 and 1993.

In its review of development proposals, the Commission has found numerous times that armoring negatively impacts public access. The direct impacts on access are evident through encroachment onto the beach; the Commission has found that the development of shoreline protective devices can:

*impede access physically through construction adjacent to the mean high tide line or through "walling off" beach areas from public view and usage, eliminating or reducing the possibility of vertical accessways for public use and creating the appearance of a private beach.*²⁷

Although all shoreline protective devices encroach onto the beach to some degree, the amount of encroachment varies with the type of device constructed. Most of the protective measures constructed in the region are revetments, which encroach onto beach areas more than seawalls.

The Commission has also identified more indirect, but equally severe, impacts to public access, including effects on sand supply and erosion. Unless beach nourishment is undertaken, placement of a shoreline protective device may ultimately lead to a complete loss of a beach. With the placement of a shoreline protective device, a beach can no longer migrate landward; as erosion continues, whether through natural means or increased erosion due to the seawall, the

sand is not replaced, and the beach continues to erode away. During this process, the mean high tide line is moved landward; since public land, and therefore public beaches, is defined by the mean high tide line, its movement landward reduces the amount of land in public ownership and available for public use. Although it may not be possible to determine the loss of beach when reviewing individual projects, the cumulative loss of public land over time may be significant.

While Commission findings for shoreline protective devices in the ReCAP area generally discuss the potential impacts on a beach, the Commission and local governments required mitigation of those impacts in only approximately 38% of cases (36 of 96 permits). In most cases where the Commission has determined that armoring will affect access, it has required a lateral offer to dedicate a public access easement, dedicating the remainder of the beach area for public use. Thirty of the 96 armoring permits were for new shoreline devices; the remaining permits generally involved some form of repair, maintenance, or expansion to an existing shoreline structure. While some maintenance activities may not further impact access, new structures, as well as expansion and maintenance projects that push shoreline protective devices further seaward, may have significant cumulative impacts. More consistently requiring mitigation of impacts from these projects will reduce the cumulative loss to access.

A related issue that leads to access impacts is the lack of mitigation for seawalls constructed through the emergency permit process. As outlined in Section 3 of this report, emergency permits are temporary permits, requiring full review through the regular permit process. However, in the ReCAP area, many emergency permits did not receive a subsequent regular coastal development permit; at least some of these were repair and maintenance waivers of earlier projects, but a few remain enforcement questions. It is through the regular permit process that development projects can be fully reviewed for consistency with the Coastal Act or LCPs and impacts can be mitigated. Since emergency permits have minimal regulatory review, and by their nature are not conditioned to mitigate impacts, there is *no* compensation for beach loss, leading to a cumulative loss of public access, unless mitigation occurs through the subsequent regular permit process. For example, of the 24 emergency permits, 16 were granted in the Live Oak area of Santa Cruz, primarily adjacent to Moran Beach. Without mitigation, the loss of recreational opportunities to this beach alone may be significant.

In spite of the requirement to mitigate impacts from armoring, the mitigation may not be entirely effective. As discussed previously, OTDs do not actually mitigate loss of beach area until they are accepted and open for public use. Further, even with an OTD, the beach area will continue to erode; with the armoring in place, sand is not replaced, leading to an ongoing loss of beach area.

In general, LCPs seek to avoid impacts on public access from shoreline protective structures by requiring that they not reduce lateral access or adversely affect shoreline processes, including sand supply. However, the LCPs lack any specific criteria or standards to assess impacts and to reduce them. Of the certified LCPs, Sand City, Santa Cruz County, and the Carmel segment of the Monterey County LCP have policies specifying that shoreline protective devices should not restrict or impede access; the LCP for Santa Cruz City states that any development in the shoreline protection overlay area must protect or enhance free public access to and along the beach. Only the Sand City LCP specifies that development proposals must indicate *how* impacts to access will be prevented. The Del Monte Forest segment LCP lacks any language requiring that impacts to access be avoided. Both the City and County of Santa Cruz LCPs encourage revetments, which encroach further onto the beach than other forms of shoreline protective devices; new information on shoreline processes since these plans were certified may indicate more appropriate approaches to armoring. In addition, the North County and Del Monte Forest segments of the Monterey County LCP and the Santa Cruz City LCP specify that armoring can be used to protect public beaches. However, as discussed, the use of armoring will *not* protect a beach in the long-run; as noted in adopted findings by the Commission in several permits in the ReCAP area, shoreline protective devices “do not hold or protect the beach”.²⁸

As discussed in Section 3 of this report, if current policy implementation continues, 27.5 additional miles of shoreline in the pilot region may be armored. With this additional armoring, a total of approximately 65 acres of additional beach area, and possibly significantly more, would be lost to public access through the encroachment of shoreline protective devices. At the same time, as discussed previously, demand for coastal access is expected to continue. The cumulative result of this loss will be additional pressure and congestion at other sites. Minimizing the number of structures approved and the amount that shoreline protective devices encroach onto a beach will reduce impacts to access and help protect available supply of recreational access.

RECOMMENDATIONS

- Through implementation of the Hazard Management Recommendations in Section 3, revise procedures to reduce the amount and encroachment of shoreline armoring and to address emergency authorizations for shoreline protective devices.
- Within the pilot region:
 - Revise the Del Monte Forest segment LCP to require policies that shoreline protective devices minimize impacts to access.
 - Revise Santa Cruz City and County LCPs to modify standards for the type and design of shoreline protective devices to minimize encroachment.
 - Revise LCPs to develop criteria or standards to assess impacts from shoreline protective devices and require LCPs to identify how impacts to public access will be avoided.
- Provide guidance for alternative mitigation programs, including increasing the use of beach replenishment as alternative mitigation to shoreline protective devices. Ensure more consistent use of mitigation requirements on shoreline protective device projects.

ACCESS PROBLEM THREE

Conflicts Between Public Access and the Protection of Sensitive Resources Are Increasing

As the demand for coastal access continues to increase, and existing areas become more congested, pressure to add additional access to areas not currently providing it will increase, and/or informal use will expand to areas not already providing formal access. Since most of the areas that can easily support access are already developed to do so, the remaining potential access areas are in places with some sort of constraint -- particularly the presence of sensitive habitat or species. This conflict between providing access and protecting species will become more prevalent in the future.

ANALYSIS

Sensitive habitat and species are found along the shoreline and adjacent dunes throughout the pilot region; many of these areas already support coastal access. By definition,

sensitive habitat is susceptible to impacts from use: Section 30107.5 of the Coastal Act defines an "environmentally sensitive area" in part as "any area in which plant or animal life or their habitats ... could be easily disturbed or degraded by human activities and developments". Sensitive habitats include dunes, wetlands, and riparian areas. Of the 106 access sites identified by ReCAP, 21 are at or border wetlands, 25 occur nearby or at dunes, and 19 occur at or near streams; many access areas support multiple sensitive habitat types. Wetlands in the ReCAP area support passive recreation, boating, nature observation, fishing, and hunting; several wetlands have hiking trails and support facilities, including Waddell Creek Marsh, Antonelli Pond, Neary Lagoon, Elkhorn Slough, and Laguna Grande.

The issue of impacts to species due to human presence is not a new issue, but is well documented in general literature. Impacts can include trampling of vegetation, resulting in a direct loss of those species and a loss of habitat for other species; erosion from informal trails; accidental or intentional killing of animal species (i.e. crushing bird eggs); predation from domestic animals; and/or the abandonment of a species from a site. While some of these impacts may be fairly easy to mitigate -- for example defining trails to avoid species -- other uses are more difficult to manage due to inherent conflicts of shared areas -- for example, human presence near snowy plovers. Although currently the conflict between the snowy plover, a recently listed species, and human presence is receiving considerable attention, many other species are prone to impacts as well.

While these impacts are well recognized, quantifying them is often difficult, as information, when available, is often anecdotal. Impacts leading to species abandoning a site due to disturbance is particularly difficult to quantify, as it requires an on-going monitoring program, starting prior to any use of the site. Within the pilot area, there are numerous examples of impacts to resources as a result of human presence. Erosion due to unmanaged access and people creating informal paths to the beach is evident along most of the coastline in the Pacific Grove area and in the Manresa/La Selva area.^{29,30,31} Impacts to the dune system are evident at various state beaches from vehicle intrusion, foot access, and equestrian use (including Asilomar, Zmudowski, Moss Landing, Salinas State Beaches).^{32,33,34} Human activity may also be a factor in impacts to snowy plover nests.³⁵ The increase in the number of endangered species noted in some areas may also indicate increased disturbance.³⁶

Further, impacts to habitat may occur due to the management focus of agencies; agencies responsible for resource management often may have to balance use of resources. In some cases, as in Santa Cruz City and the San Lorenzo River mouth, the Recreation Department focus is solely on recreation, and does not recognize the river mouth as wetland habitat. Therefore, the River is managed for access and breached regularly to ensure access to the adjacent beach area, without considering the habitat impacts of the action.

Review of certified LCPs in the pilot region show that all LCPs, except the City of Watsonville's, recognize the potential conflict between access and resource protection and have policies seeking to prevent, or reduce, those impacts. Management measures typically include formalizing trails to reduce impacts; use of boardwalks; limiting uses in sensitive areas to low-intensity uses, nature study, education, research, and/or hunting; and directing access to less sensitive areas. Some of these actions taken in the pilot region have been at least partially effective in mitigating impacts that have occurred. Dune restoration at several state parks, particularly Asilomar, has been successful,³⁷ and the installation of boardwalks appears to have minimized impacts to dune vegetation. Guard rails installed along the bluffs in Carmel have somewhat reduced the number of random trails, but they remain a problem.³⁸

Once objectives and policies are in place to protect resources, monitoring of resources becomes critical to ensure that policies are being effectively carried out. As overall use increases and spreads to more areas with sensitive resources, the likelihood of impacts on sensitive resources increases, as does the need for monitoring. Without monitoring, attention is not given

to an area until the impacts have already occurred. While these impacts can sometimes be mitigated through restoration programs, restoration is not always successful, and in cases of species abandonment, it is extremely difficult to mitigate after-the-fact, even if the problem is known. Therefore, the goal should be to prevent the impacts from occurring. Neither the Coastal Act nor the LCPs require monitoring of areas, and do not establish criteria or methods to evaluate if impacts are occurring. Wetland management plans also do not require monitoring of impacts. Of the 19 wetlands with management plans in place or under preparation, 14 discuss public access (See Chapter 5, Wetlands, Table 5-15). However, none have criteria to measure and monitor the impacts from access, and only three of these have any kind of species monitoring. Seven wetlands currently show impacts from access, including erosion, vegetation loss, and disturbance of wildlife.³⁹

A policy used in several LCPs is to tie the amount of access an area can support to its carrying capacity. While in theory this rationale is perfectly appropriate, the carrying capacities of sites have not been determined, and therefore cannot be used to determine appropriate levels of access. Even if the carrying capacity is determined, monitoring will still be needed to ensure protection of resources.

In addition to monitoring, adequate enforcement of policies and regulation on use is necessary in order to protect resources. A lack of adequate enforcement of the beach closure at Wilder Beach has been cited as a reason for continuing impacts to the snowy plover^{40,41} and inadequate enforcement of activities including off-road vehicle use has also led to impacts to dunes.⁴² A lack of adequate enforcement is also a factor in increasing impacts in inter-tidal zones, particularly increased poaching.⁴³ Increased enforcement is especially important in areas with increasing use and where resource protection is dependent on restricted use if the intent of Coastal Act and LCP protection policies is to be carried out.

The LCPs for the cities of Marina and Sand City, and the Carmel segment of the Monterey County LCP identify areas that should not encourage access due to the presence of sensitive habitat. These areas include the southern end of San Jose Creek at Carmel State Beach, north of Dunes Drive in Marina, and areas north of Tioga in Sand City. Except for the Sand City LCP which specifies fencing or other measures necessary to protect the areas, the LCPs lack mechanisms to ensure their protection.

One area of potential future impacts is the Marina area of Monterey County. Over the last two decades, the City of Marina has grown significantly.⁴⁴ Review of aerial photographs shows a large number of vacant lots remaining in the Marina area. The area near Dunes Drive is zoned visitor service use, which includes overnight accommodations. However, this area also has significant amounts of sensitive shoreline habitat. If development continues to occur in this area, it is likely that dunes will be impacted, both through the development itself and through unmanaged access across the dunes to the beach area, particularly absent monitoring and enforcement of resource protection policies.

A third factor leading to cumulative impacts on sensitive habitat from access is a lack of adequate budgets. Limited budgets and insufficient staff with expertise in resource protection leads to a reduction or elimination of interpretive and resource management programs, and to the priority of recreational use over resource protection.⁴⁵ At least one agency responsible for providing both access and protecting resources has experienced a decline in staff over the years, and has emphasized law enforcement over other activities, including interpretive programs and resource protection.⁴⁶ Without a strong, on-going resource management program, growing demand for additional access will make balancing access and resource management more difficult.

RECOMMENDATIONS

- Provide guidance to establish baseline and on-going monitoring in areas where access and sensitive resources exist.
- Access management plans should be developed for recreation areas with sensitive habitat or species, including measures to ensure that management measures are put in place prior to increase in public access within these areas.
- Provide guidance for inclusion of access management components in wetland management plans (See Chapter 5, Problem Wetlands Problem #7).
- Encourage community groups to participate year-round in the Commission's adopt-a-beach program, including wetlands and dunes.

ACCESS PROBLEM FOUR

Cumulative Impacts to Reaching the Coast

Although the physical supply of coastal access has increased throughout the ReCAP area, the ability to reach access sites is increasingly more difficult, due in part to increasing numbers of users and overall development.

ANALYSIS

Ensuring accessibility to the coast is a vital element of complying with the Coastal Act's goal of providing maximum public access. Availability of parking for access areas and alternative transit serving access sites are both necessary to ensure accessibility. While the focus traditionally tends to be on providing parking, the availability of an effective transit alternative is becoming increasingly more important.

As overall use and development in an area grows, competition for existing parking will also increase, leading to increasing difficulty in reaching the coast. Both the Commission and local governments try to mitigate this impact on access by requiring parking as part of new development projects. By ensuring that parking is provided with new development, the Commission and local governments minimize increased competition for existing parking and the impacts on recreational use. Between 1983 and 1992, the Commission required approximately 3,115 parking spaces.⁴⁷

However, ensuring accessibility to the coast through such a project-by-project review of development and requiring additional parking as mitigation is only partially effective. While new parking may reduce the competition for existing spaces between the new development and recreational use, it does not address the direct increases in use at beach areas, and the resulting increased demand for parking. This is particularly true in areas, such as Carmel, where inadequate parking for recreational use has historically been a problem. As discussed earlier, use of access sites has grown significantly. However, of the new 3,115 parking spaces required by the Commission, only 456 are dedicated to beach use throughout the pilot region. It is unlikely that the additional parking is sufficient to meet a growing demand. Although few studies are available to track the supply and demand of parking for recreational use, studies for Santa Cruz City indicate that while parking in the beach area increased by approximately 2,400 spaces

between 1980 and 1987, demand for parking still exceeds the supply, leading to competition between residents and visitors.^{48,49} By 1987, parking deficiencies in the beach area were noted not only on summer weekends, but during the week as well. Requiring parking for new development will help minimize *additional* competition, but will not resolve the larger issue of accessibility to access sites. This concern of inadequate parking was an issue during LCP planning and development in many jurisdictions in the ReCAP area.^{50,51,52,53,54}

Although Section 30223 of the Coastal Act attempts to address the need for upland support for access areas, review of the ReCAP region indicates that implementation of this policy has not been entirely effective in providing a mechanism to ensure future access to the coast. Section 30223 states:

Upland areas necessary to support coastal recreational uses shall be reserved for such uses, where feasible.

Parking remains a significant issue in some parts of the pilot region, and few areas of the coast remain undeveloped and able to be used for support facilities.⁵⁵ In addition, few LCPs identify specific areas for upland support facilities. Although areas are zoned for visitor serving or commercial uses, specific areas for upland parking support are not identified. Thus, neither the Coastal Act nor LCPs assure that as use and development increase, support facilities for recreation, particularly parking, will also increase.

Ensuring access to the beach becomes much more difficult if adequate support facilities are not reserved before areas become built out. For example, in Carmel, many of the impacts to public access are the result of development patterns prior to the implementation of the Coastal Act and the LCP, which makes adding new access to the beach and providing additional parking difficult.⁵⁶

Improving the implementation of Section 30223 to ensure upland parking support can help increase accessibility to the coast; however, its success may be limited. Improvements can consist of specifically designating land for recreational parking and encouraging joint-use programs for new developments, whereby businesses that are closed on weekends and holidays make their lots available for visitor parking. Other areas in the coastal zone have required joint-use parking programs in approving new commercial or retail development along and nearby the coast. Even with these improvements, long-term expansion of parking will be limited, due in part to limited vacant land, especially near access sites, and competing demands for it. Even with an expansion in parking at some sites, the supply of parking is unlikely to keep pace with growing recreational use and demand.

Other factors also indicate that cumulative impacts are occurring to access through restricted parking availability, particularly through the increase in preferential parking programs and red curbing/no parking signs. These actions result from increased competition for limited street parking among users, particularly residential and recreational users, and further reduce the supply of on-street parking for recreational users. In the ReCAP region, the City of Capitola, the City of Santa Cruz in the Beach Hill and Beach Flats areas, and the Live Oak area in Santa Cruz County have all implemented preferential parking programs. The Beach Hill and Beach Flats program prohibit any visitor parking; the other programs do not completely prohibit public parking, but they greatly restrict it, making beach access more difficult. Commission staff has also observed an increase in No Parking signs and red-curbings in the region, particularly in the Live Oak area and South Santa Cruz County. Better controlling where these actions occur, and ensuring adequate mitigation for parking losses can help ensure access to the coast for recreational opportunities.

An increase in parking fees also affects the perceived availability of parking. In downtown Santa Cruz, parking is available, but the increasing cost makes access to the coast

more difficult.⁵⁷ Some State Park units also require a fee for parking. Although available data provides no clear evidence of the effect of fees on beach use,⁵⁸ the imposition of a fee probably contributes to increased competition for available free on-street parking.⁵⁹ This competition again lead to conflicts between visitors and residents, and will likely lead to a desire by local residents for some form of restricted parking.

While improvements can be made to increase the availability of parking, the limitations on expanding parking for an increasing demand necessitates additional mechanisms to ensure adequate access to the coast. Effective transit systems are becoming increasingly more important to ensure this access.

Most LCPs in the region have policies that support expansion of transit services. Section 30252 of the Coastal Act encourages expanded transit to ensure that new development does not negatively impact access to the coast. Section 30252 of the Coastal Act states, in part:

... new development should maintain and enhance public access to the coast by 1) facilitating the provision or extension of transit service ... 4) providing adequate parking facilities or providing substitute means of serving the development with public transportation, 5) assuring the potential for public transit for high intensity uses ...

Improvements to access through transit opportunities have been made in the ReCAP region. Beach shuttles run in the cities of Capitola and Monterey; although suspended for 1995-1997, a shuttle has also provided additional access in Santa Cruz City. However, even with policies that support transit, implementing the policies is often difficult under a project-by-project review of development proposals. In the past, transit has been required only to mitigate large development projects generating traffic.⁶⁰ In general, the Commission's role focuses on reviewing projects, with or without conditions to mitigate impacts, and is limited in its ability to encourage new transit programs, particularly those that extend beyond the coastal zone. However, much of the need for transit is from outside the immediate ReCAP area. Even in areas which have local transit to beaches and park-and-ride lots for out of town visitors, like Capitola, the need for transit directly from inland communities remains.^{61,62}

While the need for public transit will probably increase, the Commission and local governments' ability to require transit measures as mitigation for development under the Coastal Act or LCPs will remain limited. To the extent possible, the Commission should encourage additional transit options for recreational uses by working with local governments and ensuring that recreational needs are addressed in regional transportation plans and congestion management plans. The regional management plans discussed under Access Problem #6 also provide an opportunity to help develop an effective transit system for recreational use. Because needs for recreational users differ from commute users, simply adding buses to commute routes on weekends without some adjustments does not always provide adequate service for recreational users. To be effective, transit for recreational purposes need to ensure frequent service, transit stops in convenient locations for recreational uses, and the ability to bring recreational equipment on buses.

One recent proposal could begin to address the need for effective transit: The Santa Cruz County Regional Transportation Commission is working on improving transportation between Watsonville and Santa Cruz. While much of the focus of this effort is to ensure transit for commuters during the week, the Commission should work with the Transportation Commission to ensure that recreational needs are included in transit planning. The need for alternate funding and implementation of recreational transit service is crucial for this and other transit programs. Options to fund recreational transit programs, such as using fees from parking, should be considered.

RECOMMENDATIONS

- Provision of additional support facilities should be encouraged by:
 - Designating additional sites for upland parking and support facilities in LCPs.
 - Developing in-lieu fee programs for parking, transit, and shuttle programs to the extent possible.
 - Developing joint-use parking programs of commercial and other private parking for beach use in appropriate situations.
 - Developing guidelines for approval of preferential parking proposals, including the conditions under which such proposals could be implemented, such as: requiring baseline parking and user inventories prior to implementation, avoiding additional preferential parking programs absent accompanying public parking or transit expansion, and requiring monitoring of parking resources.
 - Improving interdepartmental coordination on issues of installing red curing and no parking signs to ensure impacts to access are minimized.
- Amend LCPs to specify that the implementation of preferential parking programs constitutes development under the Coastal Act, for which a coastal development permit is required.
- Develop framework for increased intergovernmental coordination in developing transit plans. Develop a memorandum of understanding to work with local governments on Regional Transportation Plans to ensure recreational transit needs are met.
- Develop guidelines to address the need for alternative funding for recreational transit. Guidance could include developing a system of user fees to pay for shuttles, encouraging shoreline businesses to help subsidize shuttles, and using parking fees to partially fund transit programs.

ACCESS PROBLEM FIVE

Responding To Changing Access Demands and Demographics

The Coastal Management Program needs to stay responsive to the region's changing demands for access opportunities and changing demographics.

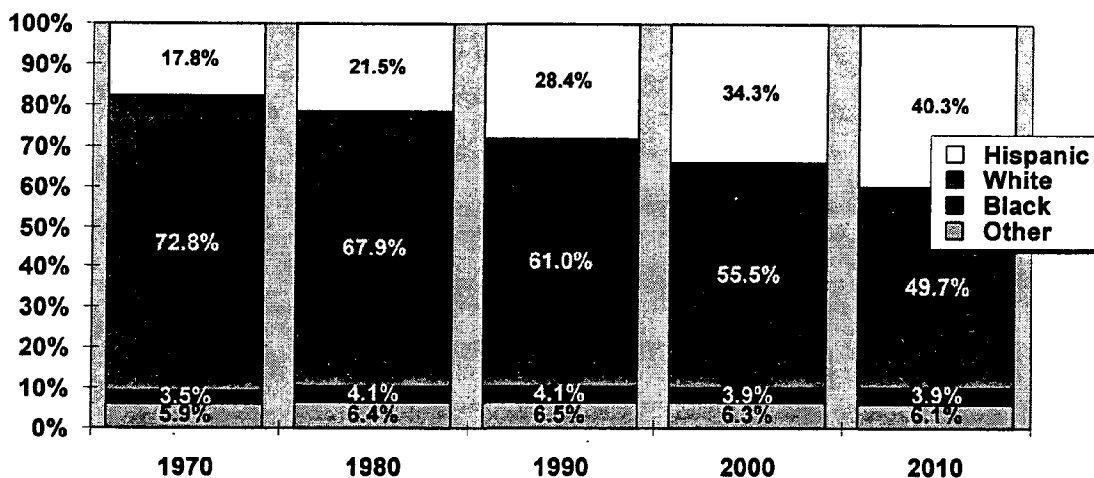
ANALYSIS

To maximize public access, an access program needs to match opportunities with demand for them. This demand will vary among different users groups, leading to the need for a diversity of recreational opportunities, and may change over time. While many changes in demand may result from the emergence of new types of recreational activities, changing demographics may also lead to new demands and may raises issues that were not previously

considered. While much is known about the demographics of the region, little information is available on the implication for coastal access management.

As shown in Figure 4-5, significant shifts are occurring in the region's demographics. Generally, the census data shows a rapid rise in the Hispanic community. By 2020, projections show a Hispanic majority in the state and the pilot region. Other demographics, such as the age of the population, may also be changing and may have implications for ensuring adequate public access.

Figure 4-5 : Ethnicity of Population, ReCAP Counties Combined, 1970-2020



Source: U.S. Census of Population and Housing (1970-1990); Department of Finance projections (2000 and 2010)
Figures may not round to total due to independent

A major constraint regarding this issue is a lack of available research and data. DPR's 1993 Recreation Plan states that recreational needs change with increasing ethnic diversity, in part due to different cultural values and uses.⁶³ Studies also indicate that additional steps, other than simply providing the physical access, need to be taken to ensure access for all groups of people; these steps include providing transit services from inland areas to the coast, addressing the potential lack of familiarity of coastal recreation opportunities, and ensuring that opportunities are relevant to the users and that facilities can accommodate different ways of use (for example, ensuring clusters of picnic tables for large groups).^{64,65,66,67} However, due to a lack of information and long-range planning, information on *whether* ethnic groups have differing needs, and if so, *what* those needs are, is not available. Therefore, it is difficult to assess if the current recreation and access system is responsive to the needs of the population.

Meeting the needs of all potential users is dependent on determining who those users are, what types of facilities are wanted, and what barriers which prevent or hinder access. As a first step to addressing this issue, ReCAP sought to do a comprehensive survey to determine what types of access and facilities were wanted, and what, if anything, hinders access to the coast. In order to obtain the necessary information, the survey needs to reach those groups of people who do *not* currently use coastal access sites. A general population survey would reach not only existing users of coastal access to determine what is not meeting their needs, but also those groups who do not use access sites. However, this objective quickly became infeasible, due to the time and cost involved. To obtain additional information on barriers to use of coastal access sites, ReCAP contacted representatives of community organizations. ReCAP sent surveys to 18 representatives and received seven responses. All seven respondents indicated that access to coastal recreation opportunities was "very important". The main barriers to use of sites were: inadequate parking/lack of access to sites, fees, and a lack of information about sites. The

majority of respondents indicated a need for better transit to the coast, additional parking, and additional facilities. The facilities cited as being necessary included improved access for handicapped users, facilities for groups, picnic facilities, and better diving access. The need for better maintenance of sites was also noted.

RECOMMENDATIONS

- The Commission should encourage research on recreation demands and changing demographics by sponsoring a workshop, focus groups or other discussions with community groups and recreation providers.
- The Commission should encourage survey research specifically addressing the issue of demographics and barriers to public access and use. The surveys should target non-users of access sites, and not only people at sites. One method of achieving this is to undertake a general population survey. These surveys should be updated and done periodically to continue to monitor changing needs.

ACCESS PROBLEM SIX

Future Management of Cumulative Impacts to Access

In spite of limited quantitative data, some qualitative evidence suggests that cumulative impacts are occurring to public access due to impacts on a number of variables other than physical supply. These variables include impacts to site quality, parking, and restrictions on use. In a number of cases, the existing framework of coastal access management through individual permits and LCPs does not adequately address these issues. Developing beach management plans and regional access plans may offer a more effective framework for addressing cumulative impacts to some factors of public coastal access.

ANALYSIS

As discussed previously, the Coastal Act requires protection of public coastal access opportunities. Regulatory review of new development proposals seeks to ensure that where development proposals will lead to negative impacts on access, those impacts are mitigated to protect access opportunities. While this review is generally effective in mitigating the loss of physical supply at specific sites, evidence indicates that cumulative impacts are occurring to overall site quality and accessibility to sites. Many aspects of ensuring public access are difficult to deal with through regulation of individual projects, as much of access planning requires coordination among agencies and departments. Further, since many of the impacts to these factors come from an overall increase in use of, and demand for, the resource, impacts may not be attributable to specific development projects; therefore, addressing impacts to these factors of access through mitigation measures on new development is difficult.

The LCPs generally focus on ensuring the physical supply of access by identifying access sites available at the time of certification within that jurisdiction. Many LCPs also identify where access dedications should be required for new development in order to protect access opportunities. However, as discussed under Access Problem #1, it is becoming more difficult to require such mitigation. In addition, many of the access sections of LCPs have not been updated since their preparation in the late 1970s and early 1980s. Although the LCPs are

effective planning tools for guiding the protection and provision of access and recreation areas in general, in order to address many of the cumulative impacts to access, they need to expand to provide guidance to daily management of access sites. The policies of an LCP generally are implemented through review of a development proposal, and are therefore not generally aimed at day-to-day management of beaches. Few access components have policies or mechanisms to address issues rising from increasing use, and do not respond to changing situations, such as changing priorities for access locations or emerging demands for new or different facilities.

Because LCPs are developed for individual political jurisdictions, the pilot area LCPs do not address regional issues, particularly the distribution of access, the prioritization of facility development throughout a region, the availability of a diversity of recreational experiences, and regional transportation for access. Ensuring that access is provided throughout a region and that access improvements are placed where the demand is greatest is difficult under a program implemented through a project-by-project review and mitigation of site impacts.⁶⁸ Further, since use of the resource is not limited to users from a single jurisdiction, and the resource itself crosses jurisdictions, many of the issues involved with providing for and managing access also span jurisdictions. For example, in a number of cases in the pilot region, a stretch of beach is governed by different management entities where a beach is divided by political jurisdictions. In the City of Santa Cruz, the beach in front of the Santa Cruz Harbor is managed by the Port District, while immediately adjacent, DPR manages Twin Lakes State Beach. Although the beach between New Brighton State Beach in Santa Cruz County and Moss Landing State Beach in Monterey County is essentially an unbroken stretch of beach, it is managed by several different entities, including DPR, private owners, and the two counties.

In order to address the cumulative impacts to public access that are not being fully addressed through the current regulatory framework, different planning mechanisms may be more effective; developing management plans will provide guidance for recreational departments and ensure that daily management carries out the broader objectives of the Coastal Act and LCPs. Regional and site specific management plans can help address the cumulative impacts to those management issues that single LCPs and project-by-project review of development in the region cannot. Management plans could also incorporate some of ReCAP's other access recommendations and can provide a tool to address the conflicts between access and sensitive resources, including wetlands.

Many of the cumulative impacts to access result from an overall increase in use of beach areas. Other impacts result because of increasing trends that LCPs in the pilot region do not currently address, such as beach curfews and fees, and other impacts result from competing objectives within departments of a local government or between local governments.

One of the basic objectives an access management plan can address is mediating among a wide range of use conflicts. As use of sites continues to grow, and congestion at sites continues, the problems with competing uses at a site also increase. Without addressing these conflicts, the perceived availability of access and the quality of the recreational experience is affected. One example of a conflict in use affecting site quality centers around alcohol use at beaches. When Santa Cruz City imposed a ban on alcohol in the mid 1980s at Cowell Beach and Main Beach, law enforcement problems declined, improving the overall quality of the recreational experience.⁶⁹ As a result, family use of these beaches increased. However, undesirable activities and resulting impacts on site quality may have moved to unregulated beaches. A similar situation was seen when dogs were banned from some beaches. In order to avoid impacts from simply being transferred from beach to beach, regional management plans can establish which beaches are appropriate for what uses and ensure that site quality, overall recreation quality, and a diversity of experiences is maintained for the maximum users.

Also evident in the pilot region are other examples of impacts to site quality. For example, clean dredge spoils from Santa Cruz Harbor are often placed directly on Twin Lakes

State Beach. Dredging operations, while helping to maximize boating opportunities and safety in the harbor, also can have significant impacts on beach access opportunities: stretches of beach are closed while the dredging occurs, and spoils emit unpleasant odors and attract large number of seagulls; thus the area is generally unattractive to beach users. However, it is important to ensure that the dredged sand remains in the shoreline system to maintain area beaches. The mitigation measures required for the Santa Cruz Harbor dredging provide examples of how to mitigate impacts and ensure maximum access: conditions require that spoils be placed during times of low recreational use and must be graded onto the beach.⁷⁰

Another example of impacts to site quality occur from polluted runoff draining onto beaches, as occurs from Schwan Lagoon to Twin Lakes State Beach and from Neary Lagoon to Cowell Beach. Concern over, and reports of, degraded water quality at some sites in the pilot region are increasing; however, it is unclear if these reports are due to increased pollution, better monitoring, increased awareness and publicity, or a combination of these factors.^{71,72} Regardless, beach closures throughout the region impact the availability of public access. A degraded access site, or one that is perceived to be unsuitable for use, may reduce the desire of people to use the site, reducing the actual opportunities available to the public. The loss of opportunities at these sites may in turn lead to increasing use and congestion at other sites. A site management plan can be instrumental in assuring these types of issues are addressed in ways that protect beach access.

A number of cumulative impacts also result from a trend of increasing restrictions on access opportunities, including growing use of beach curfews and new and/or increased fees. In the ReCAP area, approximately 30% of the access sites ReCAP identified restrict hours.⁷³ Although ReCAP does not have historic data detailing when restrictions on hours were imposed, or when they changed, the trend of limited hours seems to be more prevalent in recent years: for example, after DPR imposed a curfew at Twin Lakes State Beach in the Live Oak area of Santa Cruz, the County supervisors imposed a curfew at their adjoining beaches. Data in 1981 indicates that at that time few beach areas restricted hours of use.⁷⁴ As the imposition of curfews spreads, access opportunities are lost not only at the specific beaches, but at a wider, regional area. One example of the loss of access opportunities is the inability of surfers, fishermen and other users to reach sites early in the morning.⁷⁵

The imposition of fees is another trend that can cause significant changes in use of sites and adjoining uplands. Review of use data for DPR units in the pilot region cannot specifically correlate a change in use with the imposition of fees, particularly as many other factors may affect the use of a site.⁷⁶ However, staff observation indicates significant changes in use at several State Beaches since fees were imposed.⁷⁷ Moss Landing State Beach has provided historic access for sport fishing; after DPR imposed a day use fee, staff observed a significant decline in use of the Park by fishermen. At the same time, the number of sport fishermen using the South Harbor at Moss Landing and the Moss Landing Wildlife Area increased. This displacement in use has led to secondary impacts at these other sites: the South Harbor area has no facilities to support the increase in use by fishermen, leading to conflicts with parking and operation of the commercial harbor. Use at the Moss Landing Wildlife Area has led to resource impacts.

A second example of impacts from fees is observed at Palm Beach State Park.⁷⁸ Since DPR imposed fees at Palm Beach, staff observed increased parking along the side of the road. This trend raises not only safety concerns, but, since the roads border wetlands, result in resource impacts to these wetlands. Further, the fees may restrict lower-income users, particularly for fishing.

Intra- and inter-jurisdictional conflicts can also lead to cumulative impacts to access. Occasionally, an action taken by one department within a government contradicts the coastal access and recreation goals of another department. For example, staff observation in the ReCAP

area indicates that in a number of areas, when residents perceive congestion due to beach use, they call the local public works departments and ask for "No Parking" signs to be installed or for curbs to be painted red; staff has observed this in the Live Oak and south County areas of Santa Cruz.⁷⁹ However, it appears that the public works departments do not always coordinate with the other departments responsible for maintaining public access to ensure that public access will not be compromised. In many areas, street parking is vital to ensure public access to the coast.

Different departments within a local government may also have competing objectives. When planning is undertaken in different departments, those competing objectives are difficult to correlate and require coordination. At Neary Lagoon and the San Lorenzo River Mouth, the City of Santa Cruz must manage both recreation/habitat values and ensure neighboring property against flooding. However, actions taken for either objective can affect the other.⁸⁰ A management plan can help resolve potential conflicts between such objectives.

Another example of such inter-jurisdictional conflicts occurs when interpreting some of the general policies in LCPs. For example, the Commission and City of Santa Cruz interpret policies regulating what development can occur on the beach differently.⁸¹ A management plan can help ensure consistent application of policies and ensure that development on and adjacent to beach areas does not negatively affect access.

Since different issues relate to different geographic scales, different management plans should be developed for both individual access sites that are experiencing cumulative impacts and for a region. Management plans designed for the site level should address use numbers, user conflicts, upland support at the sites, habitat concerns at the site, and operation and maintenance. A beach management plan should also include procedures for coordinating intra-jurisdictional actions to ensure that actions from one department do not counter another department's access objectives.

Regional management plans should address overall parking availability and transit; habitat issues; priorities and distribution for access and support facilities, with an objective of providing a diversity of recreational experiences (i.e. urban, developed beaches versus rural, solitary beaches); and assuring that access priorities meet demand. Such regional plans should also establish priorities for opening and accepting offers to dedicate new access. Since many times adjacent beaches are managed by different entities, a regional management plan should also address interjurisdictional actions and include measures to minimize the effects of one action on another area.

Due to limited existing data, management plans should also develop mechanisms to track and monitor the data necessary to improve the provision of public access. This data include: use figures; the amount, type, and location of support facilities; change in facilities; ongoing maintenance; water quality; fees and limited hours; user needs; and sensitive species. This information is necessary to evaluate the extent to which cumulative impacts are occurring and the extent that those impacts are affecting use of sites. Currently, even basic information such as the number of users to a site was obtainable only for State Park units and for the main beach in Santa Cruz City. Use data provides the foundation for understanding access use and demand, determining whether increases in facilities match demand for them, and determining cumulative impacts to the resource. More accurate data will help develop more responsive policies.

In a number of cases, a management plan can be developed by supplementing an existing plan or process to incorporate the issues discussed above. For example, DPR has developed General Plans for each of the State Parks in the region; these plans can be updated to include management measures to address cumulative impacts. Current regional planning efforts may also be able to address some of the issues in a regional management plan. As discussed in Access Problem #4, Santa Cruz County is currently undertaking a regional transportation

planning effort. By working with the County on this and other regional transportation efforts, such as congestion management plans, the issue of a regional transportation network for beach access can be incorporated. The development of the Monterey Bay National Sanctuary also provides opportunities to address access management through the coordination of coastal planning and management authorities in the region.

While development of a beach management plan or a regional management plan will provide the most comprehensive mechanisms for dealing with multiple sources of cumulative impacts, other mechanisms may be sufficient in cases where cumulative impacts are limited to a specific issue. In these cases, tools such as Memorandums of Agreement between the Commission and local government or between departments within a local government may be able to address the problem.

RECOMMENDATIONS

- Develop guidance documents and implement methods to collect and retrieve data necessary for cumulative impact analysis.
- Develop guidance documents for developing beach management plans and regional management plans which suggest new mechanisms to address cumulative impacts.
- Prepare a Beach Management Plan for City of Santa Cruz Main Beach as a pilot project to guide preparation of guidance documents.
- Work with other local governments in the pilot region to prepare management plans.
- Work with DPR to update their General Plans to include management of cumulative impacts.
- Where appropriate, develop MOAs or other agreements with local governments to resolve issues leading to cumulative impacts on access.

¹ Department of State Parks and Recreation day use data is calculated by paid walk-ins, paid group walk-ins, free walk-ins, and free and paid vehicle. ReCAP has not included data for paid walk-ins and paid groups, as these groupings were seldom reported on.

² DPR most frequently uses a conversion rate of 3.2 people per vehicle. The 50% increase shown in this analysis holds within +/- 3% for conversion factors ranging from 2.0-3.0 people per vehicle.

³ Population growth based on Department of Finance Estimates, 1976-1993.

⁴ Mitchell, Dave and Gretchen Iliff. Santa Cruz County: Parks, Open Space and Cultural Services. Personal Communication. September 9, 1993.

⁵ Culbertson, Bob. California Department of Parks and Recreation. Santa Cruz County District. Personal Communication. November 4, 1993, and November 30, 1993.

⁶ Jones, Paula; Dave Dixon; Glen McGowan; Rick Surmon; and Mark Ikenberry. State Department of Parks and Recreation. Monterey County. Personal Communication. December 15, 1993.

⁷ Smith, Sally and Frojon Banwell. Surfrider Foundation. Personal Communication. November 30, 1993.

⁸ Lobay, Anthony; Bob Davis; and Vern Yadon. City of Pacific Grove. Personal Communication. September 10, 1993.

⁹ Scheiblaue, Steve. Harbor Master, Santa Cruz Harbor. Personal Communication. August 31, 1993

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- ¹⁰ Bowhay, Brooks. Harbor Master, Monterey Harbor. Personal Communication. September 3, 1993.
- ¹¹ Smith, Sally and Frojon Banwell. Ibid.
- ¹² Culbertson, Bob. Ibid. November 4, 1993, and November 30, 1993.
- ¹³ Scurich, Carol and Rick Gould. City of Santa Cruz. Personal Communication. September 10, 1993.
- ¹⁴ Santa Cruz County adopted standards requiring access every 1/4 mile in rural areas and every 650 feet in urban areas. Monterey County adopted standards only for the North County segment requiring access every 1/4 mile; ReCAP generalized these standards to the entire county.
- ¹⁵ Two areas of the pilot region--Northern Santa Cruz County and the Del Monte Forest--were not included in this assessment due to the physical infeasibility of increasing vertical access beyond what currently exists. These two regions correspond to approximately 50 miles of the coast.
- ¹⁶ Although these figures represent a comparison between the two counties and offer a general assessment of physical access improvements and the ability to further increase vertical access opportunities, the percentages may include some beaches that are not suitable for *maximum* recreational development for reasons other than geography: for example, the presence of sensitive habitat. Therefore, the actual amount of future access possible may be less than indicated.
- ¹⁷ These figures do not include permits conditioned by the local government requiring an *easement* for lateral or vertical access; easements differ from OTDs in that easements are generally dedicated to a local government and are available for public use after recordation occurs. Further, these figures do not include Commission or local governments conditioned to require an OTD for a trail, which provide additional access.
- ¹⁸ If the five permits where local grading or building permits cannot be verified are excluded, the percent of projects complying with the OTD recordation requirement is approximately 23%.
- ¹⁹ As noted previously, the additional access *easements* required by local governments do provide access for public use.
- ²⁰ Mitchell, Dave and Gretchen Iliff. Ibid.
- ²¹ Lobay, Anthony, et al. Ibid.
- ²² California Coastal Commission. *Coastal News: Standards and Recommendations for Coastal Access*. 1980.
- ²³ Mitchell, Dave and Gretchen Iliff. Ibid.
- ²⁴ An additional 49 Commission permits and 16 local government permits did not require OTDs because access improvements were incorporated into the development proposals. These improvements however are not always lateral or vertical access.
- ²⁵ California Coastal Commission. *Statewide Interpretive Guidelines*. 1981.
- ²⁶ As discussed in Section 3, this figure is calculated by estimating that seawalls extend 4 feet onto a beach and revetments/rubble walls extend 20 feet onto a beach.
- ²⁷ Commission adopted findings, including for permits 3-87-86; 3-88-51; 3-83-176-A1; 3-83-176-A2; 3-84-75-A; 3-84-83.
- ²⁸ Department of Boating and Waterways. *Shore Protection in California*. 1976. Adopted by Commission findings, including permit 3-87-86.
- ²⁹ Lobay, et. al. Ibid. 1993.
- ³⁰ Roseth, Brian. Planning Director, City of Carmel. Personal Communication. December 10, 1993.
- ³¹ Everly, John D. III. *No Trespassing: Incremental Loss of Coastal Public Access in California*. 1993.
- ³² Monterey Bay Dunes Coalition. *Monterey Bay Dunes*. 1989; revised 1991.
- ³³ Coastal Development Permit Files #3-87-258 and #3-86-011.
- ³⁴ Jones, et. al. Ibid. 1993.

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- ³⁵ Page, Gary. Point Reyes Bird Observatory. Personal Communication. May 13, 1994.
- ³⁶ Jones, et. al. Ibid. 1993.
- ³⁷ Coastal Development Permit File #3-87-258.
- ³⁸ Roseth, Brian. Planning Director, City of Carmel. Personal Communication. December 10, 1993.
- ³⁹ California Coastal Commission. *ReCAP Wetlands Database*. 1994.
- ⁴⁰ Page, Gary. Ibid. May 13, 1994.
- ⁴¹ Gray, Ken. Department of State Parks and Recreation. Personal Communication. February 11, 1994.
- ⁴² Monterey Bay Dunes Coalition. Ibid. 1989; revised 1991.
- ⁴³ Jones, et. al. Ibid. 1993.
- ⁴⁴ Analysis based on review of 1979 and 1993 aerial photographs.
- ⁴⁵ Department of State Parks and Recreation. *California Outdoor Recreation Plan: 1993*. Sacramento, CA. 1994.
- ⁴⁶ Culbertson, Bob. Ibid. November 30, 1993.
- ⁴⁷ This figure is probably an underestimation, as some files did not have specific numbers of parking spaces.
- ⁴⁸ *City of Santa Cruz Beach Area Plan*. 1980.
- ⁴⁹ DKS Associates. *Beach Area Transportation Study for Santa Cruz City*. 1987.
- ⁵⁰ Arthur D. Little, Inc. *Draft Working Paper 2: Cannery Row Local Coastal Plan*. 1978.
- ⁵¹ Monterey County Planning Department. *Carmel Coast 400 Series Draft Background Data Reports*. 1980.
- ⁵² City of Capitola. *Local Coastal Plan*. 1981.
- ⁵³ City of Carmel. *Local Coastal Plan*. 1981.
- ⁵⁴ City of Santa Cruz. *Local Coastal Plan*. 1985.
- ⁵⁵ Based on review of 1978 and 1993 aerial photos.
- ⁵⁶ City of Carmel. *Local Coastal Program: Land Use Plan*. 1981.
- ⁵⁷ Scurich, Carol and Rick Gould. Ibid.
- ⁵⁸ Department of State Parks and Recreation. Use data. 1981-1992.
- ⁵⁹ While ReCAP has no concrete data on the extent of this problem, informal observations suggests the problem exists at Seacliff, Manresa, and Moss Landing State Beaches.
- ⁶⁰ The Commission has required a shuttle as mitigation for the development of the Monterey Bay Aquarium; however, in most cases the necessary connection between the development and transit issues probably cannot be made, since much of the problem stems from increased use and congestion overall. Individual development projects may add to the problem, but cannot be required by themselves to fund a shuttle, nor would it probably be effective on a project by project case.
- ⁶¹ Fry, Linda. Santa Cruz Metro Transit. Personal Communication. September 30, 1993.
- ⁶² Scurich, Carol and Rick Gould. Ibid.
- ⁶³ Department of State Parks and Recreation. Ibid. 1994.
- ⁶⁴ Department of State Parks and Recreation. *California Outdoor Recreation Resources Plan*. Sacramento, CA. 1973.
- ⁶⁵ Department of State Parks and Recreation. Ibid. 1994.
- ⁶⁶ Allison, Maria T. "Problems of Access and Ethnic Boundary Maintenance." *In Proceedings of the Symposium on Social Aspects and Recreation Research*. United States Department of Agriculture. 1992.
- ⁶⁷ Healy, Doug. Department of State Parks and Recreation. Sacramento. Personal Communication. October 6, 1993.

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- ⁶⁸ Dickert, Thomas. "Limits to the *Ad Hoc* Approach", in Fawcett, James A, Andrew T. Manus, and Jens C. Sorensen, eds. *Proceedings of a Forum on Recreational Access to the Coastal Zone*. 1979.
- ⁶⁹ Strnad, Les. California Coastal Commission. Personal Communication. July 27, 1995.
- ⁷⁰ California Coastal Commission. Coastal development Permit #3-86-175.
- ⁷¹ Seurich, Carol and Rick Gould. Ibid.
- ⁷² Ricker, John. Santa Cruz County Environmental Health Services. Personal Communication. August 24, 1993.
- ⁷³ California Coastal Commission. ReCAP Database.
- ⁷⁴ California Coastal Commission. *California Coastal Access Guide*. 1981.
- ⁷⁵ Smith, Sally and Frojon Banwell. Ibid.
- ⁷⁶ Department of State Parks and Recreation. Use Data. 1981-1993.
- ⁷⁷ Strnad, Les. Ibid.
- ⁷⁸ Strnad, Les. Ibid.
- ⁷⁹ Locklin, Linda. California Coastal Commission. Personal Communication. July 24, 1995.
- ⁸⁰ California Coastal Commission. Coastal Development Permits #3-92-15 and #3-90-31.
- ⁸¹ Strnad, Les. Ibid.

5

WETLANDS

SUMMARY

This chapter examines both wetland resources and the institutional framework used to determine how these resources are protected and managed. The historic, current and projected status of wetland morphology (acreage, fragmentation, and habitat), physicochemical processes (hydrology and water quality), and biodiversity are presented. Institutional analysis focuses primarily on the California Coastal Management Program (CCMP), as implemented by the Coastal Commission and local governments, and secondarily on other federal and State statutes governing wetlands.

PROBLEMS

Wetland resources within the ReCAP region have suffered significant adverse impacts over time. Results from this project generally indicate that:

- The most dramatic adverse impacts occurred in the century predating the Coastal Act (i.e., pre 1970's), although adverse impacts have also occurred more recently.
- Most adverse impacts are human-induced, both directly from activities occurring in and around wetlands and indirectly from other activities occurring in the associated watersheds.
- Many adverse impacts have resulted in smaller, scattered wetlands, altered hydrology, deteriorated water quality, and reduced biodiversity.
- The cumulative impacts to wetland resources and the current status of these resources are best illustrated through qualitative information and specific examples rather than quantitative information, due to a lack of appropriate data and/or analyses that are beyond the scope of ReCAP.
- Conditions currently exist that adversely affect wetlands within the region. In some cases (e.g., the building of roads or dams), the adverse conditions have persisted over long periods.
- Continued development pressures and regulatory gaps may lead to additional adverse effects.
- Various efforts, although sometimes uncoordinated, are being made to prevent and correct some adverse conditions, especially through the development of wetland management plans.

A framework for regulating adverse affects to natural resources, consisting of the California Coastal Act, the Clean Water Act, and the California Environmental Quality Act, among others, was institutionalized in the early 1970's. By and large, the resulting regulations have prevented significant additional adverse wetland impacts from new development. However, these laws contain several exemptions that limit their universal application, especially for pre-existing land use activities. Various implementation deficiencies also limit the

effectiveness of these laws. Limitations on wetland fill are most stringent, while limitations on other types of activities in wetlands (e.g., vegetation removal or draining), and limitations on detrimental development adjacent to wetlands (such as those causing abnormal erosion) are less stringent. A lack of readily available information further limits the ability of regulatory programs to address cumulative adverse impacts to wetlands.

A variety of approaches are possible to address the existing procedural deficiencies. For instance, changes in the way some regulations are implemented to improve consistency would benefit both the regulatory agencies and the regulated community. Additionally, numerous wetland management plans have been and are being prepared to address current wetland issues. Recent and pending federal legislation to control nonpoint source pollution promises new mechanisms at the watershed level to further reduce wetland degradation.¹ Notably, this new generation of comprehensive wetland- and watershed-based planning and regulation, and the resultant information generated, has occurred since the project area's local coastal programs were originally adopted. The challenge faced by the Commission and local governments is to incorporate these new approaches into the CCMP, while continuing to support currently successful protective efforts.

RECOMMENDATIONS

ReCAP's analyses show that in order to more fully address cumulative impacts, wetland issues should be addressed in a comprehensive, watershed-based framework, which is contrary to the typically fragmented practices of the past. The primary recommendation is to establish a regional framework to set priorities, coordinate, provide technical assistance, and otherwise guide preparation and implementation of wetland and watershed management plans (see Wetlands Problem #7). The apparent best course of action is to capitalize on the recently-initiated Monterey Bay National Marine Sanctuary's Integrated Coastal Management (ICM) process, which is currently working to complete a water quality protection program. It is within the ICM framework that specific watershed and wetland management planning should continue, so as to address local concerns from a regional perspective. This chapter recommends some guidelines for preparing wetland management plans and processes for integrating these plans into the CCMP.

In conjunction with this overall recommendation, ReCAP recommends specific improvements in the following categories:

- short-term, procedural improvements to the CCMP (i.e., to the appropriate local coastal programs and Coastal Commission operations) to better achieve policy objectives and prevent cumulative impacts.
- longer-term strategies to further comprehensive wetland and watershed management.
- opportunities for further research, data analyses, and integration of the resulting information.

These opportunities for further research are based on an evaluation of what information is currently available. They are presented so as to be available to universities and others interested in pursuing wetland issues, rather than as recommended work items for the Commission to undertake.

ReCAP's analyses represent only a first level of recommended improvements. As additional information and recommendations are generated, they are expected to lead to further refinements of the existing local coastal programs and other elements of the CCMP. At the same time, implementation of wetland and watershed management plans should lead to enhancement

of the region's degraded wetlands. With respect to wetlands, the CCMP must be improved in a manner that leads to more comprehensive management, of which regulation of new development is only one component.

CHAPTER ORGANIZATION

The next section of this chapter presents as background information the policy framework under which wetlands are regulated, summarizes the status and trends of wetland resources in the region, and describes the analytical approach used to assess cumulative impacts to wetlands. Finally, this chapter describes seven problems identified through the cumulative assessment, including a discussion of the apparent causes of the problems, projections for their continuance and resolution, and specific recommendations for correction or improvement. The problems are:

- direct loss of wetland acreage, fragmentation, and habitat change.
- inadequate provisions of buffer areas.
- hydrologic impacts.
- water quality impacts.
- biodiversity impacts.
- information gaps in the decision-making process.
- lack of regional, watershed, and jurisdictional planning and management frameworks for achieving comprehensive wetland protection.

BACKGROUND

Wetlands are a significant, but severely impacted, natural resource within California. Only since the late 1960's have wetlands engaged the attention of individuals from a range of disciplines who endeavor to understand their variety and complexity.² Recent but intense interest in wetlands is due largely to their role in aquatic and terrestrial ecosystems, and our changing perceptions of them. Humans have come to understand how important wetlands are to the existence of numerous plants and animals, as well as the many functions they perform (e.g., flood control, ground water recharge, and maintenance of water quality) that are important to our quality of life.

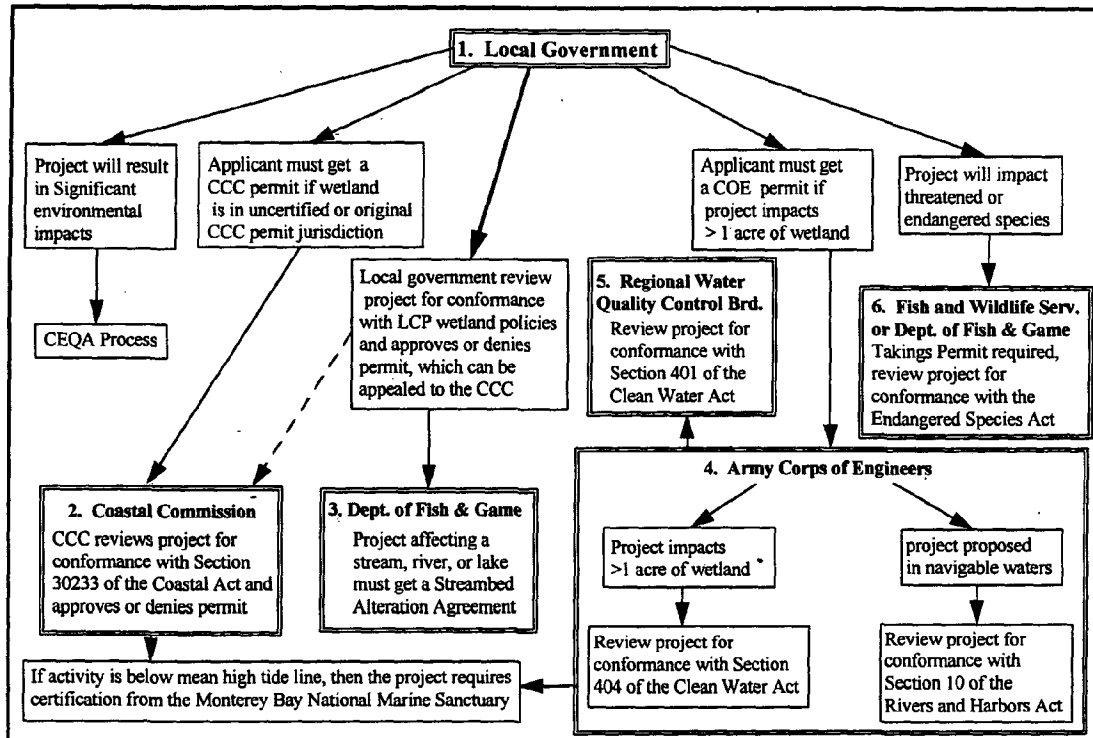
This section provides a description of three elements that play an important role in assessing the cumulative impacts to wetlands within the ReCAP region: (1) the existing policy framework; (2) the current status of wetland resources; and (3) the analytical framework used for this assessment. Each of these elements is described separately, but together form the foundation for ReCAP's identification and analysis of cumulative impacts to wetlands.

POLICY FRAMEWORK FOR WETLANDS PROTECTION

Currently, numerous federal, State, and local agencies administer and enforce a myriad of regulations that limit and control the development and alteration of wetlands in California.³ (For an example of the regulatory framework for wetlands in the ReCAP pilot area, see Figure 5-1, next page.) Although a few statutes and directives are specific to wetlands, most of the regulatory influence over wetlands occurs indirectly through management or regulation of water quality and quantity, fish and wildlife, endangered species habitat, water navigation, floodplain

control, public trust, environmental land use regulations, and coastal resource conservation.⁴ However, even with the complex array of existing regulations, California's wetlands do not receive equal protection. Although the federal regulations stipulated in the Clean Water Act (Section 404) and the River and Harbors Act (Section 10) apply to most of the wetlands within the State, only wetlands within San Francisco Bay and the coastal zone are afforded additional protection through specific State coastal program provisions.

Figure 5-1: Relationships Between Various Permits that May be Required for Development in a Wetland Occurring in the Coastal Zone⁵



The Coastal Commission is the lead State agency charged with the regulation of development in California's coastal zone.⁶ The California Coastal Act is the document the Coastal Commission relies on for overall guidance and direction in fulfilling its charge. Sections 30230, 30231, 30233, 30236, and 30240 of the Coastal Act relate directly to the preservation and protection of wetlands and other environmentally sensitive areas. The development and alteration of wetlands in the coastal zone, however, are primarily regulated by Section 30233(a) of the Coastal Act. Among other things, Section 30233(a) lists the types of development for which diking, filling, or dredging may be permitted in open coastal waters, estuaries, lakes, and wetlands.⁷ This section also stipulates the criteria under which development is permitted (i.e., least environmentally damaging feasible alternative and provision of adequate and feasible mitigation). In addition to the specific provisions of the Coastal Act, the Coastal Commission has adopted the *Statewide Interpretive Guidelines for Wetlands and Other Wet Environmentally Sensitive Habitat Areas* (1981). These guidelines contain technical definitions for wetlands and riparian areas, discuss conditions for permitting development in these areas, and provide information pertaining to the maintenance and restoration of wetlands. The guidelines were

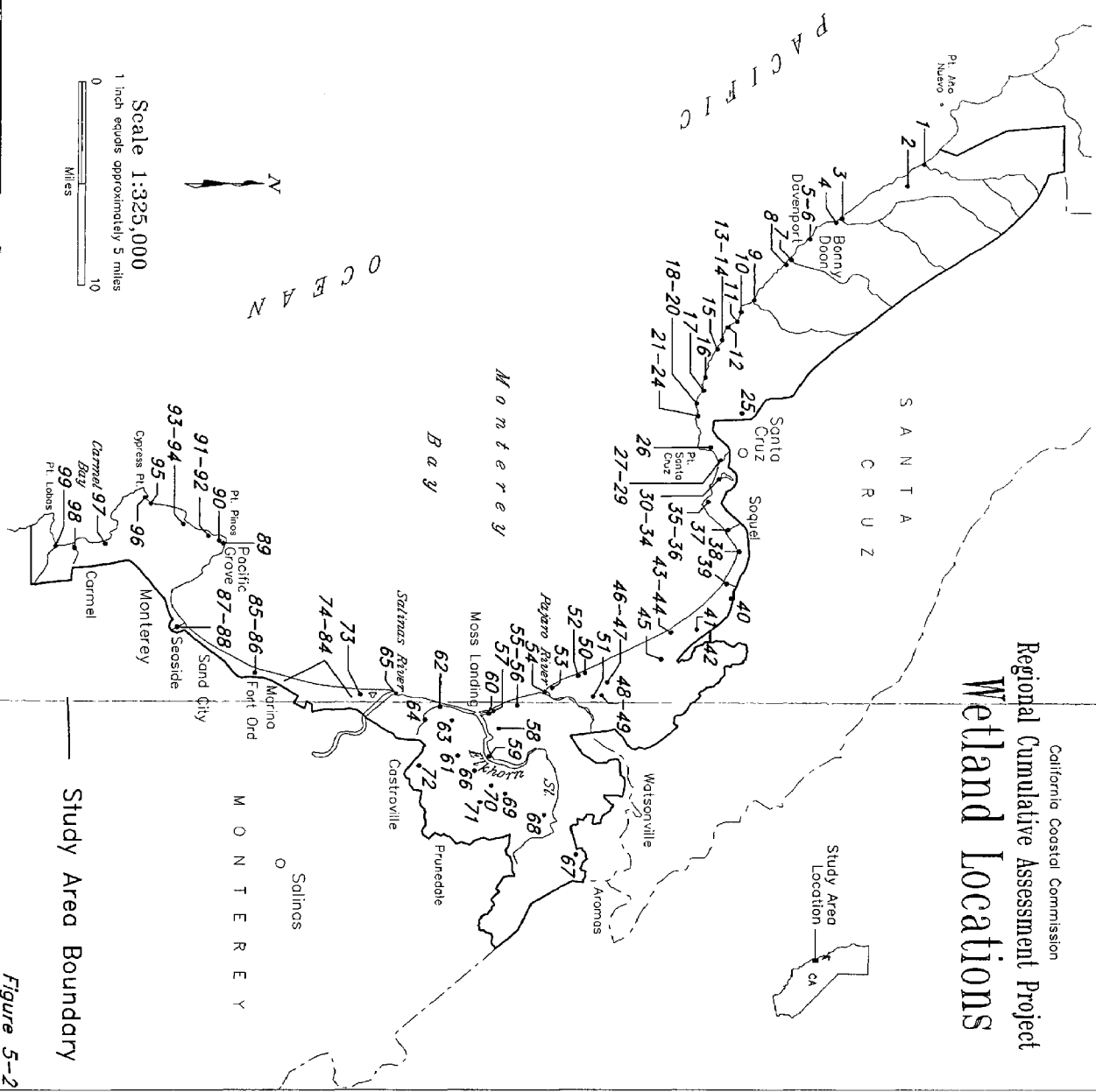
Thematic Sources:
 NASA Aerial Photography, 1977, Scale 1:32,500
 CA Dept. of Water Resources Aerial Photography, 1978, 1979, 1986, and 1993
 Atlas of Marine Resources, CA Dept. of Fish and Game, 1980
 National Wetlands Inventory, US Fish and Wildlife Service, 1986

Santa Cruz County

1. Waddell Creek Marsh and Estuary
2. Lost Chance Road Marsh
3. Scott Creek Marsh
4. Molino Creek Marsh
5. Downport Landing Marsh
6. Sluering Ponds
7. San Vicente Creek
8. Liddell Creek
9. Leguna Creek
10. Sand Hill Bluff Marsh and Pond
11. Mober's Creek
12. Table Rock Wetland
13. Bolwin Creek Marsh
14. Four-Mile Beach
15. Lombardi Gulch
16. Old Dairy Gulch Marsh
17. Wilder Creek
18. Younger Lagoon
19. Terrace Point Lower Ponds
20. Terrace Point Upper Pond
21. De Anza Pond
22. Natural Bridges Lagoon
23. Antonelli Pond
24. Monarch Pond
25. UCSC Inclusion Area A
26. Neer's Lagoon
27. San Lorenzo River
28. Jessie St. Marsh
29. Seabright Cove Drainage Outlet
30. Arona Gulch Marsh
31. Schwann's Lagoon
32. Black's Pond
33. Bonita Lagoon
34. Sunny Cove Drainage Outlet
35. Corcoran Lagoon
36. Moran Lake
37. Sequel Creek
38. Borrajos Creek
39. Arlos Creek
40. Valencio Lagoon
41. Bonita Drive Creek
42. Sesscape Pond
43. Los Barrancas Drainage Outlet
44. Monreso Drainage Outlet
45. Ellicott Station Pond
46. Calliphon Slough
47. Horkins Slough
48. Hanson Slough
49. W. Branch Struve Slough
50. Sunset Beach FW Marsh
51. Upper Watsonville Slough
52. Shorebirds Pond
53. Lower Watsonville Slough
54. Pajaro River

Monterey County

55. McCluskey Slough
56. Muduski Slough S.
57. Gibson Landing Marsh/
58. Upper Bennett Slough
59. Elkhorn Slough (Struve Pond)
60. Moss Landing N. Harbor
61. Moss Cop Slough/Shadow Oak
62. Old Salinas R. Channel
63. Coastal Alkali Grassland
64. Tembladero Slough
65. Salinas River Mouth and Lagoons
66. Parsons Slough
67. Tappay Lake
68. San Miguel Canyon Road Marsh
69. Tucker Road Pond
70. Long Canyon Road Marsh
71. Paradise Road Pond
72. Rolling Hills II Marsh
73. Martin Dunes Marsh
74. Marina Vernal Pond #1
75. Marina Vernal Pond #2
76. Marina Vernal Pond #3
77. Marina Vernal Pond #4
78. Marina Vernal Pond #5
79. Marina Vernal Pond #6
80. Marina Vernal Pond #7
81. Marina Vernal Pond #8
82. Marina Vernal Pond #9
83. Marina Vernal Pond #10
84. Marina Vernal Pond #11
85. Fort Ord Pond
86. Indian Head Ponds
87. Roberts Lake
88. Laguna Grande
89. Crespi Pond
90. Pacific Grove Muni. Pond
91. Frog Pond
92. Magella Slough
93. Spanish Bay Marsh
94. Sawmill Gulch Marsh
95. Seal Rock Creek
96. Farnsfield Beach Wetland
97. Pescadero Creek
98. Carmel River Lagoon
99. San Jose Creek



California Coastal Commission
 Regional Cumulative Assessment Project
Wetland Locations

developed to assist the Coastal Commission, local governments, and the public in the application and interpretation of the Coastal Act and in the development of local coastal programs. Most recently, the Coastal Commission has produced a document entitled *Procedural Guidance For The Review Of Wetland Projects In California's Coastal Zone* (1994). This document describes a review process the Coastal Commission uses to evaluate proposed wetland development projects.

The California Coastal Act is designed to delegate to local governments much of the Coastal Commission's authority to regulate coastal development through the implementation of local coastal programs (LCPs). To become certified for use, the LCPs must, compared to the Coastal Act, provide equal or greater protection of coastal resources. With a certified LCP, a local government assumes authority for permitting certain types of development in specified areas of the coastal zone, including many of the wetlands in the ReCAP region.

Local governments with jurisdictions in the ReCAP pilot area ensure that their LCPs provide for the regulation of wetland development by identifying wetlands as "environmentally sensitive habitat areas" and, pursuant to Coastal Act Section 30240, limiting development to resource-dependent uses. The LCPs also contain specific language relating to the protection of wetlands within the jurisdiction. For example, the LCPs specify the width of buffer areas around wetlands (see discussion of buffer areas under Wetland Problem #2), specify erosion control measures to prevent excessive amounts of sediment from entering wetlands, and specify management strategies for particular wetlands.⁸ Because of the shared responsibility for management of wetlands, program improvements need to be implemented in a coordinated fashion by the Commission and local governments.

STATUS OF WETLAND RESOURCES

The ReCAP project area contains a diverse array of wetlands. Coastal lagoons, large slough complexes, salt and freshwater marshes, lakes, and rivers all occur within the project area. Analysis completed as part of this project revealed 99 wetlands⁹ within the project area (Figure 5-2, page 75), totaling approximately 6,200 acres. A review of aerial photographs from 1977, 1986, and 1993 suggests there has not been an appreciable change in total wetland acreage over the last 16 years.¹⁰ Of the 99 wetlands identified in the project area, at least 16 have been placed under more protective status in the last 20 years. Comprehensive management plans have been prepared or are being prepared for at least 24 of the area's wetlands. Restoration projects have been undertaken for at least 32 of the area's wetlands.

It is important to realize, however, that wetland acreage is not the sole determinant of the condition of wetland resources. The quality of a wetland is more accurately determined by acreage and functional capacity. California's coastal wetlands serve a number of important functions such as the provision of habitat for native wildlife, water purification, and flood control. The value of these functions will vary depending on the wetland size, its location in the watershed, and the surrounding land use.

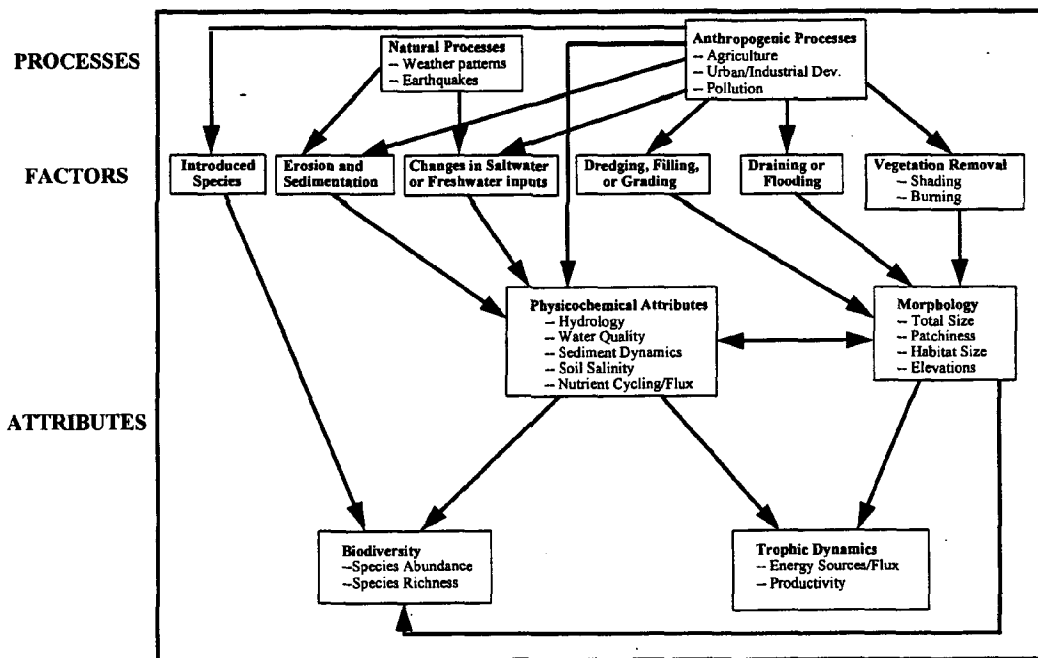
Both natural and anthropogenic processes have historically affected the quality of wetlands in the ReCAP project area. Natural changes involve processes still occurring today: seasonal berm formation at the mouths of coastal lagoons, changes in freshwater inputs due to droughts and floods, and earthquakes. Human-induced changes have involved activities related to agricultural and urban development. Over the previous century, development projects such as the damming of rivers, construction of transportation corridors, and major urban and agricultural development have all diminished the quantity and quality of wetland habitat through the degradation of wetland hydrology, water quality, and direct habitat loss. More recently, however, wetland habitat has been most affected by the lingering effects of earlier development (e.g., point and nonpoint source pollution, chronic reductions in the amount of water reaching

wetlands, and the loss of adjacent buffer areas). Although still apparent, the rate at which wetland habitat, hydrology, water quality, sedimentation rates, and biodiversity are adversely impacted appears to have declined since inception of the Coastal Act. On the other hand, there are few examples of positive change from an ecological perspective. Thus, the challenge is not simply to halt, but to reverse the historic adverse impacts, as enhancement and restoration are also Coastal Act objectives (Section 30001.5).

ANALYTICAL APPROACH

Conceptually, a number of factors have the potential of affecting a wetland through changes to one or more of the physical, chemical, or biological attributes (Figure 5-3). The conceptual diagram below illustrates the key attributes of a wetland, the various factors that could impact those attributes, and the principal processes that exert influence over the factors. The connecting arrows depict the pathways by which the processes can influence the various attributes. For example, urban development (an anthropogenic process) may enhance the establishment of introduced species, which can adversely impact wetland biodiversity. In addition, many of the pathways are interconnected. For example, a drought will lead to reduced freshwater inputs, which will affect wetland hydrology (physicochemical), which can ultimately affect both the size (morphology) and species abundance (biodiversity).

Figure 5-3: Original Conceptual Model Showing the Relationships Between Processes, Factors and Attributes in Wetlands

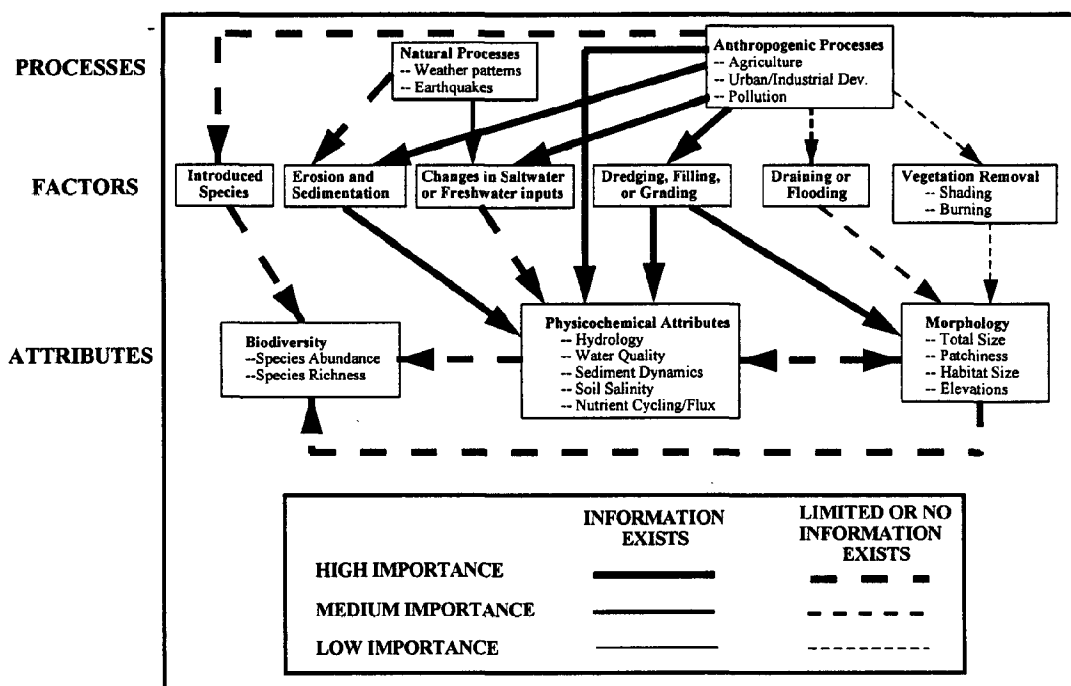


Because of their complexity, the cumulative impacts to wetland resources in the ReCAP project area were investigated through separate study of three key attributes: (1) morphology; (2) physicochemical processes; and (3) biodiversity. Although trophic dynamics was also considered a key attribute, it was not included in this analysis due to a lack of valid information.¹¹ Based on analyses of the various wetland attributes, this chapter describes, as problem statements, the various sources of impacts, and recommends procedural or policy changes to resolve or reduce the identified problem. This chapter also examines wetland regulatory concerns and comprehensive management issues in an attempt to determine strategies

for long-term effective management of cumulative impacts. In all cases, the analyses attempt to answer three basic questions: (1) what has happened; (2) why has it happened; and (3) what will happen if past trends continue. The analyses generally consider two time frames: (1) the Coastal Act period (1973 -1993, emphasizing the second decade, 1983-93, when many of the region's local coastal programs were certified); and (2) to a lesser extent, the pre-Coastal Act period (1972 and earlier).

Although separate analyses were completed for the various attributes, wetlands are not isolated systems. Interactions among wetlands and the surrounding landscape occur continually by way of water, air, and the organisms that rely on them. Thus, impacts to one aspect of a wetland will affect other attributes as well as other wetlands. With this in mind, results of the analyses were also used to revise the conceptual model of wetland impacts (Figure 5-4). These revisions included refinement of the connections between sources of impacts (processes and factors) and the affected attributes. In addition, the connecting arrows were qualitatively weighted (e.g., high, medium, and low). This weighting provides an indication of the contribution various processes and factors made to documented changes in wetland attributes. The results show that anthropogenic processes had the largest cumulative effect on wetlands in the ReCAP project area, which manifest as changes in physicochemical and morphological attributes. Natural processes were also found to affect the wetlands over the last ten years, albeit to a lesser extent, through changes in saltwater or freshwater inputs. There were several indications that wetland biodiversity has been adversely affected, but the available information was limited and did not provide evidence for the magnitude or sources of the impacts.

Figure 5-4: Revised Conceptual Model Showing the Relationships Between Processes, Factors and Attributes in Wetlands



Because wetlands are not isolated systems, assessments that evaluate wetland impacts as isolated occurrences provide an incomplete picture. There is clearly a need to take a landscape approach to protecting and managing wetlands. Resource and regulatory agencies must think about wetlands as part of a bigger system, as integral components of the watershed. Finally,

these agencies need to include humans within that bigger system, not only as a source of impacts, but also as the potential solution to the cumulative impacts humans have created.¹²

WETLANDS PROBLEM ONE

Direct Loss Of Acreage, Fragmentation, And Habitat Change

The amount of wetland acreage in the Monterey Bay pilot region has greatly decreased over the last century and wetlands have become more fragmented, due primarily to human impacts. Neither the CCMP nor any other program comprehensively addresses historic loss. Recent and potential permitted and unpermitted development have resulted in and may continue, absent some regulatory improvement, to result in some additional wetland acreage loss.

ANALYSIS

Morphologic Problems

The disappearance of our nation's wetlands -- an estimated 90% loss in California -- is a major environmental concern.¹³ So is the resulting fragmentation: historic wetland connections have been severed and distances between wetlands have increased. In the project area, wetland loss and fragmentation are historic problems that persist with no comprehensive, accepted remedy. In addition, alterations to existing wetlands have resulted in habitat changes, some of which have been adverse.¹⁴

Table 5-1: Historical Areal Changes in Salinas River Lagoon Habitat

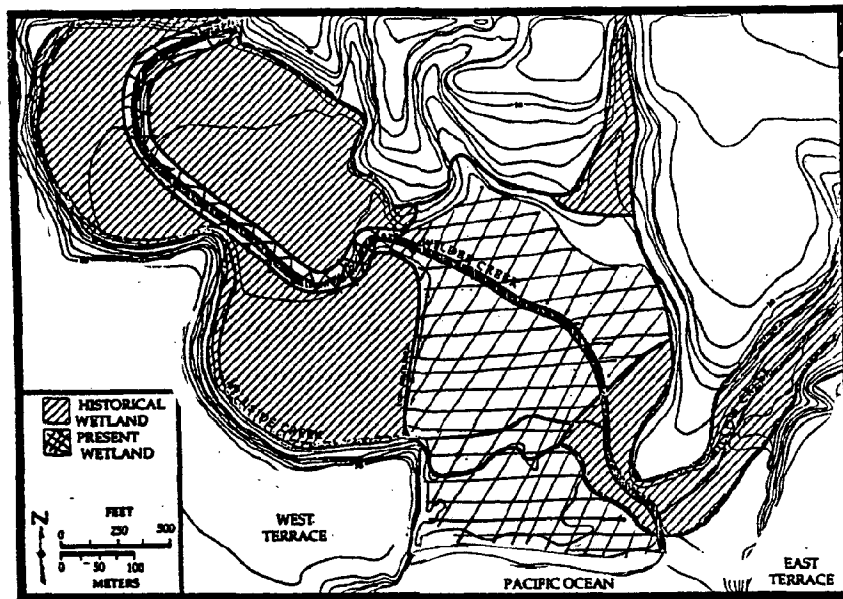
Date	Category	Area (acres)
1910	Open Water	341.38
	Islands/Wetlands	0.00
	Total	341.38
1933	Open Water	235.18
	Islands/Wetlands	16.04
	Total	251.22
1937	Open Water	184.01
	Islands/Wetlands	41.61
	Total	225.62
1990	Open Water	132.11
	Islands/Wetlands	94.97
	Total	227.08

Historic Wetland Loss

Large portions of the pilot area's historic wetlands disappeared in the century prior to environmentally-based regulation (pre-1970's). Although the total loss has not been quantified, some examples illustrate the magnitude.¹⁵ Table 5-1 shows over 114 acres (33%) lost at Salinas

River Lagoon.¹⁶ Neary Lagoon's size diminished 60% from 75 to 30 acres.¹⁷ Wilder Lagoon shrunk by almost 70% from 49 to 15 acres as Figure 5-5 shows.¹⁸ In all cases, human activities, especially diking, draining and filling for agriculture, were largely responsible.¹⁹

Figure 5-5: Wetland delineation of Wilder Pilot Area based on present vegetation, soil, and standing water; and likely historical wetland area



Fragmentation

This historic loss of wetland acreage also resulted in the fragmentation of wetlands.²⁰ Fragmentation refers to the severing of physical and ecological linkages between wetlands. Fragmentation affects wetlands adversely by reducing water circulation and limiting the migration of individuals among previously continuous populations of plants and animals. Small, isolated populations are much more susceptible to natural and human-induced stresses and have more difficulty recovering from such stresses than large, contiguous populations. Fragmentation may, therefore, be closely linked with declines in biodiversity. Within the ReCAP region, this is seen most prominently in southern Santa Cruz and northern Monterey Counties. For example, within the coastal zone north of the Salinas River and south of Moss Landing, some wetland areas disappeared altogether,²¹ while the two remaining wetlands (Old Salinas River Channel and Tembladero Slough) were reduced to drainage channels.²² The historic connection between the Salinas River and the Pajaro River north of Moss Landing was lost. The alteration of Upper Watsonville Slough (which connected to the Pajaro River mouth via lower Watsonville Slough) resulted in the severing of historic connections with Harkins, Hanson, Gallighan, and West Branch Struve Sloughs.²³

Just outside the coastal zone of Monterey Bay a significant example of wetland fragmentation occurred over time along the northern corridor of the Salinas River. A chain of nine lakes spaced over a distance of approximately ten miles has mostly disappeared, due to agricultural activities; only one lake remains.²⁴

Habitat Change

The physical character of some of the remaining wetlands has also changed over time. For example, Schwann Lagoon was transformed from a coastal lagoon into a freshwater lake when its connection with the sea was obstructed by road construction. Open water habitat areas in Bonita Lagoon, Carmel River Lagoon, and Salinas River Lagoon have gradually filled in and become vegetated (see Table 5-1 for one example). Conversely, harbor construction has turned portions of the vegetated marsh habitats in Arana Gulch (Woods Lagoon) and the Old Salinas River Channel into open deepwater habitats. The construction of Moss Landing Harbor has been linked to excessive channel erosion, resulting in the loss of intertidal marsh habitat in Elkhorn Slough.²⁵

Not all habitat changes are bad. Sometimes such changes are done intentionally as part of wetland restoration efforts. However, most of the unplanned habitat changes (i.e., those that occurred as unintentional consequences of other activities) are likely to result in negative impacts. (For additional details and examples, see endnote #14.)

Regulatory Responses

Continued development pressures coupled with gaps in the regulatory process suggest that further wetland losses, fragmentation, and adverse habitat changes are possible.

The vast changes to wetlands occurred in an era when environmental regulation was absent and economic development of wetlands was more highly valued than their natural state. This changed in the early 1970's with the advent of the California Coastal Act, the California Environment Quality Act (CEQA) and its federal counterpart the National Environmental Policy Act (NEPA),²⁶ and with the consideration of environmental factors in implementing the Clean Water Act.²⁶ Coastal Act Section 30233c, for example, prohibits most development in wetlands, except those of a resource-dependent nature that lack less environmentally damaging feasible alternatives, and for which adequate mitigation exists.²⁷

As a result of protective legislation, few permits issued in the study area since 1973 have allowed wetland fill; those that have by-and-large required at least equivalent compensation (i.e., required an equal or greater acreage of wetland to be restored or created from dry land elsewhere).²⁸ The Coastal Act's authority has allowed Commission staff to participate in discussions about potential projects before permit applications are submitted and thereby encourage alternatives to wetland fills. In the few instances where applicants persisted with insupportable fill projects, the Commission has denied the request. Such instances include urban development in Jessie Street marsh, wastewater plant expansion into Neary Lagoon, and road fill in Elkhorn Slough.²⁹

In spite of existing regulations, some direct loss of wetland area has occurred over the last twenty years at Moro Cojo Slough, Elkhorn Slough, McCluskey Slough, and Watsonville Slough, due to agriculture activities, and at Spanish Bay due to urban activities.³⁰ At least temporary losses have occurred at Neary Lagoon, Majors Creek, and Lower Watsonville Slough, where after-the-fact enforcement actions have been initiated to remediate unpermitted fills.³¹

That these instances have occurred, along with other factors, suggest that additional activities resulting in wetland loss will be attempted in the future. These other factors include known pending projects,³² some unauthorized activities,³³ potentially allowable wetland uses, disputes about what is really a wetland, no guarantees of mitigation success, and private and public ownership of wetlands not in preserve status. In addition, gaps in the CCMP regulatory process can allow incursions into wetlands to occur.³⁴ These gaps include agricultural exemptions, inconsistent enforcement and condition compliance, inconsistent wetland delineation methods, and permitted uses without guaranteed compensatory mechanisms.

Agricultural Exemptions

The list of allowable wetland uses in Coastal Act Section 30233a does not include agriculture. Most LCPs place wetlands under a resource protection category and do not explicitly show agriculture as a permitted use. However, not all agricultural activities qualify as new “development,” and therefore do not require a coastal permit. According to the Commission’s Statewide Interpretive Guidelines (1981),

When wetlands are seasonally farmed, the continued use of agriculture is allowed. Expanding farming operations into non-farmed wetlands by diking or otherwise altering the functional capacity of the wetland is not permitted. Farm-related structures (including barns, sheds, and farm-owner occupied housing) necessary for the continuance of the existing operation of the farmed wetlands may be located on an existing farmed wetland parcel, only if no alternative upland location is available for such purpose and the structures are sited and designed to minimize the adverse environmental effects on the farmed wetland. Clustering will be required.³⁵

The Coastal Commission has considered that expanding cultivation or grazing into a wetland that has not been recently farmed, even if no diking or grading is involved, is “development”. However, others might not share that interpretation based on Section 30106 of the Coastal Act,³⁶ which states in part:

Development means, on land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, and the removal or harvesting of major vegetation other than for agricultural purposes...

The North Monterey County Land Use Plan is the only plan in the ReCAP region that has a broadened definition of development that includes some agricultural removal or harvesting of major vegetation, but not specifically wetland vegetation.³⁷

The result of these regulatory limitations has been the continued cultivation of historic wetlands (especially in the Watsonville Slough complex), a few new (or reactivated) cultivated wetland areas, and expanded grazing in wetlands.³⁸ The vegetation removal exception may also have been interpreted by agricultural land owners to mean that diking, draining, and filling are allowed without a permit if the purpose of such activities is to allow the continuation of on-going agricultural activities (for example, diking to prevent a wetland from reclaiming part of a cultivated field at the end of a drought).

Condition Non-Compliance and Impediments to Enforcement

Chapter 9 of the Coastal Act provides for judicial review, enforcement, and penalties for violations. Most local coastal programs echo such provisions, and contain procedures for addressing violations on a local level.³⁹ Staffing limitations have required reliance on discovery by others and have resulted in highly variable follow-up. Lack of consistent reporting and computerized record keeping has further hindered compliance monitoring efforts. Even when enforcement commences, guaranteeing successful mitigation is problematic (see section on mitigation problems below).

The resulting unrectified incursions, discovered through ReCAP’s aerial photography interpretation, include, for example, several acres of Moro Cojo Slough that have been diked and cultivated since 1977, and small areas at the margins of McCluskey Slough and Elkhorn Slough.⁴⁰ In cases where discovery has already led to enforcement actions being initiated,

restoration has not always been achieved. For example, out of 14 required restoration plans, only eight have been formulated and six completed.⁴¹ Unpermitted activities in wetlands represent net wetland acreage losses until restoration is completed.

In cases where wetland alterations are conditionally permitted, similar staffing and tracking limitations constrain the Commission's ability to assure condition compliance (e.g. successful mitigation). Without adequate staffing to conduct field inspections, it is often not known whether permitted losses are successfully mitigated. Unfortunately, limitations in the Commission's tracking and post-construction inspection system mean that there is a lack of sufficient evidence available to evaluate this concern.⁴²

Inconsistent Delineation Methods

Coastal Act Section 30121 simply defines "wetlands" as "lands ... which may be covered periodically or permanently with shallow water and include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats and fens." According to the Coastal Commission's Interpretive Guidelines, the U.S. Fish and Wildlife Service's classification system (1979), commonly known as the Cowardin method,⁴³ is to serve as the guide for identifying wetlands. Local coastal programs contain the Coastal Act definition. However, only two out of ten LCPs in the ReCAP region reference the Cowardin method (or for that matter any particular delineation method).⁴⁴ Various other less encompassing methods have been and are performed for local and state agencies (typically through the CEQA process).⁴⁵ Recent wetland delineations are based on the U.S. Army Corps of Engineers' methodology for implementing the Clean Water Act, which itself has undergone changes in the past ten years.⁴⁶ Earlier EIRs and other documents often termed what would be "wetlands" under the Cowardin (and possibly the Corps) method as "drainage channels" or "riparian areas." Even the Coastal Commission's guidelines distinguish riparian areas as distinct from wetlands, a distinction not made by the Cowardin method.⁴⁷ Furthermore, Coastal Commission Interpretive Guidelines remain advisory. In fact, the Commission has substantial latitude to determine whether an area falls under the Coastal Act definition of "wetland".

The result of wetland delineation uncertainties has allowed some fills to escape Coastal Act Section 30233's requirements. For example, prior to development at Spanish Bay, which had previously been mined, drainage channels and ponds existed that would likely be classified as wetlands under the Cowardin method. However, EIRs and Coastal Commission findings described these features variously, and the Commission ultimately did not classify them as wetlands.⁴⁸ Commission staff explained that this was because they were unnatural, the results of water ponding in mined areas.⁴⁹ It appears that there was a net (permitted, but unstated) loss of approximately eight of these variously labeled wetland acres.⁵⁰

Two other examples involved eight acres of "seasonally flooded grassland" at Neary Lagoon and about one-half acre of "man made degraded riparian channel" at Schwann Lagoon. Both were ultimately determined not to be "wetlands" by the Commission.⁵¹ In these cases, project proponents (both public agencies: a city and a school district) offered biological opinions against the areas being "wetlands," while concerned citizens countered with pro-wetland biological determinations. Projects filling these areas were approved, without compensating mitigation in the case of Neary Lagoon.

Permitted Uses Without Guaranteed Compensatory Mitigation

Despite requiring compensatory mitigation for identified wetlands, the Coastal Act does not guarantee no net loss, especially of habitat value, because compensatory mitigation success is problematic at best.⁵² Examples of the few restoration projects in the pilot area with monitoring tend to support this conclusion. Of two projects funded by and retrospectively analyzed by the Coastal Conservancy, one was a failure.⁵³ Also, the submitted reports for the Spanish Bay

mitigation site, which has been monitored for five years, indicate general success of restoration. However, planted willows have not all survived, sediment has filled an area that now must be dredged, and unauthorized work has occurred.⁵⁴ At a mitigation site on the Old Salinas River channel, monitoring reports indicate that the plant communities are developing in a manner similar to that anticipated, with some non-native colonization and various revegetation rates.⁵⁵ Independent evaluation offers a more negative perspective, calling the project a mistake for removing an historic pickleweed marsh.⁵⁶

A review of these and other monitoring reports shows continued oversight is necessary to discover problems and recommend corrections. Where staff training or availability is limited, mitigation success will be less assured. This review also suggests that although net wetland acreage may remain constant or increase if compensatory mitigation is successful, habitat differences may result and habitat value may be consequently reduced (see Endnote #14).

Thus, the more development permitted in wetlands, the greater the probability of some continued loss. Consequently, the more leeway in allowing development, the greater the probability of its occurrence. Out of 28 permitted projects involving wetland fill, four were for explicitly permitted uses under Section 30233a (boating and resource restoration) and seven were associated with urban development (which is not listed as a permitted use). The remainder were for public projects (flood control, roads, wastewater facilities) which in some cases may be considered incidental public services under 30233a.⁵⁷ Thus, there is a fair amount of discretion built into implementing this section. Local coastal programs have narrowed this discretion, generally limiting allowed development to resource-dependent uses.⁵⁸ Seven of these projects were permitted by local governments.

To the extent that riparian areas are not defined as “wetlands” for regulatory purposes (see delineation discussion), there is a higher risk of loss of this type of wetland. Although Section 30240 of the Coastal Act treating riparian areas as “environmentally sensitive habitats” could apply to such areas, the wetland mitigation standards in Section 30607.1 do not.⁵⁹ Thus riparian wetland areas may be especially at risk of being developed without adequate mitigation.

Emerging and Potential Responses

Initiatives to standardize delineation methods, achieve “no net loss” and guide restoration could help reduce future wetland loss. Tightening exemptions that allow wetland fill and increasing enforcement and education would provide additional help. Programs extending beyond regulation are also needed to restore and enhance historic wetlands.

Delineation

The Coastal Commission’s recently published “Procedural Guidance for the Review of Wetland Projects in California’s Coastal Zone” reiterates the Coastal Act’s broad wetland definition, suggests the importance of riparian area protection, and emphasizes early involvement in the CEQA process.⁶⁰ Comments on CEQA documents could request that appropriate wetland delineations are made early on in the project review process. Incorporating these concepts into the local governments’ local coastal program implementation would be a logical follow up.

Federal agencies have standardized wetland delineation methods for regulatory purposes, and California’s Resources Agency is attempting to develop a single state definition.⁶¹ Such standardization, followed up with a manual and training course, has the potential to ensure more consistent and complete delineations. However, if the standardized methodology does not account for all wetlands protected under the Coastal Act, as previous attempts did not, then the CCMP will not benefit from this course of action.

No Net Loss

Both Governor Wilson and President Clinton have issued wetland policies that include the goal of "No Net Loss" of wetland quantity or quality.⁶² The California Department of Fish and Game also operates under "No Net Loss" directives, applying to habitat values as well as acreage.⁶³ Codifying the no-net loss principle at all levels of government and establishing guidelines for implementation is a logical next step.

Mitigation Guidance

The Coastal Commission's *Procedural Guidance for the Review of Wetland Projects* offers criteria aimed at increasing the success rate of compensatory wetland mitigation efforts.⁶⁴ Its forthcoming *Procedural Guidance for Evaluation of Wetland Mitigation Projects* is expected to provide more detailed information. Incorporating the results of these in both the Commission's and local government's practices may improve wetland management.

Regulatory Reform

Possible changes to the Coastal Act and local coastal programs to further restrict allowed wetland uses would reduce the number of potential projects that could cause wetland loss. Such changes could include tightening agricultural exemptions, more explicitly defining and interpreting the categories of permitted uses (e.g., "incidental public services" and "restoration activities"), possibly eliminating some categories of permitted uses, strengthening the criteria for restricting permitted uses, and/or limiting the kinds of wetlands where the uses are allowed. Such initiatives would have to be undertaken in a manner consistent with Coastal Act requirements concerning constitutionally protected rights of property owners.⁶⁵ Recent court cases suggest the advisability of examining non-regulatory as well as regulatory innovations to protect remaining wetlands and/or strengthen compensating mitigation requirements.⁶⁶ Further impetus comes from the delineation of more areas now as wetlands (usually during the development review process) that do not "look like" wetlands, but have the requisite characteristics.⁶⁷

Wetland Restoration and Creation Programs

Certainly additional regulation will not result in the reappearance of lost wetlands. The Coastal Act supports restoration where feasible. Similarly, the LCPs all mention objectives to restore and increase wetland acreage. In 1983, the Legislature called for an increase by 50% of wetland habitat acreage by the year 2000.⁶⁸ Moreover, Governor Wilson's new wetland policy calls for a long-term net gain in the quantity and quality of wetland acreage, as does President Clinton's.⁶⁹

One "new" wetland was created just prior to the establishment of the Coastal Act. As part of a major condominium project, the 3.8 acre Shorebirds Lagoon was constructed north of Pajaro River in an area that earlier was salt marsh.⁷⁰ Since establishment of the Coastal Act, major restoration projects have occurred only at Elkhorn Slough and adjacent Parsons Slough. One hundred seventy-five acres of grazing land has been converted back to wetlands.⁷¹ These projects occurred on property owned by the Department of Fish and Game and were publicly funded.⁷²

At the beginning of 1994, there were commitments to undertake the following projects:

- Wilder Creek marsh, convert 19 acres of agricultural land back to freshwater marsh,⁷³
- Blohm-Porter marsh portion of Elkhorn Slough, convert approximately 27 acres of upland and pasture back to freshwater marsh with islands.⁷⁴

- Hansons Slough, convert approximately 20 acres of agricultural and grazing land back to vegetated wetland.⁷⁵

This latter project is being undertaken by a non-profit group affiliated with Moss Landing Marine Laboratories (Watershed Ecology Outreach Program). WEOP's strategy is to first obtain landowner permission and then to remove agricultural uses and plant with wetland vegetation on as much historic wetland area as possible in southern Santa Cruz and northern Monterey Counties.

Wetland Management Planning

Continuing to follow and improve the implementation of existing regulations should help ensure that additional wetland loss does not occur. Even more assurance can be gained by undertaking a more specific planning process focusing on individual wetlands and their watersheds. A plan for a single or group of wetlands can include an actual wetland delineation, identify specific permitted (from among the eight Coastal Act categories) and non-permitted uses, and recommend changes in any existing detrimental uses or trends (e.g., mechanisms to remove adverse grazing from wetlands). If a plan includes clear objectives, then it will be easier to determine what the least environmentally damaging project alternative would be. A plan can compare ownerships and management authorities to the proposed uses and management strategies and recommend necessary changes (e.g., public acquisitions of privately owned parcels in wetlands).

Wetland management plans could also improve the chances for successful restoration, both for mitigation and redressing historic loss. Such plans could establish objectives for restoration (e.g., optimal mix of habitat types) and identify locations in need of restoration.

Complementary broader-based watershed, natural communities, or regional plans could further guide wetland restoration efforts. Using a landscape-based approach, these plans can identify areas that were historically wetlands and are most appropriate to restore as wetlands; such plans can also identify opportunities to reduce fragmentation. The last section of this chapter discusses the status of and opportunities for these types of broader based planning initiatives.

RECOMMENDATIONS

Program Improvements:

- Develop wetland mitigation performance guidance document that includes procedures and measures to assure policy objectives are met (i.e., adequate mitigation ratio, appropriate mitigation plans, criteria for evaluating success) and incorporate into CCMP.
- Revise definition of "development" in Coastal Act Section 30106 (or revised Interpretive Guideline or Attorney General opinion) and LCPs to include removal of natural vegetation in a wetland or wetland buffer for agricultural purposes, where the area has not been recently farmed.
- Revise local coastal programs to:
 - incorporate the Cowardin wetland identification method in their application submittal requirements and initial studies under CEQA.

- require identification of possible wetland areas in addition to those previously inventoried, where such procedures are currently lacking (i.e. Pacific Grove, Marina, Seaside, Monterey City, Carmel-by-the-Sea).

Initial and Mid-range Opportunities:

With respect to preventing further wetland losses:

- Review how riparian corridors are classified in various documents (e.g., Coastal Act, Interpretive Guidelines, guidance document, LCPs) and recommend revisions to achieve consistency in the CCMP program.
- Utilize the CEQA/NEPA review processes to ensure that wetland delineations using the Cowardin method are completed.
- Participate in and encourage discussions on standardizing wetland definitions and delineation methods.
- In conjunction with enforcement staff of other state, federal, and local agencies involved in wetland regulations, identify opportunities for better coordination and implementation of regulatory programs.
- Evaluate options for using the existing regulatory and non-regulatory incentive programs to prevent additional agricultural and grazing incursions into the wetlands, including revisions to the Coastal Act definition of development.
- Evaluate staffing, support, and other options for improving implementation of CCMP's enforcement program with regard to adverse wetland impacts and recommend improvements.
- Continue involvement in early discussions and review of projects potentially affecting wetlands.
- Review recent aerial photographs to identify additional wetland losses and make recommendations for on-going monitoring of wetland acreage change.
- Evaluate options for protecting lands newly identified as wetlands in site planning (using Terrace Point and former Rolling Hills sites as possible case studies) and recommend an appropriate strategy.
- In reviewing any mitigation or restoration projects, require a clear statement of goals, objectives, and performance standards, including appropriate time frames.
- Work with Moss Landing Harbor District and other interested entities in deriving an alternative mitigation and monitoring strategy for its problematic mitigation project; advocate preparation of a wetland management plan delineating optimal habitat types for the Old Salinas River channel.
- Allocate staff time for more consistent review of wetland monitoring plans.
- Inventory parcels where habitat constraints may raise significant land use issues; work with landowners to develop appropriate responses.
- Continue to explore mitigation banking, as detailed in the final recommendations of the wetlands task force, and other strategies for ensuring successful wetland mitigation.

With respect to reversing historic wetland losses:

- Foster the public's and agencies' awareness to appreciate the importance of increasing wetland acreage above current levels.
- Initiate and participate in a comprehensive study to determine the feasibility of restoring historic wetlands in a study area (e.g., Watsonville Slough complex watershed) in cooperation with academics, AMBAG, and other agencies.
- Continue to participate in the Moro Cojo Slough Wetland Management Plan process and use that plan as a vehicle to develop methods for reversing the adverse impacts from agriculture and grazing.
- In reviewing major development proposals or LCP amendments covering large areas adjacent to wetlands, identify areas of historic wetland loss and describe the potential preclusion for future restoration.

Wetland and Watershed Management Plans should:

- Include provisions for wetland restoration where feasible;
- Provide context and guidance for future wetland restoration projects, including clear goals and objectives;
- Delineate and describe different habitat types;
- List allowed uses in wetlands and criteria for allowing them, using the Coastal Act as a basis;
- Address methods to discontinue agricultural, grazing, and other non-resource dependent uses in wetlands.

Longer-range Opportunities:*With respect to preventing further wetland losses:*

- Evaluate any future federal unified delineation manual for application to California's coastal wetlands and strive to achieve consistency among agencies' practices.
- Develop objective, useable measures to ensure no net loss of wetland quality.
- Designate an agency to assume responsibility for monitoring for no net loss through annual review of aerial photography and selected field investigations.
- Study options for possibly revising wetland policies to allow consolidation and enhancement of scattered, small wetland areas as part of development projects.
- To the extent riparian areas are considered to be in a separate, non-wetland classification, evaluate options for revising riparian protection policies to ensure commensurate protection.
- Acquire wetlands (or development and use rights) in agricultural use as public lands using federal or state programs, pursuant to the priorities established in the comprehensive wetland planning program recommended in the final section of this chapter.

With respect to reversing historic wetland loss:

- Undertake wetland restoration pursuant to watershed and wetland management plans and according to regionally-established priorities.
- Develop a comprehensive strategy for redressing historic wetland loss through the recommended comprehensive regional wetland planning framework.

Opportunities for further study:

- Use aerial photography, historic maps, and other sources to determine the extent of wetland change over the last century.
- Identify land and/or water corridor requirements of target species that use wetlands and study reestablishing such natural connections.
- Study habitat use and species abundance in areas with pocket wetland remnants compared to single larger wetlands to determine the advisability of consolidations.
- Evaluate current uses and land values of historic wetlands and project costs of increasing wetland acreage.
- Use field inspection and interviews to determine success of area's wetland restoration projects that have not yet been evaluated (e.g., at Elkhorn Slough's North and South restoration areas).
- Review costs of mitigation projects relative to their resulting improvements to determine most cost-effective strategies.
- Evaluate permit condition compliance in and adjacent to wetlands, both in the short and long term (i.e., determine if the conditions, even when initially complied with, remained effective over time).
- Perform field delineations and physically describe the following possible wetlands: Indian Head, Fort Ord Pond, Pacific Grove Municipal Pond, DeAnza Pond.
- Perform and compare delineations of some wetlands using the 1987 U.S. Army Corps of Engineers manual, the Cowardin method, and possibly other methods to determine any differences in coverage.
- Perform field delineations on exemplary riparian corridors to identify "wetland" portions.

WETLANDS PROBLEM TWO

Inadequate Provision Of Buffer Areas

Undeveloped upland areas adjacent to wetlands, which buffer the wetland from human development and activities, have diminished over time and will continue to do so, absent improvements in the regulatory process. This has led to the chronic loss of transitional habitat immediately adjacent to wetlands and a hardening of wetland edges.

ANALYSIS

The upland area adjacent to wetlands is an important habitat for many wetland species. These areas function as transition zones between wetlands and uplands and often exhibit characteristics of both habitats. In situations where development occurs on parcels with land adjacent to wetlands, some portion of the transition zone (usually closest to the wetland) may be left undeveloped and designated a buffer area. As a complement or alternative, restrictions on various activities or uses (e.g., lighting, pets, non-native landscaping) may also be placed on lands bordering wetlands. These areas act to protect the wetland from the direct effects of nearby disturbance (both acute and chronic), and provide necessary habitat for organisms that spend only a portion of their life in the wetland, such as amphibians, reptiles, birds, and mammals.

Buffer areas are incorporated into a significant number of coastal development permits; however, the conditions requiring the establishment and use restrictions of buffer areas are not consistent, and in some cases the resulting buffer area is ineffective due to the small size or non-permanent protection (e.g., no easement or deed restriction). A review of the ReCAP database shows that of the 97 projects permitted adjacent to wetlands, 38 projects (40%) included buffer areas as a permit condition. In those 38 projects, buffer widths ranged from 5 to 500 feet. Of course, buffers are not required for activities, such as on-going agriculture, that are exempt from or predate the permit process. Although it is known that buffers can reduce the adverse affects adjacent development has on a wetland, scientific studies to determine the appropriate size of a buffer are rare.⁷⁶ In addition, no investigations have been completed to determine how variations in buffer width have affected wetland resources. Nevertheless, there is a definite need to require buffers, and current standards should be refined as the requisite studies are completed.

Development projects that occur near wetlands often affect the wetland edge as well. Site visits by Coastal Commission staff offered the most revealing information regarding the condition of wetland edges and adjacent transition zones. Staff inspected 20 (20%) of the 99 wetlands identified in the project area. Adverse impacts to the wetland edge and/or transition zone were noted at fourteen of the wetlands inspected (Table 5-2, page 94). A time series view of Neary Lagoon (Figure 5-6, page 92)⁷⁷ provides a clear example of how urban development has obliterated the transitional zone and hardened the edges of this wetland, a scenario common to many wetlands surrounded by urban development. Although many of the documented changes pre-date the Coastal Act, the impacts from these changes continue to the present. For example, agricultural development adjacent to wetlands often includes a cultivation area extending up to the wetland edge. During drought years, the wetland will recede as water inputs are reduced. The cultivation area is then extended into the "now dry" wetland area. In urban areas, transition zones adjacent to wetlands have been used to provide additional public facilities (e.g., lawns, picnic benches, barbecues, and tennis courts) to enhance recreational opportunities. In addition, wetland banks are often armored where roads and railways occur. Ultimately, the loss of transition zone habitat results in the severing of important ecological connections between the wetland and the surrounding landscape. In addition, the hardening of wetland edges limits the ability of wetlands to evolve in response to both natural and anthropogenic alterations. Cumulatively, the loss of transition zone habitat and the hardening of wetland edges have resulted in major adverse impacts to the quality of wetlands in the project area.

The requirement for buffer zones around wetlands is a contentious issue. The Coastal Act does not contain specific requirements for buffer zones, just general policy language for compatible, non-impacting adjacent development (Section 30240b), so landowners may consider all adjacent upland areas available for development. Although the Coastal Commission's *Statewide Interpretive Guidelines* (1981) suggest a minimum 100 foot buffer zone around wetlands, in practice wetland buffer widths are determined on a case-by-case basis with widely disparate results.⁷⁸ A review of the certified local coastal programs (LCPs) and land use plans

Time Series of Developmental Changes NEARY LAGOON, City of Santa Cruz (1853-1994)

Panels 1-4 of 8

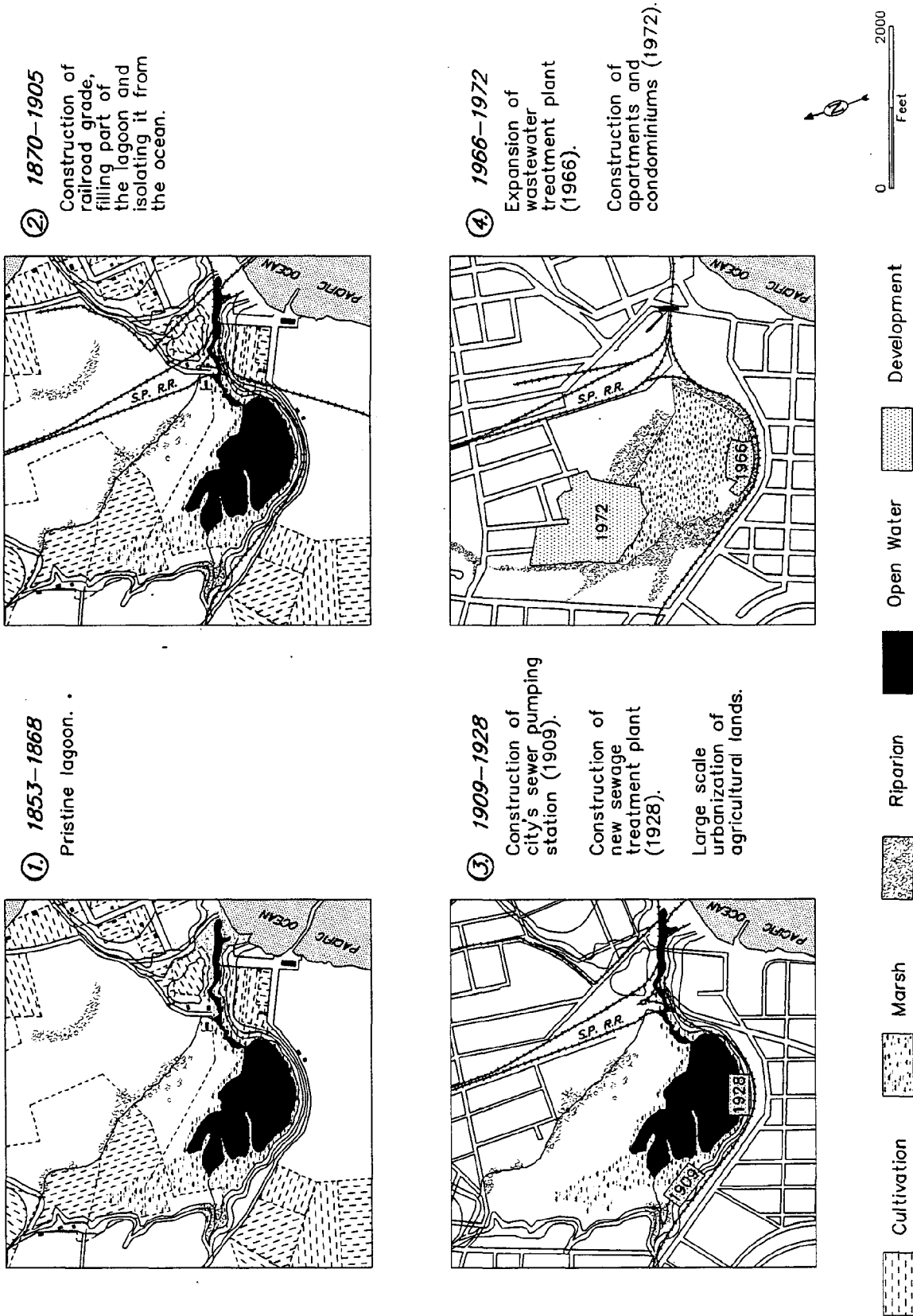
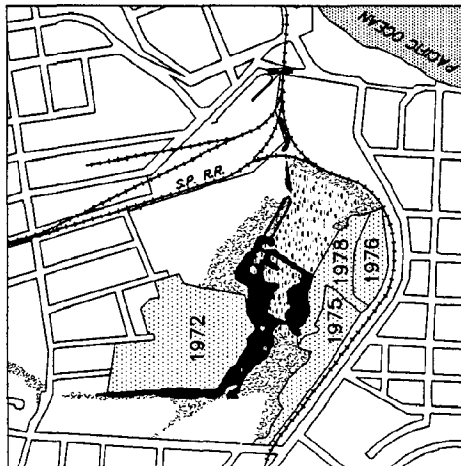


Figure 5-6
THE 2000 1000

Sources: See endnote #77. For illustrative purposes only.

Time Series of Developmental Changes NEARY LAGOON, City of Santa Cruz (1853-1994)

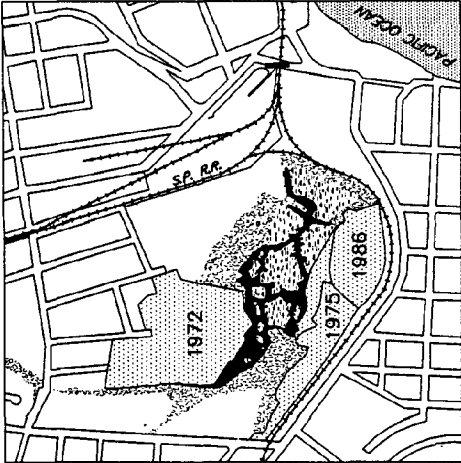
Panels 5-8 of 8



⑤ 1975-1978

Construction of park with tennis courts, lawns, boardwalks, and paths. Lagoon dredged; islands created (1975-1978).

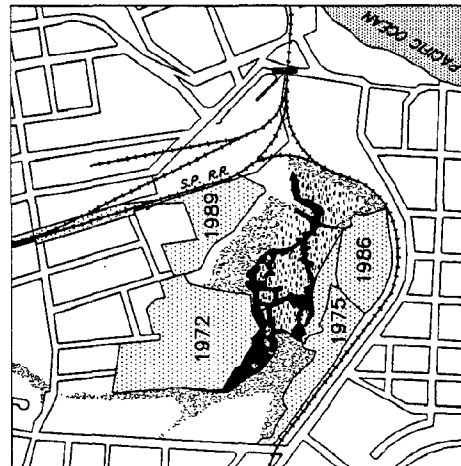
Expansion of wastewater treatment plant (1976).



⑥ 1986

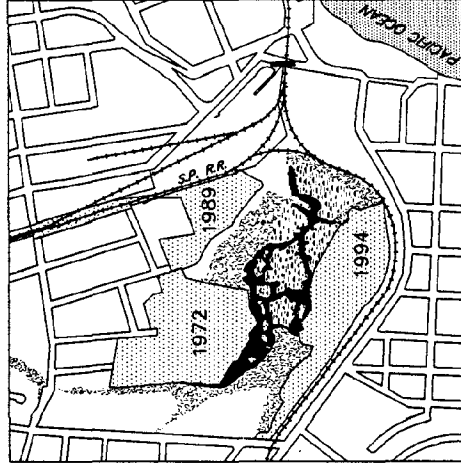
Mechanical removal of 10,000 cubic yards of marsh vegetation. Human intervention now required for existence of lagoon.

Expansion of wastewater treatment plant (1986).



⑦ 1989

Construction of senior commons housing and affordable housing units.



⑧ 1994

Expansion of wastewater treatment plant, displacing park.

Marsh Riparian Open Water Development

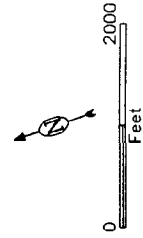


Table 5-2: Adverse Impacts to Wetland Edges and Transition Zones

Wetland Name	Impacts to Wetland Edge Caused By	Impacts to Transition Zone Caused By
Nearby Lagoon	Construction of recreational facilities, housing, roads, and sewage treatment facilities	Construction of recreational facilities, housing, roads, and sewage treatment facilities; unauthorized camping
Schwann Lagoon	Rip-rap in main channel, roads	Housing development, urban landscaping
Hanson Slough	----	Agricultural cultivation
Upper Watsonville Slough	Agricultural cultivation, industrial development	Agricultural cultivation
W. Branch Struve Slough	Agricultural cultivation	Agricultural cultivation
McCluskey Slough	Agricultural cultivation	Agricultural cultivation
Elkhorn Slough	----	Agricultural cultivation
Moro Cojo Slough	Agricultural cultivation	Agricultural cultivation, housing development
Castroville Slough (portion of Moro Cojo Slough)	Agricultural cultivation, housing development	Agricultural cultivation, housing development
Tembladero Slough	Agricultural cultivation	Agricultural cultivation
Salinas River Lagoon	Building rubble deposited along the north edge of lagoon	Agricultural cultivation
Marina Vernal Ponds 1,3,&4	----	Housing development, road construction

(LUPs) covering areas with wetlands shows buffer area provisions vary among local jurisdictions (Table 5-3). The point from which the buffer is measured also varies.⁷⁹ These inconsistencies in LCP/LUP buffer area provisions no doubt compound the problem of inconsistent application. Furthermore, most LCPs allow exceptions to the stated criteria, if accompanied by some biological evaluation that a lesser buffer will suffice.

The scientific information necessary to determine the proper size of a buffer area in California is lacking, so it is not known if any of the LCP/LUP buffer provisions are truly adequate. This problem also carries over to questions regarding the structure a buffer area

Table 5-3: LCP/LUP Provisions Relating to Wetland Buffer Areas

LCP/LUP	Required Buffer Area	Buffer Edge Measured From
Santa Cruz County	100 Feet	High water mark
Santa Cruz City	100 Feet	Wetland
Capitola	25-35 Feet	Lagoon shoreline/outer edge of riparian vegetation or bank
Watsonville	50 or 100 Feet	not stated
Monterey County		
North County	100 Feet	Edge of wetland vegetation
Del Monte Forest	100 Feet	Edge of wetland
Carmel Area	100 Feet	Edge of wetland per USFWS definition
Marina	100 Feet	Edge of wetland
Seaside	20 or 50 feet	Edge of wetland vegetation
Pacific Grove	None	Not applicable

should provide. Leaving buffer areas in a natural state has obvious advantages, but may not provide proper protection to the wetland from adjacent development. For example, one common objective of buffer areas is to prevent domesticated animals from entering a wetland. Often the most straightforward solution is to erect a fence in the buffer area; however, this would restrict wildlife movement between the wetland and adjacent uplands. Clearly, our lack of information regarding the functions of buffers compounds the policy and procedural problems associated with securing buffer areas as a condition of development.

Regulated (e.g., urban) and unregulated (e.g., agricultural) development are both continuing sources of impacts to transitional zones and wetland edges. Although land use analyses suggest full buildout has nearly been reached in several portions of the project area, population levels are projected to increase. Thus, development pressure will continue. Likely areas for urban development include south Santa Cruz County and North Monterey County. Both areas contain substantial wetland resources including three large slough complexes: Watsonville Slough, Elkhorn Slough, and Moro Cojo Slough. Strong agricultural interests will remain in the project area well into the future. Cultivation practices may begin to change in the near term as a result of concerns over nonpoint source pollution; however, practices affecting buffer areas and wetland edges will probably not change substantially unless specific regulations are implemented.⁸⁰

Based on these analyses, there is little doubt that transition zones and wetland edges will continue to be adversely affected in the future unless changes in management strategies are made. The chronic loss of these areas will adversely affect the quality of wetland habitat eventually leading to a loss in biodiversity and overall degradation of the resource. This is the situation in much of Southern California where the majority of wetlands exist in a degraded state and increasing wetland biodiversity is a primary objective of wetland conservation and restoration projects.

Continuing to follow and improve wetland setback regulations will help ensure that development near wetlands does not adversely impact the resource. Even greater assurance of protection is possible by undertaking a more specific planning process focusing on individual wetlands and their watersheds. A plan for an individual wetland can include an actual wetland delineation, allowing setback requirements relative to an accepted reference point. An inventory of, analysis of, and resultant plan for a wetland can result in a recommended buffer zone tailored to the attributes of that wetland (i.e., its species' needs and its habitat types). A plan can establish one or more optimal buffer zones along the wetland's entire perimeter depending on the type of adjacent development. It can include recommendations to manage the buffer zone and enhance it where degraded or where incompatible uses have encroached. The final problem section of this report details the status of and opportunities for this type of wetland planning.

RECOMMENDATIONS

Program Improvements:

- Explore the possibility of legislation to incorporate buffer area requirements as a specific provision of the Coastal Act.
- Work with local governments to amend LCPs to ensure that buffer area provisions are strictly and consistently applied.
- Study options for using the regulatory process and/or incentive programs to prevent agricultural and grazing activities from further intruding into wetland buffer areas.

Longer Range Opportunities:

- Until the necessary scientific studies dictate otherwise, ensure that all LCPs have a provision requiring at least a 100 foot buffer area adjacent to any wetland, measured from the wetland edge as determined by the Cowardin method. These provisions should also include limitations on permitted uses and activities within the buffer appropriate to the wetlands in question.
- Ensure that all LCPs measure buffer areas from the same point, preferably the outer delineated edge of the wetland or riparian area; make available clear and accurate maps of the established buffer zones.

Wetland and watershed management plans should:

- Specifically identify the location and appropriate uses and functions of wetland buffer areas (and discourage or preclude inappropriate, high-impact uses); require their preservation in perpetuity and, if appropriate, restoration to native vegetation; include a monitoring program to ensure maintenance of their structure and function.

Opportunities for further study:

- Complete the necessary scientific studies to determine the appropriate size and structure of buffer areas.
- Apply such studies to individual wetlands; determine if studies conducted elsewhere in the country are applicable to ReCAP area wetlands.
- Review effectiveness of Commission-imposed wetland buffer requirements over time.
- Prepare time-series maps of wetland-edge changes for other wetlands as was done for Neary Lagoon.

WETLANDS PROBLEM THREE

Impacts To Wetland Hydrology

The hydrology of most wetlands within the project area has been adversely affected by development.

ANALYSIS

The hydrology of coastal wetlands is made complex by their location at the interface between upland and aquatic environments.⁸¹ Tides, waves, currents, freshwater discharge, and ground-water seepage are all important, but variable, elements of coastal wetland hydrology.⁸² In California, wetland hydrology will also vary markedly with season, with many wetlands becoming dominated by freshwater during the winter/spring rainy period.^{83,84} In addition, the hydrology of wetlands in the project area is directly affected by the multi-year drought/flooding events that pervade California's climate.

A number of factors, both anthropogenic and natural, can affect the hydrology of wetlands. When human development alters a wetland's hydrology, the changes can adversely

affect wetland size, water quality, and habitat quality. For example, past development in the coastal zone, particularly roads and railways, have muted (e.g., at Bennett Slough and Corcoran Lagoon) or in some cases completely severed (e.g., Upper Watsonville Slough and Schwann Lagoon) the connections these coastal wetlands had with the ocean. In most cases a road or other structure was built through the wetland reducing the size of one or more channels and resulting in the placement of culverts, weirs, or tide gates that restrict or exclude tidal flow. As a result, the amount of water that these wetlands receive and the movement of water through the wetland have been diminished. In addition, earthquakes have influenced the hydrology of some coastal wetlands in the project area. For example, the 1989 Loma Prieta earthquake increased the amount of saltwater reaching some wetlands (e.g., Struve and Bennett Sloughs) by rupturing the roads and culverts that restricted tidal flows,⁸⁵ and by lowering bottom elevations.

Information reviewed and compiled by ReCAP suggests the hydrology of virtually all wetlands within the project area has been altered to some degree by human activities, such as dam building, road construction, and urban and agricultural development in the surrounding watersheds.⁸⁶ A sequence of activities on the Salinas River illustrate the timing and type of activities which have adversely affected numerous wetlands within the region (Table 5-4). Cumulatively, these activities, which mainly occurred prior to the Coastal Act, have resulted in a reduction of the amount of salt- and/or freshwater reaching the wetlands, and changes in the timing and velocity of water flowing into the wetlands. However, natural events within the ReCAP project area have also affected hydrological processes. For example, the drought of 1987 to 1992 resulted in reductions in the amount of freshwater reaching all wetlands. In contrast, the Loma Prieta earthquake in 1989 increased the amount of saltwater reaching some wetlands. The anthropogenic alterations to wetland hydrology have tended to compound the effects of these natural processes leading to synergistic cumulative impacts, including reductions in water quality, changes in habitat composition, and reductions in habitat size and biodiversity.

Table 5-4: Sequence of Human Activities Affecting the Salinas River Watershed⁸⁷

Activity	Date	Impact
Railroad and highway bridge crossings built	1850-1950	Altered channel morphology; potential degradation of water quality from highway runoff
Salinas valley sewage treatment plants goes on line	1930 and 1942	Increased regulation of water flows; chronic degradation of water quality
Santa Margarita dam built	1942	Altered timing and amount of freshwater outflow; loss of habitat for anadromous fish
Salinas River channel reconfigured and mouth relocated	1946	Altered estuarine habitat; change in saltwater hydrology
Nacimiento dam built	1957	Altered timing and amount of freshwater outflow; loss of habitat for anadromous fish
San Antonio dam built	1965	Altered timing and amount of freshwater outflow; loss of habitat for anadromous fish
Approximately 87% of watershed in agriculture ⁸⁸	by 1976	Increased withdrawal of surface and ground water; increased levels of agriculturally related nonpoint source pollution; altered watershed drainage.
Salinas River Lagoon placed under protective status by Fish and Wildlife Service and State Parks & Recreation	1972-Present	Preserved lagoon habitat

Thirty-five of the wetlands identified in the pilot area are true coastal wetlands, having one or more connections with the ocean (Table 5-5). Of these, 15 have a perennial source of freshwater. Thus, although marine processes dominate the hydrology of these wetlands, freshwater inputs are an important part of the overall hydrology. These coastal wetlands occur at

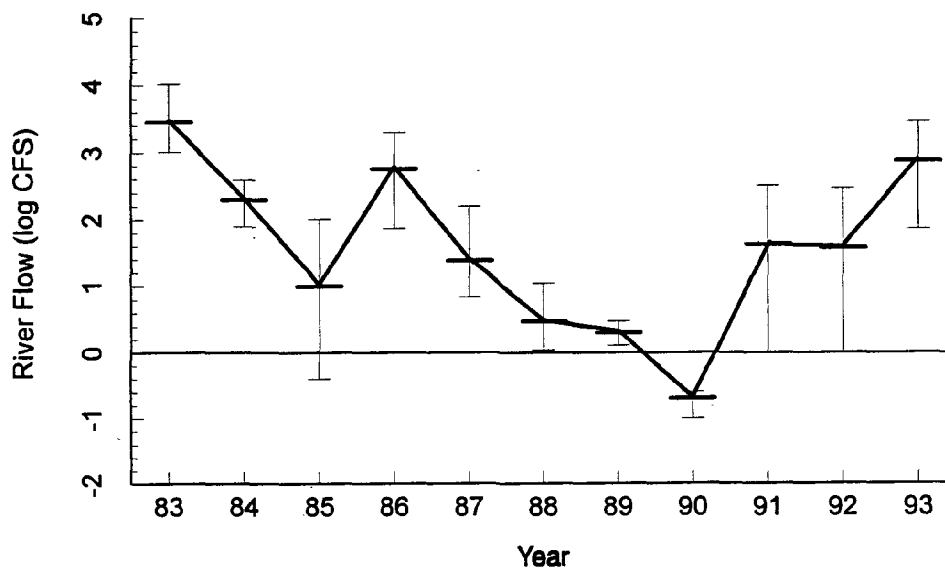
the mouths of rivers as small estuaries or lagoons, or as large systems such as Waddell Creek Marsh and Elkhorn Slough. Sixteen wetlands have a perennial source of freshwater but no connection with the ocean. The hydrology of these wetlands is a function of the freshwater supply, which although always present, will vary with season and weather patterns (e.g., droughts and floods). Coastal and freshwater wetlands with an intermittent supply of freshwater account for 69% of the wetlands in the project area (Table 5-5). These include Arana Gulch, the Marina vernal ponds, and Spanish Bay wetland. The hydrology of coastal wetlands with intermittent freshwater inputs is dominated by marine processes. The freshwater supply to these wetlands will vary with surface runoff, which is highly seasonal.

Table 5-5: Gross hydrologic categories of wetlands in the ReCAP Pilot area

Hydrologic Category	Number of Wetlands
Coastal wetland, perennial source of freshwater	15
Coastal wetland, intermittent source of freshwater	20
Freshwater wetland, perennial water source	16
Freshwater wetland, intermittent water source	48

Natural hydrological changes in freshwater supply to a wetland can be inferred through an examination of river outflow data. For example, river outflow data for the Salinas River (Figure 5-7), show annual freshwater inputs between 1983 and 1993 were largely related to regional weather patterns. Freshwater flows were highest in 1983, an extremely wet year, and lowest during the drought years, 1987 through 1992. For those 15 coastal wetlands having a

Figure 5-7: Salinas River Outflow at Sprekles, California



Source: USGS stream gauge data

perennial freshwater source, these outflow data suggest hydrological conditions within the wetlands were dominated by marine processes over much of the last ten years. Typically, such a change in hydrology would result in increased salinity throughout the year, and could affect species' distribution and abundance. For example, several species of fish use coastal wetlands as nurseries in the spring when brackish (moderate salinity) waters prevail. During a drought there may not be enough freshwater to maintain brackish conditions throughout the wetland, forcing the fish to reproduce (often less successfully) further upstream or in a different wetland. In this way, substantial droughts, such as occurred between 1987 and 1992, could adversely affect reproductive output of some wetland dependent organisms. For those 64 wetlands relying solely on freshwater as a water source, the impacts could be more direct. The drought related loss of water to these wetlands would result in a reduction in the size of the wetland and loss of wetland habitat.

Hydrologic processes within some coastal lagoons occurring in the project area illustrate the interaction between natural and anthropogenic processes and the results that these interactions can have. Several of the major wetlands in the project area are coastal lagoons (e.g., Waddell Creek Marsh, Soquel Creek, Salinas River Lagoon, and Carmel River Lagoon), and thus subject to closure through the formation of berms at the mouth. The opening and closing of a lagoon mouth is fundamentally a natural process; however, anthropogenic alterations such as the upstream diversion of freshwater, excess siltation, or reconfiguration of the mouth have led to unnatural alteration of the timing and extent of this process.

Extended closure of a lagoon mouth can have numerous adverse affects including increasing the potential for flooding, causing extreme changes in water quality, and blocking fish migration. Three examples in the project area with coastal development permits illustrate some of the processes used to prevent the adverse impact of lagoon mouth closure:

(1) Santa Cruz harbor (Arana Gulch) was historically a coastal lagoon that was altered for use as a marina. Hydrologic conditions within the marina coupled with nearshore ocean currents require nearly constant dredging to maintain the harbor mouth. The harbor district has permits to operate a suction dredge at the mouth for much of the year at considerable cost. Even so, the mouth has closed several times over the last ten years inhibiting navigation in and out of the harbor, and resulting in the production of foul odors and fish kills.

(2) The lower San Lorenzo River is another coastal lagoon whose mouth has often closed during the summer, due to low flows and beach buildup. These closures have increased the potential for flooding and could adversely impact salmon and steelhead fish migration. A coastal development permit⁸⁹ was approved for placement of an outflow control device at the mouth, as an alternative to artificial breaching. However, the water elevation control device was never installed and the City later abandoned its permit due to liability concerns, so breaching is still proposed.⁹⁰ Currently, the Army Corps of Engineers has plans to dredge the lower river channel to improve flood storage capacity; this project would also increase the tidal prism and could reduce the incidence of mouth closures.

(3) Soquel Creek is in a situation similar to the San Lorenzo River. However, unlike the San Lorenzo River, a coastal development permit⁹¹ was obtained to operate a water level control and fish bypass system and to allow breaching of the mouth as necessary. These examples, although of a common problem, illustrate three different approaches taken to achieve a remedy.⁹² Overall, these three wetlands have been maintained as lagoon ecosystems, although at substantial costs to the public and natural resources.

Excess erosion or sedimentation is the most obvious result of changes to wetland hydrology. In terms of assessing the magnitude of this problem, Elkhorn Slough is the most well studied wetland within the ReCAP project area. A recent study⁹³ found that the construction of Moss Landing Harbor in 1946 dramatically altered the Slough's hydrology and initiated ongoing

erosion. Between 1988 and 1993, approximately 420,000 cubic meters (approximately 70,000 cubic meters per year) of material was eroded from the subtidal portions of Elkhorn Slough. In addition, intertidal saltmarsh habitat has been retreating from the center of Elkhorn Slough at an average rate of 18 centimeters per year (cm/yr.) since 1946. Present day rates of saltmarsh edge retreat average 39 cm/yr. Thus, excessive development-induced erosion has been a chronic problem in Elkhorn Slough over the last 47 years, and the rate of erosion is increasing.

Meanwhile, excessive sedimentation is an ongoing problem in upper Elkhorn Slough. A recent report by Belden et. al.⁹⁴ found that two-thirds of the total sediment (approximately 178,070 tons/years) entering Elkhorn Slough is due to erosion from strawberry farms, although strawberry farms comprised only eight percent of the land use within the watershed. These unnaturally generated sources of excessive sediment will accelerate the conversion of wetland habitat to upland habitat. As wetland habitat is lost, fewer wetland dependent species can be supported. Existing policies governing land use in the coastal zone emphasize the protection of agricultural lands, limiting the regulatory alternatives for controlling agriculturally generated excessive sedimentation.⁹⁵

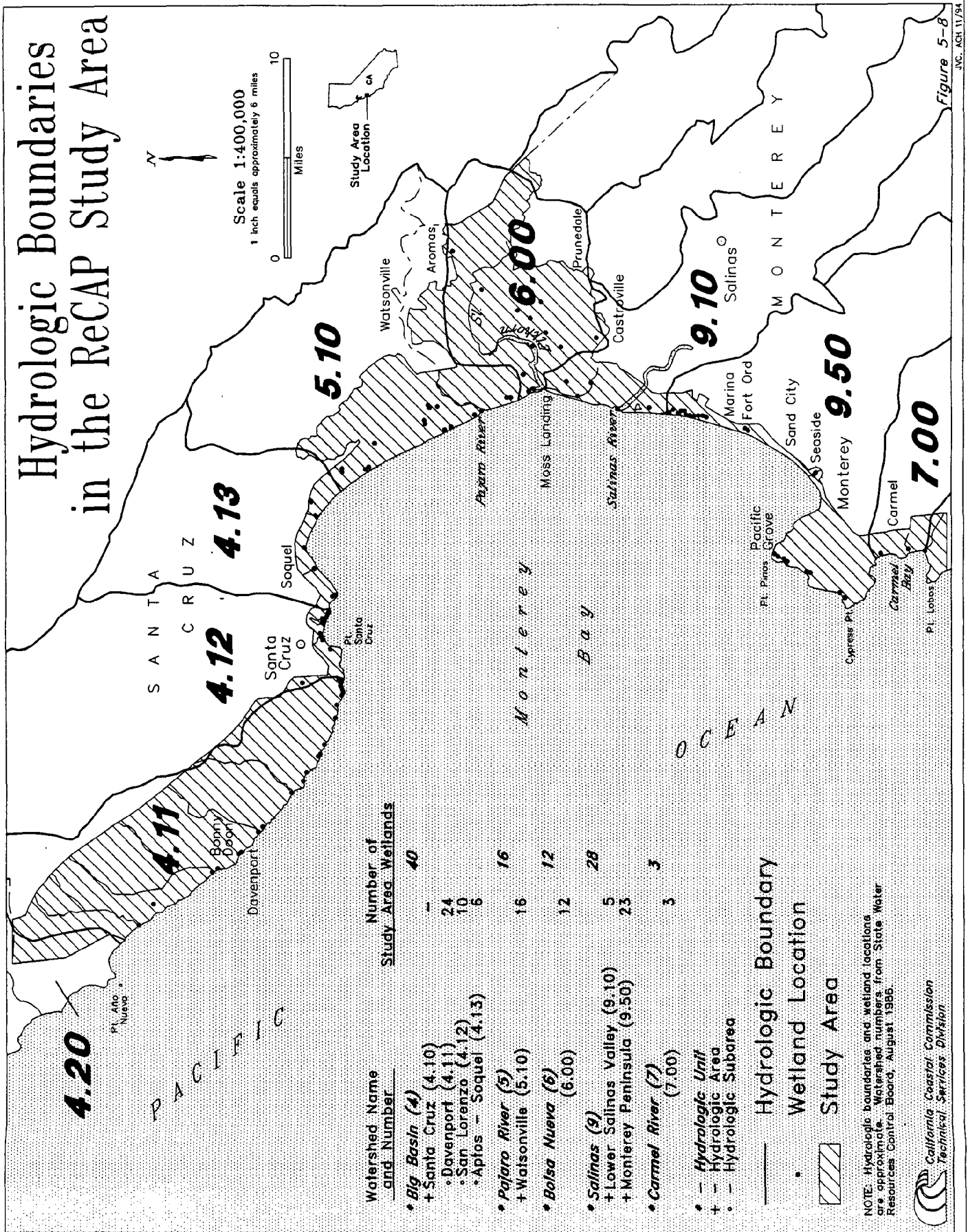
Although human-induced acceleration of erosion and sedimentation are considered adverse impacts, these processes do occur naturally and play an important role in wetland ecology. A review of aerial photographs taken in 1977, 1986, and 1993 shows the location and size of some coastal wetland outlets have changed over time. For example, the outlet of Waddell Creek Estuary migrated north about 1000 feet between 1986 and 1993. At Scott Creek, the main channel was approximately 75 feet wide in 1986 (an extremely wet year), but only about 20 feet wide in 1993. The San Lorenzo River mouth was approximately 350 feet wide in 1986, but only about 50 feet wide in 1993, when substantially different shoaling and beach conditions existed. In 1986, the Salinas River flowed through the north lagoon before entering the ocean; however, in 1977 and 1993 the river entered the ocean well south of this lagoon. These examples illustrate how wetland hydrology contributes to the dynamic nature of wetlands, an aspect critical to the long-term maintenance and health of this resource.

Changes in wetland hydrology will also affect the plants and animals within a wetland. Reducing the amount of water available to the wetland will alter the types of organisms that occur in the wetland and the density of organisms the wetland can support. For example, Valencia Lagoon is a freshwater wetland that supports the Santa Cruz long-toed salamander, an endangered species. The hydrologic function of this lagoon is critical to the existence of this species. Reductions in salamander density have been linked to a loss of habitat due to adverse impacts to the wetland hydrology stemming from road construction.⁹⁶ Similarly, changes in wetland hydrology can result in water quality changes, which in turn can affect the resident biota. The discussion on the closure and maintenance of coastal lagoon openings above is a good example of the relationship among hydrology, water quality, and wetland biota.

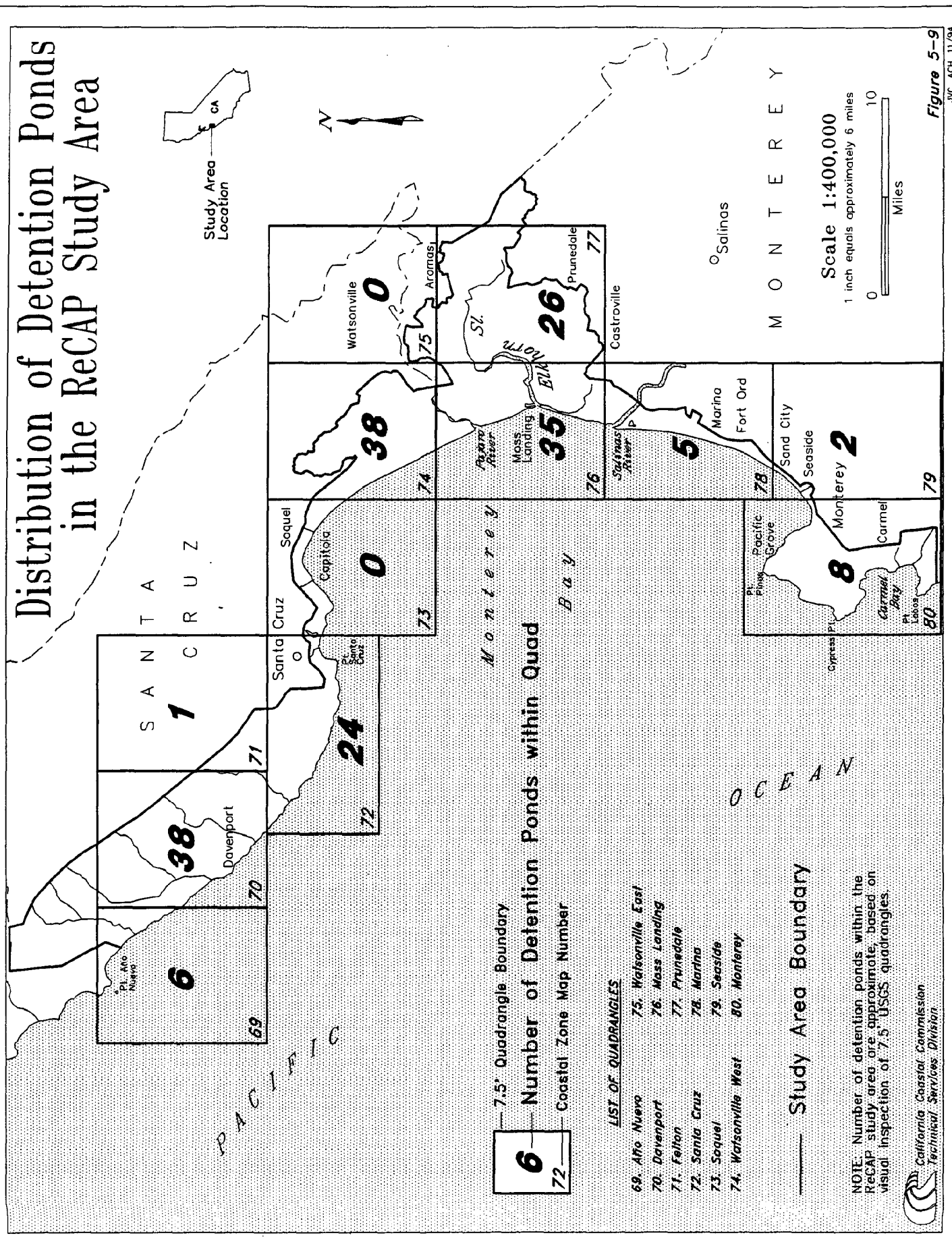
Many of the factors affecting wetland hydrology do not occur directly in the wetland, but rather within the wetland's watershed. The project area includes portions of nine major watersheds (Figure 5-8, page 101). Much of the drainage area of these watersheds occurs outside the coastal zone; however, many of the wetlands within the pilot area occur at the ends of streams, rivers, and other drainage areas within the coastal zone, and are directly affected by activities occurring throughout the watershed. Urban development increases the amount of impervious surface within the watershed, leading to increased runoff rates and channelization. Timber harvesting and agriculture have resulted in increased rates of erosion and nonpoint source pollution.

Urban and agricultural development also increase local needs for freshwater, reducing the amount of water flowing through the watershed and altering the timing of those flows. For example, aerial photograph analysis shows the existence of a substantial number of small detention ponds within the project area (Figure 5-9, page 102). These ponds are primarily used

Hydrologic Boundaries in the ReCAP Study Area

Figure 5-8
JVC, AGH 11/94

Distribution of Detention Ponds in the ReCAP Study Area



by agriculture and industry, but some may serve other functions as well. The ponds are generally small, but together cover a substantial area (Table 5-6). Some ponds are created through impoundment of small streams, but most are created in dry areas and filled with well water.⁹⁷ Between 1977 and 1993, the number of ponds increased by 51%. No doubt the presence of these detention ponds has affected the way water moves through the watershed. Although the ecological affects of these ponds are not well studied, it should be mentioned that these ponds are not without benefit. Perennial ponds can provide suitable habitat for freshwater marsh plants, and have increased the distribution of small freshwater wetlands over a broader area.⁹⁸ These ponds can provide resting and foraging habitat for migrating birds and wetland dependent animals. Yet it is unknown whether the benefits of these detention ponds outweigh the costs.

Table 5-6: Summary Information for Detention Ponds

Variable	1977	1986	1993
Total Number of Ponds	102-140*	145-199	154-212
Mean square acreage per pond	0.6-0.8	0.5-0.6	0.6-0.8
Total acreage	72-98	88-120	105-145

Overall, substantial portions of many watersheds associated with the project area have undergone significant development. Unfortunately, due to jurisdictional boundaries, regulations, for the most part, are not developed or enforced on a watershed basis. For example, between 1988 and 1992, the Department of Fish and Game processed 11 stream bed alteration agreements for projects located in Struve Slough. Although none of these projects occurred in the coastal zone, they all have affects on other locations in the watershed through alterations in the amount and timing of-freshwater flows. This is a prime example of how adverse cumulative impacts could continue to occur within the ReCAP project area regardless of any procedural or policy changes made within the coastal zone, and why new watershed-based approaches for addressing these issues must be developed.

A review of the region's LCPs/LUPs shows that with the exception of Santa Cruz County, development projects affecting wetlands are not limited based on their potential to alter wetland hydrology (Table 5-7). Santa Cruz County's LCP contains policies prohibiting construction that alters saltwater inflows to coastal lagoons and limits some dam development based on instream flow requirements. In addition, none of the LCPs/LUPs contain explicit requirements for mitigating adverse impacts to wetland hydrology. Regulation of new development cannot solve hydrologic problems caused by on-going activities. Half of the LCPs/LUPs do suggest programs to restore hydrologic functions in wetlands, but funding and other program implementation is not specified.

The process for regulating adverse impacts to wetland hydrology is complicated by the fact that wetlands comprise only a portion of larger watersheds that span multiple jurisdictions. Yet a wetland's hydrology is inextricably linked to hydrologic processes within the associated watershed. Hydrologic manipulations at wetland outlets would most likely remain in the Coastal Commission's original permit jurisdiction. However, alteration of freshwater flows could occur anywhere in a watershed. As mentioned previously, the coastal zone includes only a small portion of the watersheds in the Monterey Bay area, and other jurisdictional boundaries often bisect one or more watersheds. Activities permitted in one jurisdiction can have a direct affect on the hydrology of a wetland in another jurisdiction if these jurisdictions share the same watershed.

* Numbers reported as a range which incorporate empirically derived margins of error.

In terms of future trends, adverse impacts to wetland hydrology will continue unless changes are made to current regulatory and management practices. Although major development activities resulting in the largest changes to local hydrology have long since been completed, population projections suggest substantial increases in regional population over the next decade. Higher population levels would increase the demand for natural resources such as water and require additional development. Undoubtedly this would result in further degradation of wetland hydrology absent comprehensive mitigation measures. In addition, development in other parts of the coastal watersheds will continue. This development could also contribute to the cumulative degradation of coastal zone wetland hydrology. Meanwhile, numerous opportunities exist to restore and enhance the hydrologic functions of wetlands within the region. These projects could provide positive benefits both to the individual wetlands and in a cumulative sense to the natural resources within the region. Efforts to pursue all possible restoration opportunities must continue at all levels of government and within the community.⁹⁹ A new publication by the California State Coastal Conservancy entitled *Options for Wetland Conservation, A Guide For California Landowners* (1994) provides valuable information relevant to this issue.

Table 5-7: Results of LCP/LUP Review for provisions relating to Hydrologic Alternations

LCP/LUP	Restrictions on projects that alter hydrology	Requires explicit mitigation	Defines a specific baseline flow	Contains policies/programs designed to restore hydrology
Santa Cruz County	Does not permit projects that alter saltwater hydrology; some limits on dams	No	70-95% of stream flow	Yes
Santa Cruz City	No language	Through CEQA	No	Yes
Capitola	No language	Permit review	No	No
Watsonville	No language	No	No	No
Monterey County	No language	No	No	Yes
Marina	No language	Through CEQA	No	No
Seaside	No language	No	No	Yes
Pacific Grove	No language	No	No	No

Continuing to follow and improve existing regulations will help ensure that hydrologic impacts from new development do not occur or are adequately mitigated. Even more assurance can be gained by undertaking a more specific planning process focusing on individual wetlands and their watersheds. Such a plan can describe current and optimal hydrologic conditions to serve as a basis for analyzing new projects.¹⁰⁰ Such a plan can also anticipate likely hydrologic manipulations (e.g., river lagoon breaches) and provide criteria for (or recommend alternatives to) them. Finally, a wetland management plan can also review existing hydrologically-impacting structures (e.g., a broken tide gate) or activities (e.g., pumping) and recommend remedial actions.

There is a definite trend by many government agencies to use a watershed approach as the basis for comprehensive natural resource planning. This approach offers additional opportunities for the management and conservation of wetland hydrology based on processes and activities occurring throughout the watershed. In addition, this approach could help to reduce duplication, foster cooperation and consistency, and result in more efficient use of limited government funds. Such a plan can recommend regulatory improvements to uniformly apply to

new development in the watershed as well as necessary programs to address existing contributory activities and uses. The final problem section of this chapter outlines the status of and opportunities for such planning initiatives.

RECOMMENDATIONS

Program Improvement:

- Develop proposed legislation aimed at revising management and regulatory processes to incorporate a watershed approach into comprehensive planning and regulatory procedures.
- Develop a consistent approach for breaching lagoon mouths in consultation with the Army Corps of Engineers, the Department of Fish and Game, the Regional Water Quality Control Board, local flood control districts, local governments, and other relevant agencies. This could include the development of guidelines and/or memorandums of agreement for use in the regular permitting process.

Revise local coastal programs to:

- Include specific provisions to maintain and manage hydrologic processes both within the wetlands and the associated watersheds. These provisions should be cost effective and should apply equally to urban and agricultural lands. The regulation of erosion and sedimentation is the most direct way to accomplish this recommendation and should be an explicit part of any provision. These provisions must be consistent among LCPs to ensure equal treatment, since current jurisdictional boundaries bisect watershed boundaries.
- Incorporate appropriate information developed from the Monterey Bay National Marine Sanctuary's watershed analysis and planning work, including the identification of opportunities for the restoration of impaired hydrology and associated processes.

Wetland and watershed management plans should:

- Include wetland hydrology as a specific component of the overall plan including an inventory of problems, established baseline conditions, and recommended remedial actions.

Opportunities for further study:

- Investigate the hydrologic implications of detention ponds.
- Evaluate the effectiveness of policies to control runoff in the Elkhorn Slough watershed.
- Evaluate the success of wetland restoration projects that included hydrologic components; evaluate success of restoration projects where hydrology was not given consideration.

WETLANDS PROBLEM FOUR

Impacts To Wetland Water Quality

The water quality status of most wetlands within the project area is unknown, although some wetlands are known to have suffered adverse impacts due to human development.

ANALYSIS

Water quality is defined here as the physical, chemical, and biological integrity of a water body. Proper wetland water quality is necessary to provide an environment that not only supports the existence of wetland plants and animals but allows for their reproduction and growth. Thus, water quality is a direct measure of the health of a wetland. However, interest in wetlands has intensified recently, because of the ability of wetlands to enhance water quality. Through a variety of processes, wetlands are able to remove sediments and both organic and inorganic pollutants from the overlying water.^{101,102}

Unfortunately, much of the water quality information available in the project area is inappropriate or unsuitable for determining the long-term cumulative impacts to wetland water quality. Although a large amount of water quality data has been collected from wetlands within the pilot area, most of the information was collected to answer project specific questions. In addition, sampling methods and testing criteria vary considerably. Thus, much of the available data cannot be readily used to establish general water quality conditions or long-term trends for specific constituents. A 1976 assessment of water quality conditions in Santa Cruz County found that "in-depth examination of the surface and ground water historical water quality records indicates that there is insufficient information to adequately define the long-term, short-term, and areal variations for most of the County".¹⁰³ A recent assessment of water quality information by the Monterey Bay National Marine Sanctuary shows relatively little is still known about the quality of water in the project area (Table 5-8).

Table 5-8: Summary of Information Needs for Wetlands/Water Bodies Within the ReCAP Project Area*

Number of Wetlands and Water Bodies Reviewed	Number and (percent) for which Designated Human Use is Unknown [†]	Number and (Percent) for which Designated Habitat Use is Unknown	Number and (Percent) for which Water Quality Classification is Unknown [‡]
31	23 (74%)	13 (42%)	19 (61%)

* Source: National Oceanic and Atmospheric Administration. 1994. Monterey Bay National Marine Sanctuary Water Quality Protection Program. *Workbook Regional Characteristics*. Draft.

[†] Designated use only includes existing or designated uses.

[‡] Water Quality Classifications: Good - Waters that support and enhance the designated beneficial uses. Intermediate - Waters that support designated beneficial uses while there is occasional degradation of water quality. Impaired - Water bodies that cannot reasonably be expected to attain or maintain applicable water quality standards. Unknown - Water bodies with unknown water quality where limited or no direct observations are available.

There is information that shows nonpoint source pollution is adversely affecting some wetlands in the project area at various times. For example, there are numerous reports of elevated coliform bacteria counts.^{104,105,106} Elevated bacterial concentrations typically occur after winter storms, suggesting nonpoint source runoff is responsible. Although coliform bacteria problems mainly occur in wetlands surrounded by pasture lands and agriculture, there have been reports of problems in urban areas. Neary Lagoon provides a recent example. It is estimated that Neary Lagoon receives nearly two-thirds of Santa Cruz city's urban storm water runoff.¹⁰⁷ Fecal coliform levels in excess of 500 percent of the State and Federal water quality standards have been documented in the lagoon.¹⁰⁸ This situation has persisted for a number of years, and only recently has the Regional Water Quality Control Board required Santa Cruz City to apply for a federal discharge permit in an attempt to regulate this problem.

The introduction of pesticides, heavy metals, and other pollutants into wetlands in the project area is of ongoing concern. Unfortunately, long term monitoring data are generally not available. Additionally, the in-depth studies necessary to identify, track, and quantify these pollutants are generally cost prohibitive. The few studies completed show pesticides do exist in some wetlands within the project area. Specifically, studies of Moro Cojo Slough, Elkhorn Slough, Moss Landing Harbor, and the Salinas River Lagoon all concluded that pesticides do occur in these wetlands.^{109,110} Pesticides are thought to enter these wetlands with nonpoint source runoff from surrounding agricultural areas. In contrast, heavy metals and other pollutants such as domestic sewage are thought to enter wetlands with urban runoff. Thus, these pollutants are most prevalent in wetlands surrounded by urban areas and large developments such as central Santa Cruz County, the city of Marina, and Spanish Bay. Urban runoff into some of these wetlands can be substantial given their size. For example, 28% of the watershed draining into Majella Slough (approximately 25 acres) is now part of the Spanish Bay development.¹¹¹ Also, Marina Vernal Pond # 1 (approximately 10 acres) receives runoff from approximately 13 acres of an adjacent stretch of Highway One.¹¹² Thus, while it cannot be determined if water pollution in the project area is widespread, there clearly are areas of concern.

As with hydrology and morphology, many of the factors affecting wetland water quality do not occur directly in the wetland, but rather occur within the wetland's watershed. Along with urbanization come new sources of pollution (e.g., household pesticides, fertilizers, motor oil, and cleansers) that can enter the watershed with stormwater runoff. Timber harvesting and agriculture can result in increased rates of erosion and nonpoint source pollution. These sources of pollution have had adverse impacts on wetlands located in both urban (e.g., Neary Lagoon and Schwann Lagoon) and agricultural (e.g., Elkhorn Slough, Upper Watsonville Slough, and Tembladero Slough) areas.

Point source discharges also exist within the project area. A review of current waste discharge permits shows there are 13 active discharges into local streams and 5 active discharges into local wetlands.¹¹³ These discharges include treated sewage, overflow from settling ponds, cooling water, and effluent from vegetable and meat processing plants. The exact effects of these discharges are not fully known.

A review of the LCPs/LUPs covering areas with wetlands, revealed all but one included some pollution control requirements (Table 5-9). (The City of Pacific Grove's policy is simply to investigate potential pollution problems.)¹¹⁴ Requirements include provision of erosion controls, as well as sediment and grease traps, which are implemented on a case-by-case basis. Maintenance of such devices is generally stipulated, but there are no requirements to monitor specific pollutants or potential project related sources. With the exception of Pacific Grove, all LCPs/LUPs require wetlands to have buffers (which can help protect wetland water quality). In no case has an analysis been performed leading to information on maximum acceptable pollutant loading into a wetland. All but two LCPs (Capitola's and Watsonville's) suggest programs aimed at reducing existing pollution problems; however, Capitola has recently adopted a management plan to do so for Soquel Creek, its only wetland.

Table 5-9: Results of LCP/LUP Review for Provisions Relating to Water Pollution

LCP/LUP	Pollution Controls Required	Requires Monitoring of Potentially Polluting Projects	Requires Buffer Areas to Reduce Potential of Polluting Wetlands	Suggests Remediation Measures
Santa Cruz County	Yes	No	Yes	Yes
Santa Cruz City	Yes	No	Yes	Yes
Capitola	Yes	Possibly	Yes	No
Watsonville	Yes	No	Yes	No
Monterey County	Yes	No	Yes	Yes
Marina	Yes	No	Yes	Yes
Seaside	Yes	No	Yes	Yes
Pacific Grove	Investigate	No	No	Yes

It is hard to predict future trends for water quality in the absence of appropriate information. Land use analyses suggest full buildout has nearly been reached in several portions of the pilot area. If more recent activities such as infill development and changes in zoning decline as full buildout is reached, then the adverse impacts to water quality from development activities should stabilize. In contrast, population projections suggest substantial increases in regional population over the next decade. Higher population levels would increase the potential for pollution, particularly nonpoint sources. However, government agencies, such as the Coastal Commission, Monterey Bay National Marine Sanctuary, and Regional Water Quality Control Board, continue to refine and enhance education programs and regulatory measures aimed at reducing and/or preventing impacts to water quality. One such effort is the Coastal Commission's project of special merit to address polluted runoff.¹¹⁵ These agencies must remain proactive in their work to safeguard water quality. Although the constraints and costs to the individual may at times seem excessive, the cost of remedying chronic and cumulative adverse impacts to water quality is many times greater. Left uncorrected, the cumulative degradation of water quality will ultimately have adverse affects on many other economic resources (e.g., tourism, agriculture, and fishing) within the region.

Continuing to follow and to improve existing regulations will help ensure that adverse water quality impacts from new development do not occur or are adequately mitigated. However, as discussed in the preceding Hydrology section, real progress in addressing water quality is best achieved through watershed planning and management. Such a planning process can comprehensively address all sources polluting a wetland and coordinate responsibilities for controls and remediations. The final problem section of this chapter outlines the status of and opportunities for such planning initiatives.

RECOMMENDATIONS

Program Improvements:

- Continue to participate in the Monterey Bay National Marine Sanctuary's water quality program to complete a comprehensive Water Quality Protection Program, including a determination of baseline water quality where the condition is unknown.
- Develop mechanisms and strategies for incorporating new information and procedures for protecting water quality into the Coastal Commission's planning and regulatory programs.
- Utilize and train local government staff to use the *Procedural Guidance Manual: Addressing Polluted Runoff in the California Coastal Zone*; incorporate relevant control measures into local coastal programs.
- Continue to participate in the Moro Cojo Slough wetland management planning process and use that plan as a vehicle for developing methods to apply best management practices (BMPs) to control nonpoint source pollution.

Longer Range Opportunities:

- Incorporate the appropriate policies developed by the Monterey Bay National Marine Sanctuary's Water Quality Protection Program.
- Provide guidance to require standardized monitoring procedures as a condition of all development activities having the potential to impact water quality.¹¹⁶ Local governments, the Regional Water Quality Control Board, the Coastal Commission, and the Monterey Bay National Marine Sanctuary should work together to formulate such guidance.
- A region-wide monitoring program should be developed to obtain basic water quality information. This information should be used to determine long-term trends in water quality, help eliminate or reduce pollution sources, and identify wetlands most in need of attention.

Wetland and Watershed Management Plans Should:

- Incorporate wetland/watershed water quality as a specific element of management plans, including an inventory of problems.
- Include a standardized water quality monitoring program.
- Consider strategies to restore water quality where degraded conditions exist.

Opportunities for Further Study

- Compile water quality information from all available studies into a ReCAP wetland database; use results to recommend priorities for future data collection (e.g., by category and wetland).
- Study cumulative or synergistic effects of various pollutants entering a wetland system.

WETLANDS PROBLEM FIVE

Impacts To Wetland Biodiversity

An understanding of wetland biodiversity in the project area is necessary to fully protect and manage wetland resources. However, such an understanding cannot be determined at this time due to a lack of appropriate information. Nonetheless, there are indications that wetland biodiversity has declined due to human impacts.

ANALYSIS

The plants and animals that exist in or rely on wetlands comprise the biological component of the wetland ecosystem. Providing the function of wetland biodiversity, that is, providing the resources that result in the existence and reproduction of a diverse array of species, is considered one of the most important functions of wetlands today. Measurements of species' number and their abundance is one way to quantify the value of this function. The establishment of exotic species, the number of special status species, and changes in the number and abundance of native species are indicators of changes in biodiversity. A reduction in biodiversity is indicative of a wetland that has suffered adverse impacts.

There are several cases where actual changes in biodiversity have been noted; the majority of cases conclude that a reduction in native species has occurred.¹¹⁷ In terms of animals, fewer steelhead have been found in Carmel River Lagoon, clams have virtually disappeared from Moss Landing North Harbor (once part of the Old Salinas River Channel), fewer fish occur in the Pajaro River Marsh, and fewer invertebrates populate the Salinas River Lagoon. In terms of plants, non-native species have supplanted cattails in Gallighan Slough after it was deepened by peat harvesting, lupines in the UC Santa Cruz Inclusion Area A Seasonal Wetlands disappeared after heavy grazing, vegetation changed at Majella Slough as a result of mining activities, and willows died in the Blohm-Porter Marsh (a portion of Elkhorn Slough) after harbor construction opened it to tidal influence. Grazing and agriculture in McCluskey Slough are thought to have resulted in a loss of native species and a concurrent increase in introduced species. These changes may be responsible for a decline in the abundance of Santa Cruz long-toed Salamanders, which inhabited McCluskey Slough.

Although a large amount of biodiversity data has been collected for wetlands within the project area, much of this information is inappropriate or unsuitable for determining the long-term cumulative impacts to wetland biodiversity. For example, numerous studies contain information related to plant biodiversity. However, a review of several reports shows the study results are highly dependent on the amount of time spent completing the survey and the area covered. Various biological surveys of wetlands in the pilot area found between 2 species of plants in Moro Cojo Slough and 249 species of plants in Elkhorn Slough (Table 5-10). On average, 36 species of plants were found.¹¹⁸ Surprisingly, few surveys identified the number of special status (rare, threatened, or endangered) species. Slightly more information was available for exotic species.

Fewer studies included information relating to animal biodiversity (Table 5-11). Much of the data was categorized among animal groups such as mammals, birds, amphibians, and fish (Table 5-12, page 112). However, making comparisons among wetlands using these data would be erroneous without first standardizing the data based on a common level of survey effort. As with plants, the data was quite variable. For example, two different surveys of Elkhorn Slough identified 7 and 404 animal species respectively (Table 5-11). Few surveys identified special

Table 5-10: Examples of Plant Species Biodiversity Survey Results¹¹⁹

Wetland Name	Date of Measurements	Total Number of Plant Species	Number of Special Status Species	Number of Exotic Plant Species
Carmel River Lagoon	1991	6	--	--
Elkhorn Slough	1989	279	2	--
Elkhorn Slough	1990	9	--	1
Gallighan Slough	1982	5	--	--
Hansons Slough	1982	48	--	21
Harkins Slough	1982	46	--	16
Laguna Grande	1993	8	--	4
Lower Bennett Slough	1990	4	--	--
Majella Slough	1984	16	--	3
Marina Vernal Pond #1	1973	5	--	--
Marina Vernal Pond #1	1978	15	--	--
Marina Vernal Pond #1	1992	19	--	--
McCluskey Slough	1973	3	--	--
McCluskey Slough	1977	12	--	--
Moro Cojo Slough	1990	2	--	--
Moro Cojo Slough	1993	184	8	--

status species or non-native species. All of the survey reports containing animal species abundance or distribution data reported data for various groups of animals (e.g., birds, mammals, reptiles, etc.). Birds were most commonly identified, followed by mammals. Methods for completing such surveys were rarely stated, although the results suggest a high degree of variability. In particular, many reports included listings of "species that may potentially occur in the wetland based on the presence of appropriate habitat". Identification of appropriate habitat was based on gross observations.

Table 5-11: Examples of Animal Species Biodiversity Survey Results¹²⁰

Wetland Name	Date of Measurements	Total Number of Animal Species	Number of Special Status Species	Number of Exotic Animal Species
Elkhorn Slough	1989	404	6	--
Elkhorn Slough	1990	7	2	--
Marina Vernal Pond #1	1978	46	--	--
Marina Vernal Pond #1	1992	42	--	--
Moss Landing North Harbor	1990	23	--	5
Soquel Creek Lagoon	1992	18	1	--
Valencia Lagoon	1978	17	1	--

In general, little can be concluded from the review of this data. Much of the variability among surveys is attributed to methodological differences, rather than actual differences in biodiversity. Although repeat surveys were completed in several wetlands, generally the time span between surveys was relatively short. One exception was two surveys completed for Marina Vernal Pond #1. These surveys conducted in 1978 and 1992 found similar numbers of plants and animals in the wetland (Table 5-10 and Table 5-11), although species numbers among animal categories varied somewhat (Table 5-12). Given the available data, however, it is not possible to directly determine the cumulative impacts to wetland biodiversity. These findings point to the critical need for standardized methodologies in assessing wetland biodiversity. The methods used should yield the information necessary to answer project specific questions, as well as the appropriate information for assessing the cumulative impacts to biodiversity over time and space.

Table 5-12: Animal Species (By Group) Biodiversity Survey Results¹²¹

Wetland Name	Date of Measurement	Total Number of Animal Species	Number of Mammal Species	Number of Bird Species	Number of Reptile Species	Number of Amphibian Species	Number of Fish Species
Elkhorn Slough	1989	404	59	307	18	11	9
Elkhorn Slough	1990	7	5	2	--	--	--
Marina Ver. Pd. #1	1978	46	5	35	4	2	--
Marina Ver. Pd. #1	1992	42	1	38	1	2	--
Moss Land. N. Harbor	1992	23	3	20	--	--	--
Soquel Crk. Lagoon	1992	18	--	11	--	--	7
Valencia Lagoon	1978	17	8	--	7	3	--

Other types of data were also examined in an attempt to characterize regional changes in biodiversity. The presence of special status species or their habitat may provide an indication of a change biodiversity. An inverse relationship presumably exists between biodiversity and the number of special status species. That is, as overall biodiversity is negatively impacted, more species are placed in jeopardy of extinction, some of which receive special status listing (34%). As the number of special status species increases so does the number of habitat types critical to their existence. So the presence of special status species or their habitat may be indicative of a decline in a wetlands' ability to maintain biodiversity. A review of the ReCAP database shows 34 wetlands within the pilot area either contain special status species or appropriate habitat. This suggests that species biodiversity in the project area has been adversely impacted.

A review of the LCPs/LUPs within the region showed they all provide indirect protection for biodiversity through the recognition and enhanced protection of select habitats. Typically, the LCPs/LUPs specifically identify select habitats (e.g., habitat for the Santa Cruz long-toed salamander) or specific areas (e.g., Laguna Grande) that are rare or have received recognition because of their uniqueness in the local area. These habitats are identified as environmentally sensitive habitat areas, which severely limits development under the provisions

of Coastal Act Section 30240. However, is it not known if the indirect approach incorporated into LCPs/LUPs to protect biodiversity is preventing the loss of wetland species or appropriate habitat.¹²² This suggests a more consistent, direct, and proactive approach is needed to ensure the preservation of wetland biodiversity.

Although there are indications that wetland biodiversity is decreasing in the project area, the lack of consistent long-term biological (e.g., species abundance and distribution) and ecological (e.g., habitat type and condition) information prevents predictions of future trends. In addition, changes in the regional biodiversity of wide ranging species such as birds are affected by processes occurring outside the project area and outside the region, further confounding predictions of future trends. The analyses above suggest that the future condition of wetland biodiversity is to some extent related to land use changes within the region. On a basic level, additional development that directly or indirectly affects wetlands will affect biodiversity.

Continuing to follow and improve the regulatory process can help ensure that new development does not further affect biodiversity. Even greater assurance can be gained by undertaking a more specific planning process focusing on individual wetlands and their watersheds. A plan for an individual wetland can more specifically identify permitted uses, mitigation measures, and buffers to protect its specific plants and animals. Furthermore, in identifying existing habitat types, hydrologic systems, and water quality, such a plan can recommend improvements that would conserve or enhance biodiversity as well. Complementary broader-based natural community, watershed, and regional planning can further advance biodiversity protection and restoration at the level necessary to address entire habitats of species that frequent wetlands and the activities and land uses that affect them. The final problem section of this chapter outlines the status of and opportunities for such planning initiatives.

RECOMMENDATIONS

Program Improvements:

- Explore the potential for local governments, the Department of Fish and Game, the Monterey Bay National Marine Sanctuary and other appropriate agencies to work together to formulate standardized procedures for determining regional wetland biodiversity. These procedures should include select indicator species or other appropriate measures which can be used to identify changes in the biodiversity throughout the region.

Longer Range Opportunities:

- Incorporate standardized procedures for determining wetland biodiversity into the CCMP (e.g., local coastal programs). These procedures should also be used in studies required for environmental impact reports, management plans, and other environmental documentation required as part of the regulatory process.
- Explicitly require the use of local native plant species in all revegetation projects.
- Explore the potential for developing comprehensive habitat conservation plans for unique habitats within the region.

Wetland/Watershed Management Plans Should:

- Incorporate standardized procedures for determining wetland biodiversity for the region.

- Use relevant biodiversity information to assist in determining specific habitat restoration goals and procedures.

Opportunities for Further Study

- Compile biodiversity information from all available studies into the ReCAP wetland database; use results to recommend priorities for future data collection (e.g., by category and wetland).
- Evaluate effectiveness of Santa Cruz long-toed salamander protection policies in the Valencia Lagoon watershed over time.

WETLANDS PROBLEM SIX

Information Gaps In Decision-Making Process Need To Be Addressed

Each stage of the decision-making process regarding wetland projects -- from project conception and wetland identification to follow-up monitoring and management -- could be improved with the generation of better information and by improving access to that information.

ANALYSIS

Information Problems

ReCAP has found that analysis of cumulative impacts to the project area's wetlands is hampered by the lack of readily available and useable data. Direct access to reliable and accurate data is important in all stages of the CCMP in order to improve identification of wetlands, to assess impacts, to develop appropriate alternatives and mitigation measures, and to evaluate condition compliance and restoration success.

In reviewing Commission and local government permit files, ReCAP found the problem of information gaps evident in several aspects of the CCMP:

- specific wetland identification;
- information requirements for permit applications;
- systematic understanding of wetlands;
- agency information sharing and coordination;
- access to expertise in, and training in, hydrology and biology;
- information storage and retrieval.

Wetland Identification

Knowledge of a wetland's existence and boundaries is crucial to managing the resource. Coastal managers need direct access to an inventory of wetlands to guide wetland site identification and delineation. Without such information, a site visit may not be performed or a wetland may be missed. Access to reliable, updated site delineations would further increase assurance of wetland identification and appropriate regulatory action. Access to maps and descriptions of individual habitat types would also assist coastal managers in identifying adverse impacts and in devising appropriate mitigation requirements.

ReCAP discovered cases where identified wetlands were not acknowledged in previous regulatory actions. These cases arose where previously approved projects were never built and new site information became available upon project resurrection. For example, at Terrace Point, environmental studies in 1981 and 1987 failed to note any wetlands (the area was under cultivation), whereas a 1994 field investigation revealed four wetland areas totaling 12 acres.¹²³ At a site formerly called Villa Nueva or Rolling Hills I, a small ponded area and a swale not identified in 1982 and 1986 are now delineated as "wetlands" under standard criteria applied by the U.S. Army Corps of Engineers.¹²⁴

Previous efforts to inventory, locate, and delineate all of the area's wetlands have been incomplete. To date, the wetland location map provided in this report is the most comprehensive listing of all of the area's wetlands (see Figure 5-2, page 75). Yet, there is no single repository for wetland delineation maps. The U.S. Fish and Wildlife Service began a national wetland inventory program, the National Wetland Inventory, in the 1970's. Although all of the ReCAP area in Monterey County was inventoried, only about 50% of Santa Cruz County has been inventoried.¹²⁵ ReCAP identified 99 wetlands totaling about 6200 acres based only on staff review of the literature and aerial photography interpretation. However, some of the wetlands identified by ReCAP staff are not shown on the National Inventory maps. Further, only 59 wetlands (61%) were identified in the aggregate by background work done in the late 1970's to the early 1980's for the Local Coastal Programs (Table 5-13).

It should be noted, however, that the wetlands not identified in the LCP documents are comparatively small, representing only about 3% of the total wetland acreage. The categories of wetlands identified by ReCAP, but not in the LCPs, include:

- small stream mouths blocked by summer beach sands (e.g., Seabright, Borregas, Los Barancas, Pescadero).
- small ponds (e.g. Marina Vernal Ponds 8-11).
- seasonally wet areas (e.g. Terrace Point Lower and Upper ponds).

The existence of some of these wetlands became evident through the regulatory process. Generally, they were noted in environmental impact reports or in biological investigations that were based on actual field work.

The wetland regulatory process would be improved if coastal managers had direct access to a complete inventory of wetland resources. Development of such an inventory will necessitate detailed field work. In turn, successful field work would require manuals and training to identify appropriate indicators, as well as the necessary time, maps, and other tools to perform a complete delineation. Ultimately, wetland management would benefit if all the region's wetlands and their component habitats were named and accurately mapped on a computerized Geographic Information System (GIS) directly accessible to all.

Table 5-13: LCP Wetland Identification

Jurisdiction	No. of Wetlands Identified by ReCAP	No. of Wetlands Identified in LCP Documents	No. of Wetlands not identified in LCP documents	LCP Requires Subsequent Delineations ?
Santa Cruz County	42	27	15	yes
Santa Cruz City	11	6	5	yes
Capitola	1	1		yes
Monterey County				
Carmel Area	2	1	1	yes
North County	23	10	13	yes
Del Monte Forest	6	5	1	yes
Marina	7	6	1	no
Seaside	2	2		no
Pacific Grove	3	1	2	no
TOTALS	97	59	38	

Notes: Two wetlands in Fort Ord are not within any LCP jurisdiction, thus bringing the total to 99. Since all of the City of Watsonville's coastal zone wetlands extend into Santa Cruz County as well, they are included under the County entry; wetlands in more than one jurisdiction were counted only once. Watsonville also requires subsequent delineations.

Informational Requirements

In order to increase ease of access to available information, improvements could be made in how information is collected in the regulatory process. Also, ensuring timely and complete information from all permit applicants will assist coastal decision makers in providing a prompt, fair and thorough review. To foster a scientific basis to regulatory actions, it is also important that the information is prepared by qualified persons.

ReCAP encountered a range of informational requirements for projects involving wetlands and varying responses. For example, the California Environmental Quality Act (CEQA) requires biological analysis, but its guidelines do not address specific wetland parameters. Furthermore, approximately one-third of coastal permit applications from 1983-1993 involving the region's wetlands have been found exempt from CEQA provisions. The Coastal Commission staff recently completed a *Wetlands Procedural Guidance Document for the Review of Wetland Projects*, which lists items that should be included in permit applications.¹²⁶ Santa Cruz County has a tiered system. Initially staff performs a biotic evaluation, and based on the results, may then require a more thorough biotic report prepared by a technical specialist.¹²⁷ Monterey County's Local Coastal Program appendices spell out required contents of biotic reports. Such reports are required for sites containing or adjacent to a wetland. A cursory review of biological reports submitted with local and Coastal Commission permit applications showed a wide range in content.

In reviewing authorized developments, ReCAP found that monitoring requirements for restoration and mitigation projects varied greatly. Out of 39 projects, 20 required monitoring and 6 apparently did not (the record was unclear for the remaining 13 projects). The most common monitoring period was 5 years. Although thorough evaluation of the scope and effectiveness of local monitoring programs was not attempted, a common finding of a preliminary review was the lack of appropriate information including goal statements, baseline condition presentations, and as-built descriptions and assessments.¹²⁸ Currently, the U.S. Army Corps of Engineers has thorough monitoring report guidelines.¹²⁹ These guidelines could be used by other agencies who currently lack them. The Coastal Commission is currently

developing a procedural guidance document that provides information useful to developing wetland monitoring plans.

Reports submitted with permit applications and monitoring reports typically present only project-specific information (see Water Quality and Biodiversity sections of this chapter and the Coastal Commission's Elkhorn Slough Watershed monitoring report¹³⁰). As a result, cumulative impacts on wetland systems are difficult to quantify. Overall biodiversity or water quality may be declining in a wetland system, while the specific plant species that a project was required to protect or enhance may be flourishing, or the specific discharge that a project was required to control may be lower in concentration than the ambient condition. Ultimately, agreement should be reached on specific standardized indicators and protocols for all required project and monitoring reports.

Systematic Presentation Allowing Cumulative Impact Finding

The background section to this chapter illustrates a systems diagram for wetlands (see Figure 5-4, page 79). Depending on the complexity of a project, analysis should assess how the project impacts each component of the system. A systematic understanding is also necessary to recommend and to evaluate appropriate alternatives or mitigation measures. Watersheds would typically define the outer system boundaries. As is the case for wetlands, common identification and descriptions of watersheds is lacking in the region.¹³¹

A review of 20 coastal permits involving development in and adjacent to wetlands in the Live Oak area of Santa Cruz County revealed that analysis focused almost exclusively on the subject project and site. As illustrated in Table 5-14, there was little discussion of the project areas in the context of the wetland system and hence potential cumulative impacts to wetlands were rarely addressed.

Table 5-14: Cumulative Impacts Analysis Characterization in the Regulatory Process(Live Oak Area)

Cumulative Impact Analysis Topics	In File* (N = 20)	In Permit Finding
Generally characterized entire wetland	3	0
Discussed other projects in wetland	2	0
Related the project to entire wetland system	2	1
Analyzed watershed/cumulative impacts	3	1

*This column refers to other information contained in files, such as Environmental Impact and biotic reports. Complete local files (N=13) were not available for review. Projects with Negative Declarations stating that there were no cumulative environmental impacts without any elaboration are not included in the tallies.

In other cases, more extensive analyses of cumulative impacts have been attempted.¹³² One notable example is at Neary Lagoon where a massive wastewater treatment plant was proposed adjacent to the wetland. As indicated in Figure 5-6 (page 92), this proposal followed a series of other adjacent developments. The project's EIR qualitatively attempted to discuss the cumulative effect of these structures which "walled" in the lagoon bird habitat.¹³³ In other cases, cumulative impacts have been addressed (in a limited sense) but the mitigation deferred. For example, permits allowed immediate culvert repairs coupled with the longer-term development of monitoring and/or management plans.

Cumulative impact analysis has also been employed in the regulatory process for two wetland watersheds. At Valencia Lagoon, a breeding pond for the endangered Santa Cruz long-toed salamander, the total amount of potential development was analyzed. As a result, each individual project had to conform to measures intended to mitigate cumulative effects. At Elkhorn Slough, development was supposed to stay within targets designed to prevent

cumulative erosion problems. Until these targets were developed (as part of the local coastal program process), new subdivisions were denied, pursuant to the cumulative impact provision in Coastal Act Section 30250(a).

While comprehensive wetland and watershed planning can best address cumulative impacts (see last section of this chapter), regulators meanwhile develop and use limited cumulative impact information in reviewing individual projects, as these examples illustrate.

Agency Information Sharing and Coordination

Coastal managers can use existing resources more efficiently by sharing information and expertise. Efforts have begun in the pilot region to do this, through ReCAP, the Monterey Bay Initiative and the Coastal Aquatic and Marine Projects Information Transfer System (CAMPITS) program. Development of further mechanisms to share information about other agencies' actions and to increase coordination prior to decisions can improve wetland management.

There are some examples of intergovernmental coordination mechanisms that are useful in resolving potential wetland management problems before much project design and investment has occurred. For example, the U.S. Army Corps of Engineers holds voluntary, monthly interagency meetings (before applications are filed) for projects requiring Corps' Section 404 permits. The Department of Fish and Game, Environmental Protection Agency and other appropriate agencies are invited and usually attend; the Coastal Commission is invited for projects in the coastal zone. Roughly 25% of the applicants to the Corps take advantage of these pre-filing meetings, with a higher attendance rate for larger projects.¹³⁴ Although exact figures were not gathered, a number of coastal permits involving wetlands have been the subject of these interagency meetings. In other cases, coastal planners often make informal contact with other agency personnel, but no tabulated accounting of such contacts is available.

After the Coastal Commission approves a permit involving a wetland, it typically conditions permit issuance to receipt of other agency permits, such as those of the Department of Fish and Game and the U.S. Army Corps of Engineers. In contrast, very few locally-issued coastal permits are conditioned for receiving other agency approvals.

In the absence of consolidated wetland project review, coastal managers can continue to improve their information base by increasing and formalizing interagency contacts.¹³⁵

Access to Hydrological and Biological Expertise and Training

Some level of scientific training is desirable for staff involved with the planning, regulating, or managing of wetlands. For example, in order to identify wetlands, a certain level of biological expertise is necessary. In order to understand the wetland system components discussed in this report, knowledge of hydrology and biology is helpful.¹³⁶ A basic knowledge of these factors and relationships is helpful in suggesting the contents of environmental reports, in developing alternatives and in making informed decisions. A review of coastal permit applications involving wetlands shows that many technical issues are posed. Out of 64 projects in wetlands, 26 posed hydrologic issues. The majority of these involved culverts and/or associated water control devices or sand bar breaching. A review of restoration projects, discussed above, also showed technical issues present in determining success and suggesting corrective measures.

Coastal managers could improve the ability to evaluate these technical issues by increasing access to, and sharing, available scientific expertise and training. Currently, state and local coastal managers seem to gain information and assistance in wetland science through information in EIRs and the consultants preparing these documents, from the staff of state and federal resource agencies and, in some cases, from Commission technical staff. In cases where

biologic information is required, the providers have usually had biological training. A small number of consulting firms with specific wetland expertise and experience now provide the bulk of the technical information required by permitting agencies in the project area. For example, a review of five projects with EIR's in the Live Oak area showed that the preparers of at least the three most recent ones included biologists.¹³⁷ LCP requirements for wetland reports typically specify preparation by a "qualified" biologist. Technical consultation and information is sometimes provided to coastal managers by staff of the Department of Fish and Game and the federal resource agencies. Although the Department of Fish and Game (DFG) is a central source of expertise for the Coastal Commission, DFG personnel availability has limited the number of consultations in the region.

Given limited staff and resources, mechanisms need to be developed to make more efficient use of existing expertise in wetland systems. Mechanisms to share staff and to develop staff training programs and technical assistance programs can help increase access to, and knowledge of, wetland management.¹³⁸

Information Storage and Retrieval

The greater the availability of useful information, the more informed staff and decision-makers can become. Varied accessibility has resulted in an uneven approach to using relevant information. Initial steps to improve access to available records were taken in the establishment of the Coastal Resource Information Center in the Commission. Cataloguing and access to available documents is ongoing, albeit slowly. Efforts are underway to make access to library catalogues available from Commission computers. ReCAP examined over 350 documents from Commission records concerning the area's wetlands, but less than 10% are catalogued in the Coastal Commission's library to date. Setting priorities for cataloguing the remainder of these documents would help accelerate access to this information. In the process of ReCAP, many wetland-related reports prepared by other agencies or academicians were discovered that were not known to or available to staff or decision-makers. The same wetlands may be identified by different names and in different ways, thus making comparison among reports difficult. Maps of individual wetland are scattered among these different sources and are of varying scale and quality. It is apparent that there is a fair amount of technical information existing which would help coastal managers and decision makers if it were more directly available.

Emerging Informational Improvements

The above analysis suggests several areas where information or its use can be improved. Fortunately, some improvements are emerging as discussed in the following examples.

One agency, the Department of Fish and Game, is comprehensively reevaluating its programs. The Coastal Commission has recommended increasing information exchange and increasing input on coastal permit decisions from that Department as a way to improve implementation of the CCMP.¹³⁹ The Clean Water Act allows for state assumption of some Corps permitting functions in wetlands. While this program has generated controversy and is not necessarily recommended for California, pursuit of the concept may lead to protocols for better utilization of expertise and information among state and federal agencies.¹⁴⁰

With regard to mapping wetlands and watersheds, the Coastal Commission has available computer hardware and software that should eventually enable the storage and retrieval of such information. Some local governments have such capability, but none has a complete file of computerized wetland identification maps. The State Department of Forestry and Fire Protection is digitizing watershed boundaries for the whole state. Santa Cruz County plans to name its delineated watersheds and perform further, more individualized watershed mapping. The Commission could play an important role in coordinating these efforts.

ReCAP developed a computerized wetland database to summarize information on permits, morphological, physical, chemical, biological, bibliographical, and basic attribute information that it has reviewed. After the database modules are completed and an operational guide written, the database will offer an opportunity for agencies and the public to use and exchange the available information.

Informational Relationships To Wetland Planning and Management

Not only will improvements in the flow of information directly assist wetland management and regulatory decision-making, its use in the planning process may lead to improved decision-making. The wetland and watershed management planning processes described in the following section of this chapter can base recommendations on compiled and analyzed information. The resultant plans thus provide the context on which to base future decisions. For example, a plan may describe an optimal wetland system, including restoration areas and standards. A subsequent applicant could then incorporate such provisions as project mitigation.¹⁴¹ Planning also offers an avenue through which to address cumulative impacts. Plans can set maximum densities or coverages or requirements that assure cumulative impact thresholds are not exceeded. Individually permitted projects then have to simply comply with these requirements without the need to generate extensive original cumulative impact information. In the above-mentioned cases for Valencia Lagoon and Elkhorn Slough, such provisions were incorporated into the local coastal programs. While regulatory evaluation may still be necessary after planning is complete, it could be performed within a pre-defined context relying on directly available information. Acceptance of such plans by all agencies with regulatory authorities might lead to future efficiencies in the decision-making process itself.

On a regional level, improvements in the flow of information can lead to its use in setting priorities for wetland and watershed improvement initiatives as well as to identify gaps to be addressed by future research. A logical next step would be to identify an appropriate regional framework for wetland information compilation and dissemination.

RECOMMENDATIONS

Program Improvements:

- Revise local coastal programs to:
 - require evidence of obtaining necessary U.S. Army Corps of Engineers and Department of Fish and Game permits for wetland projects before final issuance of local coastal permits;
 - develop ways to encourage applicants with wetland projects to participate in U.S. Army Corps interagency meetings;
 - require identification of possible wetland areas in addition to those inventoried, where such procedures are currently lacking (i.e., Pacific Grove, Marina, Seaside, Monterey City, Carmel-by-the-Sea); and
 - specifically require cumulative impact findings for any project proposing to adversely impact a wetland.
- Revise local coastal program procedures (for the region's cities) to detail required biological information for wetland projects.

Initial and Mid-Range Opportunities:**With regard to wetland and watershed identification:**

- Distribute summaries of the currently used 1987 Corps wetland delineation manual to Commission and local government staff to understand how delineations they review have been derived.
- Make available other information on various delineation methods and attempts at standardization to local government staff.
- Utilize the CEQA/NEPA comment opportunities to ensure that wetlands delineations using the Cowardin system are made.
- Promote common identification of wetlands currently unnamed or with multiple names to local governments and U.S. Board of Geographic Names.
- Transfer identified wetland map information to a local government within the project area using a Geographic Information System. Evaluate options for public display (accounting for possible inaccuracies), and develop a protocol for future transfers to the other local jurisdictions.
- Obtain a Geographic Information System program for the Santa Cruz district office; train a district staff person to use it; and transfer available wetland delineations to it.
- Promote common identification of specific and aggregated watersheds to local governments and regional authorities.
- Assess the usefulness of the Division of Forestry and Fire Protection's digitized watershed mapping project, offer the agency any appropriate information or comments, and transfer to the Commission's computer.

With regard to information requirements:

- Using the ReCAP wetland database, identify, request, and if necessary, use the Commission's enforcement powers to obtain outstanding monitoring reports.
- Revise the Commission's permit application form to incorporate the information needs specified in its wetlands procedural guidance document.
- Complete the Wetland Mitigation Guidance Document under the Project of Special Merit using the U.S. Army Corps of Engineers "Habitat Mitigation and Monitoring Proposal Guidelines" in the interim to secure necessary information.

With regard to cumulative impact information:

- Apply ReCAP methods from this pilot project to ensure evaluation of cumulative impacts in the permit process (i.e., the elements of permit analysis such as those listed in Table 5-14 that address cumulative impacts); include directions for using the ReCAP database in reviewing permits to determine past impacts and place current proposals in context.
- In reviewing and commenting on any wetland management plans and in developing any guidelines for wetland and watershed plan preparation, ensure that the plans include land

use, permitted use, parcel status, and other information to provide background for cumulative impact analysis for future projects.

With regard to interagency information sharing:

- Update, expand with local entities and academicians, and distribute the contact list of wetland experts and regulatory staffs involved in wetlands.
- Make the ReCAP wetland database available and provide manuals and training in its use.
- Invite other agencies to meet to develop a common guidance document concerning what it takes to develop in wetlands, integrating all requirements.
- Conduct a joint study review with the U.S. Army Corps of Engineers for a permit involving a wetlands (i.e., accept applications simultaneously, coordinate on analysis, issue simultaneous recommendations consistent to the greatest degree possible).
- In completing preparation of the Project of Special Merit wetland performance guidance document, strive to achieve consistency with similar information requirements of the U.S. Army Corps or Department of Fish and Game.
- In reviewing and commenting on any wetland management plans and in developing any guidelines for preparation of wetland and watershed plans, strive to have clear descriptions of the review procedures for proposed future projects.
- Continue to participate in the Department of Fish and Game's strategic planning process in order to obtain more expertise devoted to wetland issues.

With regard to training

- Establish a training program on wetland issues with local government staff in the area and make technical resource issues, especially polluted runoff, a priority for training.
- Develop ways to expand use of the Commission's computerized mapping program (ARCVIEW) to be able to map wetlands and watersheds and retrieve such maps for future planning and regulatory use.
- Revive and maintain the Wetlands Task Force and designate at least one person in each office to be its wetland coordinator as a means of maximizing access to wetland knowledge.
- Derive a low-cost, on-going training program for Commission staff, especially the wetlands coordinators.
- Establish a procedure to use technical staff (either in house or from another agency) to review EIRs and biological reports with wetland issues and expand to encompass at least one study local government.

With regard to information storage and retrieval:

- Maintain ReCAP's wetland and permit databases to improve tracking of mitigation projects.

- Establish a framework for a computerized Wetland Inventory to complement the Commission's Access Inventory, with regard to required easements, deed restrictions, etc.
- Continue to organize, catalog, and disseminate watershed management information under the Polluted Runoff Project of Special Merit.
- Update the Commission's library circulation list of wetland journals and articles and evaluate options for extending circulation to local government staffs.
- Accelerate the cataloging of wetland documents in the Commission library and add and catalog other related wetland documents gathered or identified by ReCAP to be retrievable for future planning and regulatory uses.

Wetland and Watershed Management Plans should:

- Include maps delineating wetland habitats.
- Discuss the authorities of, functions of and interrelationships among agencies with identified regulatory responsibilities.
- Include cumulative impact analysis.
- Identify the most threatened components of a wetland and determine a threshold to ensure that either future development will not result in the threshold being exceeded or measures will be implemented to reduce impacts to the threshold (if already exceeded).

Longer-Range Opportunities:

- The Coastal Commission and other agencies regulating wetland development should have access to an independent wetland biologist and hydrologist with sufficient time budgeted for reviewing and monitoring wetland projects.
- All agencies regulating wetlands should have a common set of delineation maps.
- Options for coordinated wetland project review among all regulatory agencies should be explored.
- On-going training should occur to improve existing staff's expertise (e.g., how to better review restoration plans) and to reach new staff.

Opportunities for future research:

- Review a sampling of biological reports submitted to the Coastal Commission and local governments for completeness and accuracy and recommend criteria for more adequate reports.
- Use field inspection and interviews to determine success of area's wetland restoration projects that have not yet been evaluated and suggest remedial actions.
- Compare actions on allowed uses, buffers, mitigation ratios, etc. for a sampling of projects that received Coastal, Army Corps and Fish and Game permits and recommend coordinated, standardized requirements.

See also, the Information Management section of this report.

WETLANDS PROBLEM SEVEN

Comprehensive Wetland Planning and Management Framework Is Absent

The lack of a comprehensive wetland and watershed management framework has led to piecemeal decisions that do not fully protect the region's wetlands. In particular, individual decisions made on projects in wetlands without comprehensive management plans cannot readily account for cumulative impacts.

ANALYSIS

The California Coastal Management Program's primary implementation mechanism -- regulation under local coastal programs -- does not fully address the cumulative impacts to wetlands identified earlier in this chapter. LCPs primarily address new development, whereas ReCAP found that in the pilot area, existing uses and activities are the more significant contributors to cumulative effects. LCPs cover only the coastal zone, but activities throughout a wetland's watershed may have substantial cumulative effects on wetlands in the coastal zone. Many watersheds are bisected by the coastal zone; for some watersheds, only a small portion resides within the coastal zone. LCPs are divided by political jurisdiction, whereas some cumulative effects on wetlands are regional. LCPs primarily regulate the jurisdiction's land use actions, and not typically the regulatory or management actions of other agencies with authority over wetlands (e.g., a Department of Fish and Games decision to allow hunting in a wetland). On the other hand, LCPs can set fairly specific land use standards, but are often not of the detail needed to address many wetland cumulative impact concerns. Initiation of proposed LCP amendments are at the discretion of the local governments, so new or more detailed wetland initiatives are not automatically incorporated into an LCP.

Another complicating factor is that some wetlands or parts of wetlands remain under Coastal Commission permit jurisdiction, even after local coastal program certification.¹⁴² The same regulatory limitations noted here that local governments operate under also apply to the Commission's permitting authority and to some extent, its federal review authority.¹⁴³ In some cases, a project in or affecting a wetland may require two separate coastal permits -- one from the Commission and one from the local government -- further fragmenting the decision-making process. The preceding sections of this chapter conclude that new planning and management initiatives at various geographic and jurisdictional levels are necessary to more completely address the identified problems.

Considerations for Wetland Planning by Geographic Area

Within the complex regulatory, ownership, and management milieu that affects wetlands, a strategy to address both the broad and specific aspects of cumulative impact concerns is already emerging in the pilot area. Four levels of planning and resultant management are operating: by region, watershed, jurisdiction, and wetland. Another level, encompassing natural communities, may become a factor. Building on this framework in the short-term and possibly refining it in the longer-term offers a means to further protect wetland resources.

Region

The Monterey Bay National Marine Sanctuary's Integrated Coastal Management (ICM) process is a particularly promising prospect for coordinating regional wetland planning and management in the project area. Through the ICM process, the various agencies with wetland

management responsibilities could gather and disseminate information on all the area's wetlands and respective watersheds; continue to analyze the identified problems, especially their interrelationships in a regional context; prioritize problem areas needing attention; and guide and coordinate solutions. Several states and regions are undertaking such an approach, including the San Francisco Bay area, which may serve as useful models.¹⁴⁴

To date, efforts to plan for wetlands on a regional basis in the Monterey Bay area have been limited: U.S. Fish and Wildlife Service's National Wetland Inventory simply mapped wetlands by habitat type for part of the area in the mid 1970's; Santa Cruz County's Parks, Recreation, and Open Space Plan of 1972 identified many of the County's wetlands and recommended that they be the subject of specific plans; the Coastal Conservancy reviewed the status of wetlands in the area and listed 21 potential enhancement projects in 1979; the California Assembly Resources Committee listed 24 project area wetlands and causes of acreage loss; and Santa Cruz County's local coastal plan called for a (not yet established) task force to identify and prioritize key restoration projects and available funding.¹⁴⁵ Currently, as part of state and federal efforts to protect sensitive sites from oil spills, an inventory and protection strategy for the area's tidally influenced wetlands is being developed.¹⁴⁶ Concurrently, the State prepared an Ocean Resources Management Plan which includes a mapped inventory of sensitive managed areas.¹⁴⁷

The current ICM process is an interagency effort to protect Monterey Bay's water quality, under the auspices of the Strategic Environmental Assessments (SEA) division of the National Ocean Service's Office of Ocean Resources Conservation and Assessment.¹⁴⁸ As part of the establishment of the Monterey Bay National Marine Sanctuary, a number of agencies, including the Coastal Commission, signed a Memorandum of Understanding to prepare a water quality protection program for the Bay. Using a computerized database, the ICM team has gathered some available water quality and related information, including wetland characteristics for 34 of the major wetlands in the area, and combined the data by aggregate watersheds.¹⁴⁹ Prioritization of problem areas and a resultant regional water quality plan are the expected results. Altering its focus and possibly its structure (e.g. membership, time frame) to include wetland issues besides water quality and to present its findings by individual watershed would be necessary to accomplish the strategy envisioned here.

A logical next step would be to approach SEA and the ICM participants to discuss whether they are interested in assuming this role. If not, other entities could assume the lead effort, such as the Association of Monterey Bay Area Governments (AMBAG, the regional planning agency), the U.S. Environmental Protection Agency, Watershed Ecology Outreach Program, the Coastal Commission, or an interagency task force (which would require some entity to take the lead in organizing it).¹⁵⁰ Major players would also include academic researchers, as much scholarly work on area wetlands could be shared with decision-makers; private consultants, who have collectively amassed the most information on the area's wetlands; and the public, including various user groups. If in the future regional governance emerges, coordination of wetland protection efforts as described here could be one of its functions.

Watershed

At the watershed level, there is no uniform structure nor single entity with comprehensive responsibilities to address cumulative impacts on wetlands; rather, ad hoc advisory groups are forming for individual watersheds. Watershed planning and management are critical to address activities, uses, and growth patterns that affect wetland hydrology and to some extent biodiversity, as discussed in this chapter.¹⁵¹ Watershed planning is becoming quite popular as a means to address polluted runoff.¹⁵² Wetland protection would be an integral, but not exclusive component or objective of watershed plans, which could also address other issues, such as flood protection and resource utilization.

To date, one watershed plan has been completed in the region. The San Lorenzo River Watershed Management Plan addresses water resources, erosion and sedimentation, flood hazard, water quality, fishery resources, vegetation and wildlife resources, and recreation, scenic and historic resources.¹⁵³ It originally had no specific wetland component, but one was developed in a subsequent process.¹⁵⁴ Two draft Carmel River Watershed Management Plans were prepared covering many of the same topics as the San Lorenzo plan.¹⁵⁵ Watershed issues continue to receive attention in the planning for a new dam on the Carmel River.¹⁵⁶ The North Monterey County Land Use Plan was partially based on a watershed analysis to limit sedimentation into Elkhorn Slough.¹⁵⁷ Watershed planning programs are in the formative stages for Soquel Creek, Pajaro River, and Elkhorn Slough. Four wetland based management plans, including the one for Elkhorn Slough, and two which are under preparation, contain some provisions that address activities beyond, but affecting, wetlands proper (but are not comprehensive watershed plans).

The forthcoming watershed initiatives in the pilot area may occur under the auspices of CRMP (Coordinated Resource Management and Planning). Sponsored by a range of state and federal agencies, this planning approach

*addresses the dilemma of managing areas with multiple-use ownership, conflicting management objectives and requirements, conflicting land-use demands, and offsite impacts.... CRMP integrates and coordinates resource uses to accomplish specific goals... The process is designed to achieve compatibility between the land and resource uses... All resources are effectively managed for short-term and long-term use and perpetuated for future generations in a condition of high quality.*¹⁵⁸

In the future, more standardized and formalized watershed-based governance entities may emerge which could assume the noted functions. In anticipation of increased watershed planning activities, a logical next step would be continuing to review and enunciate appropriate procedural and content options. As a start, each section of this chapter contains recommendations for topics to include.

Wetland

At the individual wetland level, there is no set structure to address cumulative impacts; rather, a variety of wetland management plans have been and are being prepared under varying circumstances and auspices.¹⁵⁹ Wetland plans provide an opportunity to comprehensively address and relate all wetland issues. Wetland management plans are broadly construed in this analysis to comprehensively address regulation, management, acquisition, restoration, enhancement, monitoring and the like for entire wetland systems. Table 5-15 lists some elements common to wetland plans.

To date, wetland planning has been extensive. Nineteen wetland plans (some covering multiple wetlands) have been or are being prepared (and another two are just underway). Eighteen out of the 25 largest wetlands are covered.¹⁶⁰ However, as Table 5-15 indicates, these plans are far from comprehensive. Out of the 11 noted topics which ReCAP found to be important in managing cumulative impacts, the average number covered per plan is half (5.5); with a range from 2 to 11.¹⁶¹ Having standard guidelines for wetland plan contents could improve the ability to manage wetlands.

To achieve solutions to all wetland problems, the planning process requires the participation of affected owners and managers, as well as the public.¹⁶² No one structure appears best for management plan preparation; evaluation of the approaches used to date would be instructive.¹⁶³ As noted, wetland plans can result in recommendations for action within watersheds. Conversely, a watershed analysis can lead to wetland recommendations that more

comprehensively address cumulative impacts. While logically it would appear that watershed planning should precede (and provide the information base and parameters to) wetland planning, the latter process is currently more advanced and easier to undertake because the geographic scope is typically smaller. At this point, proceeding on both geographic tracks is worthwhile, as long as there is openness to future amendments to ensure consistencies.¹⁶⁴ If a regional framework becomes operational, it could schedule and coordinate future wetland and watershed planning efforts more efficiently.

Table 5-15: Frequency of Topics Included in Wetland Management Plans

Topic	In How Many Completed Plans (n=12)	In How Many Forthcoming Plans(n=7)
Clear Objectives	8	4
Permitted Uses Of/In Wetlands	2	0
Habitat Types Delineated	7	5
Buffers/Adjacent Development Policies	4	2
Public Access Provisions	10	4
Public Education Provisions	5	4
Watershed-based Policies	4	2
Hydrology/Water Quality Provisions	7	6
Habitat Improvement Provisions	10	6
Specific Implementation Schedule	5	2
Interagency Coordination Provisions	5	2

Jurisdiction

At the City and County level, land use planning is universal; but, as noted, its ability to address wetland issues is limited. In the pilot area local coastal program land use plans were predominantly prepared in the early 1980's, prior to preparation of most wetland management plans. As noted, LCPs are not at the level of detail of subsequent management plans. Local coastal programs for Marina, North Monterey County and Santa Cruz City, for example, simply call for preparation of wetland management plans, although lack explicit criteria for doing so. Santa Cruz City recently amended its local coastal program to incorporate policies and excerpts from its completed management plans; Monterey County, on the other hand, did not.¹⁶⁵ Because many management plans were prepared pursuant to its enforcement and permit issuance authority, the Coastal Commission formally reviewed them. Since most were not explicit components of the LCPs, they have not been amended into the California Coastal Management Program.¹⁶⁶ Future plans may not receive Coastal Commission review (or formal review) or local jurisdictional review unless required as a condition of a locally-issued coastal permit or to resolve an enforcement action.

The CCMP requires local coastal plans to have land uses, intensities, and locations as well as development criteria that result in wetland resource protection, consistent with Coastal Act Sections 30231, 30233, and 30240. ReCAP found that the region's LCPs generally conform; a few improvements can be made as recommended in this chapter. Subsequent wetland and watershed planning can apply these LCP policy and use parameters, as well as other factors, and arrive at a greater level of detail necessary to address wetland resource issues (as Table 5-15 indicates, many wetland plans to date lack a land/water use component). If a wetland planning process results in recommended land use changes (e.g., decreasing maximum bare ground

exposure to prevent sedimentation into a wetland or maximum densities in areas served by septic systems to reduce nutrient loading), then commensurate, follow-up LCP amendments will be required (as well as general plan revisions to cover beyond the coastal zone). Broader structural changes in the CCMP, involving integrating watershed and wetland management planning and implementation within the local coastal program or another process, are worthy of evaluation. This should be undertaken in the context of ReCAP's overall investigation of how the CCMP can address all cumulative resource impacts.

Implementation Authority

A comprehensive wetland management plan will likely contain a series of recommendations to address adverse cumulative impacts. Some of these may address minimizing impacts from new development (e.g., setbacks, erosion controls) that can be incorporated into the existing regulatory process. However, other recommendations may address how to manage existing natural processes and existing development; for example, recommendations to remove invasive vegetation, adjust existing tide gates, or sweep streets to prevent polluted runoff. It will thus be necessary for wetland plans to identify appropriate authorities and provisions. Since various authorities may be involved in implementation, they should also be part of the planning process. As Table 5-15 notes, only 7 out of 19 plans have significant implementation components and interagency coordination provisions.

ReCAP identified the following complexities that affect implementation of wetland management recommendations in the pilot area: private ownership, multiple ownership, public authorities with competing mandates, extra area authorities, and inadequately constituted authorities.

Private Ownerships:

Many wetlands appear to be at least partially in private ownership.¹⁶⁷ In some cases the owner is knowingly committed to wetland protection (e.g., the Nature Conservancy and the Santa Cruz County Land Trust). In some cases owners have given easements to other entities for management purposes. The extent of other private ownerships engaged in, willing to engage in, or willing to let others engage in protective stewardship is unknown. A logical next step would be to assemble an accurate picture of ownership status (including easement status) and intentions for all of the region's wetlands including their buffer areas. Also, dissemination of general information on private protective stewardship options for wetland owners need not wait for a formal planning process.

Multiple Ownerships and Responsibilities

A second management complexity involves multiple ownerships and responsibilities. At least 11 wetlands are under multiple ownership -- some of these involve a mix of public and private holdings. An example of the management dilemmas encountered with multiple owners involved Lower Bennett Slough. The Slough is separated from Moss Landing Harbor North by a road with culverts, which failed in the 1989 Loma Prieta earthquake. Moss Landing Harbor is under public trust authority by the harbor district. The road is owned by the County; the lower Slough, by the Department of Parks and Recreation and private parties; and the crossing to the upper Slough, by CALTRANS. Since the proposed repair project affected the wetland hydrology, all of these ownerships were potentially affected.¹⁶⁸ After much discussion agreement was reached on a project that could be adjusted in the future if a comprehensive wetland management plan is ever developed.

Beyond ownership, many agencies have management responsibilities which affect Monterey Bay's wetlands. These are not necessarily the same agencies with regulatory responsibilities. Even in the case of a single owner undertaking its own project, other agencies

may be involved in regulation, funding, and the like. For example, at Laguna Grande, the three primary owners, the cities of Seaside and Monterey and the Monterey Peninsula Regional Park District, united under a joint powers agreement to undertake a restoration project. Five other agencies also played significant roles.¹⁶⁹

Public Authorities with Competing Mandates

While some wetlands are owned by public agencies and managed for resource purposes (e.g., at least 16 wetlands are owned by the Department of Parks and Recreation and many have been placed in Natural Preserve status), a few portions of wetlands are owned by CALTRANS, Port Districts, or local governments who have placed management under public works departments. These agencies' stated missions (e.g., flood control, transportation) often conflict with resource management objectives. And, in the cases of breaching coastal lagoon mouths mentioned above, the responsible public agencies are other than the actual owners.

Extra-area Authorities

This chapter has documented instances of development occurring outside of, but affecting, wetlands. In the cases of dams on the Carmel, Salinas, and San Lorenzo Rivers, for example, the managing authorities do not own the downstream wetlands.

Inadequately Constituted Authority

As solutions to cumulative impacts are developed, the logical implementing entities may not exist, may lack authority to fully carry out the recommendations, or may not be adequately constituted to perform the required tasks (e.g., may lack staffing, budget, equipment, training, motivation, etc.). In North Monterey County, for example, a preventative program is in place to clean up soils eroded onto roadways so they will not wash into Elkhorn Slough and then bill property owners for costs. However, program evaluation discovered that soil is sometimes left on the road and that property owners are not always billed. The responsible agency operates the program for traffic safety, not environmental, purposes and lacks staff time and funding.¹⁷⁰ In Santa Cruz City, the Neary Lagoon Management Plan presented a series of recreational, water quality, and habitat management improvements and identified various city departments with authorities to undertake them.¹⁷¹ However, what was missing was an entity with authority to oversee and coordinate implementation. To remedy this long-standing problem, the plan recommended creating a coordinator position, which was subsequently authorized, funded, and filled. In turn that coordinator has engaged students and volunteers to perform identified tasks that city departments were constrained in performing.

As each wetland is likely to have different management needs, it will be incumbent upon the development and subsequent monitoring of each plan to identify detailed implementation strategies. In some cases, identifying new or restructured authorities or positions, with proper funding, training, and the like may be necessary.

Conclusion

In conclusion, planning for wetland resources requires an understanding of the relationship of all the system components and the effects on them as illustrated in Figure 5-4 (page 79). It then requires responses that address all of the topical issues at the appropriate geographical levels -- wetland, watershed, region, and jurisdiction. Likewise, knowledge of all the responsible and needed authorities, and a commensurate implementation strategy is necessary to carry out planned long-term management and restoration.

Addressing the information gaps in the decision-making process at the project level would also assist comprehensive plan preparation and implementation. Maintenance and use of

a computerized, regional database to enable easy access to ownership, management, project status, watershed locations and similar information for each wetland, such as developed by ReCAP staff, would support and further the identified wetland planning initiatives.

RECOMMENDATIONS

Program Improvements:

- Prepare a guidance document as to contents of wetland and watershed management plans, based on recommendations in each section of this chapter.
- Prepare the following plans for the following wetlands of particular concern:
 - Carmel River Lagoon Enhancement Plan.
 - Coastal/Vernal Ponds Comprehensive Management Plan (all marina Vernal Ponds).
 - Moro Cojo Slough Management and Enhancement Plan.
 - Pajaro River Lagoon Management Plan.
 - Salinas River Lagoon Management and Enhancement Plan.
 - Wilder Ranch Wetland Restoration Plan.¹⁷²
- Develop a schedule to prepare additional wetland and watershed management plans.
- Revise local coastal programs to:
 - require the preparation of wetland management plans, where such provisions are lacking.
 - incorporate standards for preparing and reviewing the adequacy of wetland management plans.
 - incorporate policy provisions and other excerpts of completed wetland management plans.
 - require harbor districts to update environmental management components of their harbor plans.
- Coordinate and link existing authorities, via a memorandum of agreement, to oversee a regional wetland watershed protection and enhancement strategy to, at a minimum:
 - identify wetland and watershed systems and their relationships.
 - schedule future wetland and watershed planning and restoration programs.
 - seek and coordinate funding for implementing the strategy.
 - address regulatory options within and beyond the coastal zone.
 - provide technical assistance to those entities involved in implementing the strategy and acting as a liaison with the academic community studying wetlands.
 - identify entities responsible for wetland protection and encourage and coordinate efforts where multiple authorities are involved.

- monitor success.

Initial and Mid-Range Opportunities:

- Complete, maintain, and improve ReCAP's wetland and permit computerized databases and prepare an operational manual to allow their use in future planning programs; elements to emphasize include ownership and management authorities and geocoded locations of wetland projects.

With regard to a regional framework:

- Coordinate with National Oceanic and Atmospheric Administration's Strategic Environmental Assessments (SEA) division to share relevant information among its databases and the Commission's and local governments' databases.
- Continue participation in the strategic planning process and water quality protection program and discuss with the participants the recommendations in this report related to wetland and watershed planning.
- Convene (or entice the ICM program or another entity to convene) a workshop or series of workshops on the status of the area's wetlands and solicit ideas for comprehensive planning, including using the ICM to guide implementation of this report's comprehensive planning and management recommendations. Initiate necessary follow-up (e.g., memorandum of agreement, further workshops, funding requests), based on the results of such workshops.
- Participate in efforts to prioritize future wetland and watershed planning based on identified issues and pending projects.

With regard to watershed management planning:

- Work with other agencies to promote watershed planning and participate in working groups and conferences to further this objective.
- Be involved with legislative initiatives for watershed planning.
- Evaluate options for implementing recommendations involving coastal wetland watershed issues beyond the coastal zone.
- Work with Monterey County in preparing a watershed management plan for Elkhorn Slough under the Polluted Runoff Project of Special Merit and CRMP.
- Actively participate in the Soquel Creek and Pajaro River watershed planning programs now underway.
- Continue to review dam proposals in the context of, and advocate for, comprehensive planning for the Carmel River watershed.
- Seek funding to prepare a guidance document on the preparation of watershed management plans and the relation of such plans to individual wetland plans.
- In participating in the development of or in reviewing any wetland management plans, seek to have the whole watershed addressed.

With regard to wetland management planning:

- Evaluate procedural and participatory options for preparation of wetland management plans (i.e. the process for and participants to preparing the plans).
- Evaluate options for requiring easements over wetlands and buffers as a condition of new development on parcels containing wetlands.
- Outline procedural and topical requirements for future wetland management plan preparation (see other sections of this chapter for topical recommendations).
- Evaluate options to determine when permitted work in or affecting wetlands will trigger a management plan preparation requirement.
- Participate in the on-going wetland management planning programs.
- Evaluate options for requiring wetland management plans to be incorporated into the CCMP (e.g., through the LCP amendment approval process or some other process).
- Perform more in-depth analysis of effectiveness and adequacy of existing wetland management plans.

With regard to management authorities:

- Gather information on wetland stewardship and disseminate to private wetland owners.
- Inventory all required easements (e.g., scenic, conservation) over wetlands and buffers (as identified in the ReCAP wetland database), strive to have recorded any not yet recorded, identify possible receiving agencies and incorporate into the computerized Wetland Inventory.
- Identify and pursue with the relevant entities the possibility of assuming management responsibilities for wetland areas under easement offers.
- Complete entering ownership information in the ReCAP wetland database.

Wetland and watershed management plans should:

- List appropriate management authorities and a schedule for implementing any recommendations.
- Address interagency coordination where multiple responsible authorities are identified.

Over the longer term:

- Management plans should be completed and implemented for all watersheds, according to a regionally established schedule. Thereafter, plans should be evaluated and updated on a regular basis.
- Management plans should be completed and implemented for all wetlands; plans may be for single wetlands or groupings (in some cases for small wetlands with sufficient watershed plans, the latter could include a detailed wetland component). Plans should be evaluated and updated on a regular basis.
- Wetland management plans should be revised to be consistent with their associated watershed plans.

- Local coastal programs should be revised to incorporate the results of any regional watershed and wetland planning program.
- If regional governance entities are created (e.g., a joint powers authority), they could assume responsibility for implementing the proposed regional wetland strategy.
- Watershed governance entities that may be created could assume responsibility for preparing and implementing watershed management plans.
- Wetland and watershed management planning procedural guidelines should be refined and incorporated into the CCMP.
- Natural communities should be geographically defined and the recommended wetland planning framework be adjusted accordingly.

Opportunities for further study:

- Identify the region's natural communities.
- Evaluate success of pioneering watershed planning exercises and offer recommendations for future efforts.

¹ See, for example discussion in Chapter 1 of California Coastal Commission, *Procedural Guidance For the Control of Polluted Runoff*. 1995.

² Williams M. Understanding wetlands. Pages 1041 in M. Williams [ed.]. *Wetlands: A Threatened Landscape*. Alden Press Ltd., Oxford, England. 1991.

³ For more detailed discussions of individual regulations see Environmental Law Institute. *Wetlands Deskbook*. Washington D.C. 1993

⁴ Dennis, N.B. and M.L. Marcus. *Status and Trends of California Wetlands*. Final report prepared for the California Assembly, Resources Subcommittee. 1984.

⁵ Note that diagram does not necessarily reflect the sequence of project review.

⁶ Note that the "coastal zone" as defined in the Coastal Act does not include San Francisco Bay, which is the jurisdiction of the Bay Conservation and Development Commission.

⁷ Allowed uses within wetlands include: port-related and coastal-dependent industrial facilities; maintenance dredging; mineral extraction (except in environmentally sensitive areas); restoration projects; nature study, aquaculture, or similar resource-dependent activities; and incidental public service purposes such as utilities.

⁸ Since local coastal programs were certified, predominately in the early 1980's, they have been amended, in regard to wetland issues, at least forty times in the aggregate. In many cases, the amendments facilitated development adjacent to wetlands, both private and public (e.g., a park, wastewater treatment plant). On balance, the overall result is slightly more intense development around wetlands; but in some cases, lower adjacent intensities have resulted. In only two cases, did the amendments result in development in wetlands; one for a landfill, one for a school. In these cases, "riparian" rather than wetland loss was acknowledged and compensating mitigation was incorporated (see Problem One section of this Chapter). In general, local coastal program wetland provisions have remained largely in tact since original certifications. California Coastal Commission. *ReCAP database*. Wetlands and Local Coastal Program modules.

⁹ The number and nomenclature of the project area wetlands is somewhat arbitrary. For example, the *Independent Report on Environmental Considerations for the Marina Freeway* (Caltrans, 1973) and subsequent *Environmental Analysis for the Coastal Zone of the City of Marina* (Biosystems Analysis, San Francisco, 1980) identified a wetland impacted by the new Highway 1 as Marina Vernal Pond #6. Three nearby ponds were identified as Marina Vernal Ponds #9, 10, and 11. Years later, a *Coastal/Vernal Pond Comprehensive Management Plan* (Habitat Restoration Group, Felton, 1993) fails to identify Pond #6 (which still exists) and instead calls Ponds #9-11 "Pond #6."

Some connected water bodies have been given different names (e.g., Laguna Grande and Roberts Lake) and hence, in some cases, are listed as separate wetlands in the California Coastal Commission ReCAP wetland database. On the other hand, there are some connected water bodies or discernible components that are listed as a single wetland (e.g., Elkhorn Slough which includes such components as South marsh, North marsh, and Blohm Porter marsh). Separate water bodies are usually listed separately (e.g., Marina Vernal Pond #1 and #2, etc.), but occasionally are grouped under one name, especially when they were likely once connected (e.g., Pajaro River mouth includes the small seasonally wet pond to the south). Riparian areas were generally not listed unless they were specifically described as wetlands in the literature, a trend that has been increasing in recent years. Detention ponds, golf course ponds, and other artificially created water bodies are not listed.

This exercise identified as wetlands four sites that would require on-site biological evaluation to arrive at a final determination: Indian Head and Fort Ord Pond in the Fort Ord dunes, Pacific Grove Municipal Golf Course swale, and DeAnza Mobile Estates pond.

As ReCAP progressed and new field delineations were made, additional small, non-tidal areas were determined to be wetlands. Although within the already listed wetland systems, they are disjunct and could merit separate nomenclature and database entries. In addition to those noted by Moro Cojo Slough (see Endnote #130), these include: an acre wetland behind an old concrete spillway on Wilder Creek about one mile above the lagoon (according to Short, Rob and Brown, Kathy, *Wilder Creek Watershed: Facts, Photos and Fish Barriers*, UCSC paper for ENVIS 167, Santa Cruz, Spring 1994); a freshwater seep adjacent to Old Dairy Gulch (and three others on its tributaries) about one mile above the lagoon (according to Jones & Stokes Associates, *Wilder Sand Quarry Draft EIR*, Sacramento, August 1994); and a half-acre native marshy slope on a bend of Moore Creek about one mile above Natural Bridges Lagoon. (according to Strelow, Stephanie, *Sphere of Influence Amendment, Local Coastal Program Amendment, General Plan Amendment, and Rezoning of Meder Street Properties*, Revised Draft EIR, Santa Cruz, December 1990, p. 28.)

¹⁰ California Coastal Commission, Cartographic Unit. *ReCAP Photo Interpretation Notes*, 1994. These results are based on an analysis of wetland acreage in the ReCAP project area using the following methodology: the identification and subsequent acreage determinations of wetlands in the project area were completed via manual interpretation of the Coastal Commission's existing vertical color aerial photographs obtained in 1977-78, 1986, and 1993. The nominal scale of the source photography is 1:32,500 (1 inch equals approximately 2,700 feet) for 1977, and 1:12,000 (1 inch equals 1,000 feet) for 1978, 1986, and 1993. Aerial photographs covering each wetland area were examined stereoscopically, and detailed notations were made. Remarks were predominately qualitative, however, in certain cases approximate measurements of length and area were made for purposes of comparison. Although the resolution of the aerial photographs will readily allow detection of linear changes of less than 50 feet, and area changes on the order of less than an acre, the images are not rectified (i.e., free from geometric distortion), nor are they orthogonal (i.e., planimetrically correct). Therefore, the results are considered approximations, appropriate for rough assessments of change only. In addition, other factors such as vegetation composition, seasonal changes, time of day, tidal stage, sun angle, film type, and aircraft position all affect the ultimate content of the image and its utility for wetland analysis. A limited number of wetlands in the pilot area were visually inspected in the field as a means of corroborating photographic analysis; however, these site visits were generally of a reconnaissance nature, and involved no actual surveying.

¹¹ Trophic dynamics relates to the sources, sinks, and flux of energy within a wetland and the translation of that energy into new individuals. This process is most straightforward for plants using measures of primary productivity.

¹² Johnston, C.A. "Cumulative Impacts to Wetlands". *Wetlands*. 14(1)49-55. 1994.

¹³ Tiner, Ralph W. Jr., *Wetlands of the United States: Current Status and Recent Trends*, for U.S. Fish and Wildlife Service, Washington, D.C., 1984 notes the net loss of approximately nine million acres of wetlands nationally, since the 1950's, mostly due to agricultural development. Estimates for California's historic loss, (see for example, Gosselink and Baumann, "Wetland Inventories: Wetland Loss Along the United States Coast," *Z. Geomorphology*, N.F. Suppl.-Bd., 34: 173-187) do not include an estimate for the Central Coast area. Nearby San Francisco Bay is estimated to have lost nearly 95% of its historic wetlands according to Josselyn, Michael, *The Ecology of San Francisco Bay Tidal Marshes*. Washington, D.C., 1983.

¹⁴ Whether a habitat change is environmentally adverse or not depends on the entire wetland system and any management goals. In the Elkhorn Slough system, for example, increased open water habitat at the expense of vegetated salt marsh habitat and increased salt water at the expense of inland freshwater habitat have resulted in a management plan strategy aimed at reverting the affected area to more historic conditions. See, ABA Consultants,

Elkhorn Slough Wetland Management Plan, Capitola, California 1989. In the Old Salinas River channel mitigation occurred absent a management plan and more open water area resulted. According to project critics, "this mistake could have been avoided if a resource management plan were available for Old Salinas River." ABA Consultants, Moss Landing Marine Laboratories, *Earthquake Reconstruction Planning Document D, Wetland Enhancement Plan*, Capitola, November 1992, p. 12. Such a plan would have considered the entire wetland, resulting in better judgments about optimal types of wetland habitats to restore. In contrast, the change to open water could be beneficial in cases where dense vegetation growth has impaired water circulation and limited plant diversity.

- ¹⁵ ABA Consultants, *Elkhorn Slough Wetland Management Plan*, Capitola, California 1989, p. 14 shows an estimate that at least 90% of Monterey Bay's coastal wetlands were ditched and drained from the mid 1800's to the 1940's, but the method for determining this estimate is unstated.
- ¹⁶ Habitat Restoration Group. et. al., *Draft Salinas River Lagoon Management and Enhancement Plan*, 1992, Table 5, p. 39.
- ¹⁷ Jones & Stokes Associates, Inc., *Final Neary Lagoon Management Plan*, Sacramento, 1992, pp. 5 -8.
- ¹⁸ Moss Landing Marine Laboratories, *Wilder Ranch Wetland Restoration Plan*, Moss Landing, 1993, p. 84. This is the only clear example of mapping historic wetland extent in the ReCAP project area.
- ¹⁹ California Coastal Commission, ReCAP Wetland Database. This database includes any mentioned or inferred causes of historic wetland loss, based on the literature. Some development/activities occurring in wetlands (number of wetlands affected in parentheses) prior to 1973 include agriculture (14 wetlands), road construction (12), flood control (6), grazing (6), boating (5), urban development (4), resource extraction (3), and landfills (3). Quantified losses from such activities are not generally offered.
- ²⁰ This fragmentation may have been offset to some degree by the construction of numerous small detention ponds which have developed wetland functions over time, according to Gordon, Burton L., *Monterey Bay Area: Natural History and Cultural Imprint*, Boxwood Press, Pacific Grove, 1977, p. 224.
- ²¹ United States Geological Survey Map, Monterey Quadrangle, 1911-1912.
- ²² Gordon, Burton L., *Monterey Bay Area: Natural History and Cultural Imprint*, Boxwood Press, Pacific Grove, 1977, p. 234
- ²³ Hornbeck, David, *Landscape Change in the Pajaro Valley, 1840-1880: A Study in Change Processes*, masters thesis, Fresno State College, Fresno, 1969, pp. 11, 17.
- ²⁴ Gordon, Burton L., *Monterey Bay Area: Natural History and Cultural Imprint*, Boxwood Press, Pacific Grove, 1977, pp. 85-87.
- ²⁵ Crampton, T.A. *Long Term Effects Of Moss Landing Harbor On The Wetlands Of Elkhorn Slough*. University of California, Santa Cruz. Master of Science Thesis. 1994. 81pp.
- ²⁶ Holland, Cindy and Kentula, Mary, "Impacts of Section 404 Permits Requiring Compensatory Mitigation on Wetlands in California (USA)", *Wetlands Ecology and Management*, 2(3), pp. 158-159.
- ²⁷ Section 30607.1 provides a mitigation standard for no net loss or in lieu fees:

Where any dike and fill development is permitted in wetlands in conformity with Section 30233 or other applicable policies set forth in this division, mitigation measures shall include, at a minimum, either acquisition of equivalent areas of equal or greater biological productivity or opening up equivalent areas to tidal action; provided, however, that if no appropriate restoration site is available, an in-lieu fee sufficient to provide an area of equivalent productive value or surface areas shall be dedicated to an appropriate public agency, or the replacement site shall be purchased before the dike or fill development may proceed. The mitigation measures shall not be required for temporary or short-term fill or diking if a bond or other evidence of financial responsibility is provided to assure that restoration will be accomplished in the shortest feasible time.

Few LCPs require mitigation of wetland fill, most are silent, probably because they do not explicitly permit wetland fill. Only the *North Monterey County Land Use Plan* has a specific mitigation ratio, which is 1:1.
- ²⁸ California Coastal Commission, ReCAP Wetland Database. ReCAP has so far identified 64 projects as being permitted in wetlands since 1973; 27 fills, mostly in minor amounts.

- ²⁹ California Coastal Commission, Coastal permit appeal A-3-STC-85-257; findings for Santa Cruz City Local Coastal Program submittal, July 8, 1981; Coastal permit P-670.
- ³⁰ Changes in wetland area are primarily based on a review of aerial photographs from 1977, 1986, and 1993, supplemented by permit files and the literature. California Coastal Commission, Cartographic Unit. ReCAP Photo Interpretation Notes, 1994. In some cases, 1978 or 1979 aerial photos were used because they were clearer. Habitat changes were difficult to cumulatively describe as they could not be discerned as well from the photos and are often not described in the literature.
- ³¹ California Coastal Commission, ReCAP Wetland Database and Draft Summary of Wetland Enforcement Activity in Santa Cruz and Monterey Counties, November 1994.
- ³² California Coastal Commission ReCAP Wetland Database, developed in 1994, identifies eight pending wetland fill projects.
- ³³ Almost the same number of wetlands (14) were subject to after-the-fact enforcement actions regarding wetland fills as were subject to before-the-fact permit applications for wetland fills (17 wetlands). California Coastal Commission, ReCAP Wetland Database and Draft Summary of Wetland Enforcement Activity in Santa Cruz and Monterey Counties, November 1994.
- ³⁴ Other regulatory programs have similar gaps. For example, CEQA, where mitigation measures may be offered to protect wetlands, does not apply to all projects which could affect wetlands, such as emergency repairs to public facilities, water withdrawals from a reservoir, housing in an urbanized area, and pipeline reconstruction. See Remy, Michael et. al., *Guide to the California Environmental Quality Act*. Point Arena: Solono Press Books, 1993. Under the Clean Water Act, no permit is required to fill less than one acre of wetland.
- ³⁵ California Coastal Commission, "Interpretive Guidelines for Wetlands and Other Wet Environmentally Sensitive Habitat Areas," San Francisco, 1981, p. 40
- ³⁶ California Coastal Commission, Jurisdiction to Require Coastal Permits for Removal of Major Vegetation Other Than for Agricultural Purposes, Section 30106, memorandum by Roy Gorman and Linda Breeden to Coastal Commission, San Francisco, November 1980. The California Attorney General does not share the Commission's interpretation.
- ³⁷ The County Code explicitly states that coastal development permits shall be required for new or expanded agricultural operations on parcels with predominantly 10% or greater slopes and on soils with high or very high erosion potential. This allows the implementation of policies which basically prohibit the conversion of steep slopes in the Elkhorn Slough watershed to agriculture (however, no permits have been issued before such conversions have occurred; this was in response to a series of conversions that occurred in the late 1970's and early 1980's, before the County assumed permit authority in 1988). This clarification would not be helpful in stopping most agricultural intrusion into wetlands, since they are not typically over 10% slope or highly erodible.
- ³⁸ Harris, Raymond, Jr., *Application of NOAA's Coastwatch Change Analysis Project for Wetland and Upland Change Detection in the Elkhorn Slough Watershed*, San Jose State University, May 1994; Habitat Restoration Group, *Moro Cojo Slough Management and Enhancement Plan Vol 1 Existing Conditions Report*, Felton, March 1994; California Coastal Commission, Cartographic Unit. ReCAP Photo Interpretation Notes, 1994.
- ³⁹ Coastal Commission enforcement procedures are outlined in memoranda that have yet to be consolidated into a guidance manual, although this is currently underway.
- ⁴⁰ It is difficult to discern from aerial photos whether a complete loss of wetland has occurred; or whether the wetland technically remains, but in an altered (degraded) state. Discovery through ReCAP has resulted in initiating enforcement follow-up. Use of aerial photo interpretation on a regular basis would be a valuable enforcement tool.
- ⁴¹ California Coastal Commission, Draft Summary of Wetland Enforcement Activity in Santa Cruz and Monterey Counties, November 1994.
- ⁴² Based on ReCAP's review of aerial photos, there did not appear to be any cases of wetland loss in the pilot area due to non-compliance. (California Coastal Commission, Cartographic Unit. ReCAP Photo Interpretation Notes, 1994). However, a more thorough investigation than was possible for ReCAP might have found problems. In an example where an actual field evaluation was performed in Oregon, 46 of 72 compensatory wetland mitigation projects had one or more compliance violations. (Oregon, Division of State Lands, *A Report Monitoring and Evaluating*

Wetland Compensatory Mitigation Projects In Portland, Oregon by Joel Shaich and Ken Franklin, draft memorandum, Salem, February 1994.)

With regard to paper conditions, half of the area's coastal land use plans require protective easements to be placed over privately owned wetlands, as a condition of permitting development on the property. At least 21 coastal permits required protective easements to be placed over wetland areas. A sampling of five required easement offers at Moro Cojo Slough in the Elkhorn target area, revealed only two had been recorded. A review of the files of 13 restoration projects requiring monitoring reports, revealed that only three had the requisite reports. In one case, Moss Landing Harbor District staff explained that sufficient money was not budgeted to cover a consultant's estimated monitoring costs, and questioned the efficacy of spending substantial sums on monitoring, according to personal communication with Larry Stefan, Harbormaster, June 22, 1994. Review of monitoring costs and ensuring funding are issues worthy of further investigation. See for example, King, Dennis and Bohlen, Curtis, "Estimating the Costs of Restoration," *National Wetlands Newsletter*, Vol 16, No 3, May/June 1994, pp. 3-8. Whether the lack of documentary condition compliance translates into incomplete wetland mitigation is unknown. Unlike the Coastal Commission's computerized Access Inventory, no comparable database or tracking of easement or monitoring requirements has been established. The ReCAP database can be used for such purposes. There is no record of subsequent monitoring of easement use.

⁴³ U.S. Fish and Wildlife Service, *Classification of Wetlands and Deepwater Habitats of the United States*, by Lewis Cowardin, et. al. Washington, D.C. 1979.

⁴⁴ Monterey County, *Carmel Area Land Use Plan*, and *City of Santa Cruz General Plan and Local Coastal Program 1990-2005*.

⁴⁵ "Wetlands" is a generic term without a universally accepted definition. Enlightening discussions of this topic are found in California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994, pp. 41-48; San Francisco Estuary Project, *Status and Trends Report On Wetlands and Related Habitats in the San Francisco Estuary*, Oakland, 1991, pp. 21-27; Kusler, J.A., "Wetlands Delineation," *Environment*, Vol 35, March 1992, pp. 6-11+. For purposes of analysis, the most important consideration appears to be the presence of wetland indicators. Variations in definitions and hence delineation methods hinge on the number of the three common wetland indicators -- hydrology, hydric soils, hydrophytic vegetation -- requires before a positive wetland identification is made. According to personal communication with Wayne Ferrin Jr., UCSB Department of Biological Sciences, June 14, 1994, there are potentially significant areas that may not appear to be "wetlands" to the casual observer (because they are not always wet) that qualify under at least the more expansive wetland definitions.

Interestingly, in some cases significant standing water bodies have been termed "ponds," "lakes," "bays," etc. and not considered wetlands. However, under Section 30233 of the Coastal Act, open waters and lakes receive almost the same protection as wetlands.

⁴⁶ See, for example, "What Is a Jurisdictional Wetland?" *National Wetlands Newsletter*, Vol 13, #5, September/October 1991.

⁴⁷ California Coastal Commission, *Interpretive Guidelines for Wetlands and Other Wet Environmentally Sensitive Habitat Areas*, San Francisco, 1981. Also see California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994, p.25 for a discussion of this topic.

⁴⁸ County of Monterey, Department of Planning, *Environmental Impact Report for Spanish Bay Development*, Salinas, 1976, p. 28. noted drainage channels into the area and ponds formed in the mined out areas. Environmental Management Consultants, *Spanish Bay Resort Environmental Impact Report*, Monterey 1984, Appendix H, p. 3 briefly notes the presence of a wetland (riparian corridor). California Coastal Commission, 3-84-226 permit staff report, March 1985, did not mention "wetlands." LSA, *Spanish Bay Resources Management Plan*, July 1987, p. II-1, VII-1 noted small seasonal wet areas and drainage ways.

⁴⁹ California Coastal Commission ReCAP, personal communication with Lee Otter, Coastal Planner, May 3, 1994.

⁵⁰ Derived from aerial photographic display maps accompanying Pebble Beach Company, *Spanish Bay Resource Management Plan, Fifth Annual Monitoring Report*, Pebble Beach, March 1994 compared to California Coastal Commission, Cartographic Unit. ReCAP Photo Interpretation Notes, 1994. Lacking a pre-development field investigation, it will never be known how much wetland acreage there truly was.

- ⁵¹ California Coastal Commission Coastal permit appeals A-3-SNC-89-10, -11, & -12; findings on Santa Cruz County Local Coastal Program Amendment # 1-93.
- ⁵² Ray, Daniel and Woodruff, Wayne, *Mitigating Impacts to Wetlands and Estuaries In California's Coastal Zone*, paper presented at Association of State Wetland Manager's conference, New Orleans, October 11, 1986; San Francisco Bay Conservation and Development Commission, *Mitigation: An Analysis of Tideland Restoration Projects In San Francisco Bay*, San Francisco, March 1988; California Coastal Commission, *Humboldt Bay Wetlands Inventory Project: Data Interpretation and Summary*, January 1989.
- ⁵³ This project was not mitigation. Josselyn, M., S. Chamberlain, K. Goodnight, H. Hopkins, and A. Fiorello. *Evaluation of Coastal Conservancy Enhancement Projects 1978-1992*, a report prepared for Reed Holderman, State Coastal Conservancy. Oakland, California. 1993.
- ⁵⁴ Pebble Beach Company, *Spanish Bay Resource Management Plan, Fifth Annual Monitoring Report*, Pebble Beach, March 1994; Monterey County Coastal Permit PC-7523 (3-MCO-90-077).
- ⁵⁵ Habitat Restoration Group, *Moss Landing South Harbor Wetland Restoration Project Monitoring, Second Annual Monitoring Report*, Scotts Valley, October 1992.
- ⁵⁶ ABA Consultants, *Moss Landing Marine Laboratories Earthquake Reconstruction Planning Document D, Wetland Enhancement Plan*, Capitola, November 1992, pp. 12 -14.
- ⁵⁷ See California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994, for a more expansive discussion of this issue of interpreting permitted uses under Section 30233.
- ⁵⁸ For example, only one LCP in the study area explicitly allows boating and only one explicitly allows limited resource extraction (of peat). None, explicitly allow port, energy, or coastal-dependent industrial facilities. For a further discussion of this topic on a statewide basis see California Coastal Commission, "Wetland Task Force Final Recommendations," memorandum from Les Strnad, Santa Cruz, November 1988, pp. 6 -9.
- ⁵⁹ Field work and aerial photo interpretation would be necessary to attempt an after-the-fact study of whether removal of any (non-wetland-considered) "riparian vegetation" would have constituted wetland vegetation under the Cowardin method.
- ⁶⁰ California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994.
- ⁶¹ California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994, p. 48. The Coastal Commission has provided input to this effort.
- ⁶² California Coastal Commission, "Briefing on Recently Issued State and Federal Wetland Policy Statements," memorandum, San Francisco, September 1993.
- ⁶³ California Department of Fish and Game, *Wetland Resources Policy*, Sacramento, 1987.
- ⁶⁴ California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994.
- ⁶⁵ There may be a few cases where either privately owned parcels are totally wetland or a wetland would have to be filled to accommodate a single family home; further analysis would be necessary to identify these. Given recent court cases, the Commission may face more issues related to proposed wetland fill for a non-priority (i.e., residential) use; see, for example, Berry, James, "The Dolan Case: Grabbing Tigard by the Tail?" *Environment & Development*, August 1994, p. 3.
- ⁶⁶ Although it was beyond the scope of ReCAP to study the relationship of other agencies' mitigation requirements to the Coastal Commission's and local governments', inconsistency among agencies, which threatens mitigation success, was found on a statewide basis. California Coastal Commission, "Wetland Task Force Final Recommendations," memorandum from Les Strnad, Santa Cruz, November 1988, Recommendations #3 & 4 and pp. 12 -16. See Problem Six Information Gaps section of this chapter for further agency coordination recommendations.
- ⁶⁷ Two pending cases portend this trend. Recently delineated wetland remnants on former agricultural and grazing land at both Terrace Point and what was once known as Rolling Hills respectively are proposed to be filled. Whether fill

of small isolated, seasonal, and/or degraded areas with compensating mitigation may result in an overall net habitat improvement is an issue worthy of further study.

- ⁶⁸ California Department of Fish and Game, *Wetlands Resources Policy*, Sacramento, 1987.
- ⁶⁹ California Coastal Commission, "Briefing on Recently Issued State and Federal Wetland Policy Statements," memorandum, San Francisco, September 1993.
- ⁷⁰ California Coastal Commission Central Coast Region, Vested Rights file # E-3-73-5; Mitchell Swanson Associates and Habitat Restoration Group, *Final Pajaro River Lagoon Management Plan*, Santa Cruz, May 1993, p. 12.
- ⁷¹ Coastal permit files 3-83-185 and P-81-162 and California Coastal Commission, Cartographic Unit. ReCAP Photo Interpretation Notes, 1994.
- ⁷² At least two recent enhancement projects involved recreating historic habitat conditions, within existing wetland areas. Restoration of Laguna Grande and Roberts Lake included clearing 4.6 acres of tule vegetation, resulting in open water habitat. Similarly, tule cutting has been permitted at Neary Lagoon on two occasions to result in more open water habitat. Both of these projects were undertaken in concert with wetland management plans based on biologists' beliefs that these smaller wetlands were being choked with too much vegetation. In some cases natural restoration has been documented. At Carmel River Lagoon and Natural Bridges Lagoon, native vegetation had reestablished itself after cessation of farming or grazing activities which had eliminated it.
- ⁷³ Moss Landing Marine Laboratories, *Wilder Ranch Wetland Restoration Plan*, Moss Landing, 1993.
- ⁷⁴ ABA Consultants, *Elkhorn Slough Wetland Management Plan*, Capitola, California 1989 and ABA Consultants, *Biological Assessment, Development and Restoration Plan for the Elkhorn Heights Parcel*, Capitola, California, 1991.
- ⁷⁵ Moss Landing Marine Laboratories, Benthic Lab, *Watershed Ecology Outreach Program First Progress Report*, Moss Landing, September 1994. and personal communication with John Oliver, November 8, 1994.
- ⁷⁶ See Dyste, Rosie, *Methods of Delineating and Determining the Effectiveness of Wetland Buffer Zones*, student paper for San Jose State University Environmental Studies 200, Spring 1994.
- ⁷⁷ Data sources for Figure 5-6 are as follows: Panels 1-3: U.S. Coast Survey Register No. T-444, Santa Cruz Harbor and Vicinity, 1853, Scale 1:10,000; U.S. Coast and Geodetic Survey Register No. T-444a, Santa Cruz Harbor and Vicinity, 1910, scale 1:10,000; Sanborn Fire Insurance Maps, Sanborn Map Co., 1909 and 1950; California Joint Highway District No. 9, Aerial photograph No. 1, 1928. Panels 4-8: Santa Cruz County parcel base map, scale 1:7,200; California Dept., of Navigation and Ocean Development Aerial photograph No. 76-5-104, April 2, 1970; and Aerial photograph No. 4-12-135, May 6, 1978; California Dept. of Boating and Waterways, Aerial photograph No. 4-123-229, March 26, 1986 Aerial photograph No. 4-123-6, April 19, 1993; Brown and Caldwell, *Project Report, Santa Cruz Wastewater Facilities Planning Study*, Walnut Creek, 1978; Jones and Stokes Associates, Inc., *Final Neary Lagoon Management Plan*. Sacramento, 1990.
- ⁷⁸ California Coastal Commission. *Statewide Interpretive Guidelines for Wetlands and Other Wet Environmentally Sensitive Habitat Areas*. San Francisco, 1981. These guidelines were developed using extensive scientific input as summarized in Castelle, Andrew, et. Al., *Wetland Buffers: Use and Effectiveness*, Olympia, Wa: February 1992, p. 20.
- ⁷⁹ Since the point will relate to the wetland, how the wetland itself is delineated is a crucial factor; see previous section on "Inconsistent Delineation Methods." Imposing different buffer widths may be appropriate for different situations; however, the discrepancies identified are largely the result of policy decisions, not scientific evidence.
- ⁸⁰ One new initiative regarding vegetated treatment systems is found in United States Environmental Protection Agency, *Guidance Specifying Management Measures for Sources of Nonpoint Pollution in Coastal Water*, Washington, DC., January 1993, Chapter 7, IIC.
- ⁸¹ Orme, A.R. "Wetland Morphology, Hydrodynamics, and Sedimentation," in Williams, Michael [Ed.]. *Wetlands: A Threatened Landscape*. Oxford, England: Alden Press Ltd., 1991, pp. 43-94.
- ⁸² Orme, A.R. Ibid.
- ⁸³ Josselyn, M. *The Ecology of San Francisco Bay Tidal Marshes: A Community Profile*. U.S. Fish and Wildlife Service, Division of Biological Services, Washington D.C. FWS/OBS-83/23. 102pp. 1983.

- ⁸⁴Zedler, J.B. 1982. *The Ecology of Southern California Coastal Salt Marshes: A Community Profile*. U.S. Fish and Wildlife Service, Division of Biological Services, Washington D.C. FWS/OBS-81/54. 110pp. 1982.
- ⁸⁵California Coastal Commission Permit File; Permit # 3-90-104.
- ⁸⁶California Coastal Commission ReCAP Database - Wetlands Module, 1983-1993.
- ⁸⁷California Coastal Commission ReCAP Database - Wetlands Module, 1983 - 1993.
- ⁸⁸The Planning Collaborative and John Sanger, *Regional Land Use Study*, for AMBAG. San Francisco, 1978.
- ⁸⁹California Coastal Commission Permit File; Permit # 3-92-15.
- ⁹⁰As a recent alternative to breaching, Coastal Commission staff organized a human rescue effort to transport trapped fish from the lagoon to the Bay.
- ⁹¹California Coastal Commission Permit File; Permit # 3-90-41.
- ⁹²These approaches should not be construed to imply that breaching is always the appropriate solution. For example, "recent research of water quality and biological productivity, conducted at other lagoons along the central California coast, demonstrates that sand bar breaching is harmful to lagoon habitats for fish and other aquatic organisms. Breaching in the spring or summer months delays or arrests a lagoon's seasonal conversion to freshwater from the mixed fresh-salt water regime that occurs with an open river mouth in the winter months. The water column in the lagoon becomes stratified, with a hot, saline, anoxic bottom water layer underlying a cooler, freshwater layer above. Under stratified conditions, fish and other aquatic organisms, especially benthic organisms, cannot survive. Without the basis for a healthy food chain, the biological productivity of the lagoon is diminished for fish, birds and other wildlife," from Mitchell Swanson Associates and Habitat Restoration Group, *Final Pajaro River Lagoon Management Plan*, Santa Cruz, May 1993, p. 3.
- ⁹³Crampton, T.A. *Long Term Effects Of Moss Landing Harbor On The Wetlands Of Elkhorn Slough*. University of California, Santa Cruz. Master of Science Thesis. 81pp. 1994.
- ⁹⁴Belden, T., R. Gramlich, D. Leland, T. Panella, and H. To. *Policy Strategy to Reduce Erosion in the Elkhorn Slough Watershed*. A report to the California Coastal Commission, Central Coast District. 52pp. plus Appendices. 1994.
- ⁹⁵Belden, et al., *ibid*. The Coastal Commission did attempt to address the cumulative effects of erosion and sedimentation on Elkhorn Slough from potential additional development. The Coastal Commission proceeded to deny new subdivisions, in the late 1970's while permitting singly-family residences on vacant lots of record. A fairly standard finding was applied to each subdivision permit, creating a de facto moratorium on new lots. Exceptions were made for dividing property that already contained multiple units and a few other situations, on a case-by-case basis. The findings made it clear that such denials were being given until a new plan for the area addressing cumulative impacts could be developed. As background for that plan, a UC Berkeley Sea Grant study identified "bare ground exposure" thresholds for the subwatersheds of Elkhorn Slough (Dickert, Thomas and Tuttle, Andrea, *Elkhorn Slough Watershed Linking the Cumulative Impacts of Watershed Development to Coastal Wetlands*, Berkeley, October 1980). These were incorporated into the local coastal program along with a tracking system to ensure that they were not exceeded and a subwatershed planning process to address those that were already exceeded. The local plan resulted in a downzoning, but does allow new subdivision based on the new densities. (Hyman, Rick. Unpublished remarks at Methodologies and Mechanisms for Management of Cumulative Coastal Environmental Impacts Workshop, University of Rhode Island School of Oceanography, Narragansett, Rhode Island, May 6, 1993.) Some would argue that this bias against new subdivision (and the commensurate priority given to agriculture) is responsible for more erosion and sedimentation. For further details of this effort, see Strnad, Les and Hyman, Rick, "A Watershed Approach to Coastal Zone Management for the Elkhorn Slough Estuarine Complex," *Coastal Zone 1993 Vol 2, Proceedings of the Eighth Symposium on Coastal and Ocean Management*, edited by Orville Magoon, et. al. New York: American Society of Civil Engineers, 1993, pp. 1569 - 1583. For an evaluation of efforts to control sedimentation in the watershed see the Coastal Commission's forthcoming project of special merit report on Cumulative Impacts of Nonpoint Source Pollution.
- ⁹⁶Reed, Rhonda. *Population Study of the Santa Cruz Long-Toed Salamander at Valencia Lagoon*. for California Department of Fish and Game, Aptos, CA, 1978.
- ⁹⁷Gordon, B.L. *Monterey Bay Area: Natural History and Cultural Imprints*. Second edition. The Boxwood Press, Pacific Grove, California. 1994.

⁹⁸ Gordon. Ibid.

⁹⁹ As suggested earlier in this chapter, pursuit of restoration does not guarantee success and may require substantial effort. Although it was beyond the scope of ReCAP to systematically evaluate success of wetland restoration projects, many projects appear to emphasize acreage and habitat over hydrology. The problematic restoration project at the Old Salinas River channel, as well as restoration projects at Elkhorn Slough, are not functioning as planned. Hydrologic evaluation of potential tidal erosion and related factors were not incorporated in project design or monitoring. Personal communication with Les Strnad, November 14, 1994 regarding coastal development permits #3-83-125; P-81-162; 3-88-96.

¹⁰⁰ For example, at Elkhorn Slough, bisected by Elkhorn Road, Monterey County proposed to replace flap gates and earthquake-damaged culverts. The area above the tidegates known as Blohm-Porter marsh was thought to originally be freshwater, but is now tidally influenced. (California Coastal Commission Permit file #3-94-11). At Upper Bennett Slough, bisected by Highway One, CALTRANS proposed to replace a broken culvert for flood control purposes. The area above the culvert, known as Struve Slough, was recently freshwater, but is now saline. (California Coastal Commission pending permit file). In order to evaluate these projects from a wetland hydrology perspective, a baseline objective needs to be agreed upon. In both of these cases, the objective discussed by the various resource agency officials was for a freshwater system. But, neither area has a fully adopted management plan stating this. When such an objective is agreed upon, it may result in a project which, while not the least intrusive development, could be considered the least environmentally damaging in a systems context.

¹⁰¹ Chan, E., T.A. Brusztynsky, N. Hantzsch, and Y.S. Litwin. *The Use Of Wetlands For Water Pollution Control*. for Association of Bay Area Governments. Berkeley, California. 1981.

¹⁰² Sather, J.H. and R.D. Smith. *An Overview Of Major Wetland Functions And Values*. U.S. Fish and Wildlife Service, Office of Biological Services. FWS/OBS-84/18. 68pp. 1984.

¹⁰³ Aston, R.P. *An Assessment of Water Quality in Santa Cruz County: Problems, Needs and Programs*. A report prepared for the Santa Cruz County Board of Supervisors, Health Services Agency, Division of Environmental Health, Watershed Program, May 1976.

¹⁰⁴ ABA Consultants. *Elkhorn Slough Wetland Management Plan*. Capitola, 1989.

¹⁰⁵ Dames and Moore, *Route 1 Improvement Study Background Report: Surface Water Quality of Moss Landing Vicinity*, Goleta, (1990?).

¹⁰⁶ Harvey and Stanley Associates, *Nearby Lagoon Enhancement Plan Part I Environmental Inventory; Part II Interim Enhancement Plan*. Alviso, August 1987.

¹⁰⁷ Sugar, K. "State Lowers the Boom on Neary Lagoon," *Save Our Shores (SOS) Sanctuary Watch*, June 1994, p. 7.

¹⁰⁸ Sugar, K. Ibid.

¹⁰⁹ California Central Coast Regional Water Quality Control Board. *Proposed Amendments of the Central Coast Water Quality Control Plan*. 1993.

¹¹⁰ Dames & Moore. *Natural Environmental Study for the Widening of Highway 1 from Castroville, Ca to the Santa Cruz Co. Line Monterey Co.* Goleta, CA. 1990.

¹¹¹ Environmental Management Consultants. *Spanish Bay Resort Environmental Impact Report*. Appendix D. Monterey, CA. 1984.

¹¹² Bestor Engineers. *Initial Study of Environmental Impact Marina Beach Tract No. 2*. Monterey, CA. 1978. p. 15.

¹¹³ California Coastal Commission. Cotter, P. Unpublished data.

¹¹⁴ Coastal Act Section 30231 provides the policy basis for protecting water quality in the coastal zone. Although the Coastal Commission and local governments can apply this section to new development, primary responsibility for coastal water quality is vested in the State Water Resources Control Board and its Regional Water Quality Control Boards. It was beyond the scope of ReCAP to analyze effectiveness of coastal permits in addressing pollution of wetlands. Such is a focus of the Commission's forthcoming project of special merit, "Cumulative Impacts of Nonpoint Source Pollution."

¹¹⁵ California Coastal Commission, *Procedural Guidance Manual: Addressing Polluted Runoff in the California Coastal Zone*, San Francisco: May 1995.

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- ¹¹⁶ For an example of such procedures see Cotter, P.J., L. Mortello, and L. Strnad. *Data Evaluation Report and Monitoring Framework for the Elkhorn Slough Watershed*. Draft report. California Coastal Commission, Monterey Bay Initiative. EPA Region IX Near Coastal Waters Grant No. X-009999-01-0. 1994.
- ¹¹⁷ California Coastal Commission ReCAP Database - Wetlands Module.
- ¹¹⁸ California Coastal Commission ReCAP Database - Wetlands Module
- ¹¹⁹ California Coastal Commission ReCAP Database - Wetlands Module.
- ¹²⁰ California Coastal Commission ReCAP Database - Wetlands Module
- ¹²¹ California Coastal Commission ReCAP Database - Wetlands Module
- ¹²² For example, in the Valencia Lagoon watershed continued development threatened the habitat of the Santa Cruz long-toed salamander. The Coastal Commission devised a two-part protection strategy. Some lots immediately adjacent to the Lagoon were designated "critical habitat." Permits for single-family homes were denied and the lots were eventually purchased by the State Department of Fish and Game. The remainder of the lots could be built on to a maximum of 15% site disturbance. This standard was incorporated into a special "SD" overlay zoning district in the Santa Cruz County local coastal program. No evaluation of the effectiveness of these measures has occurred. (Hyman, Rick. Unpublished remarks at Methodologies and Mechanisms for Management of Cumulative Coastal Environmental Impacts Workshop, University of Rhode Island School of Oceanography, Narragansett, Rhode Island, May 6, 1993.)
- ¹²³ City of Santa Cruz, *Final EIR on the Westside Lands Final Plan*, 1987 and Strelow, Stephanie, *Draft Environmental Impact Report, Terrace Point Specific Plan*, Santa Cruz, 1994.
- ¹²⁴ Earth Metrics, *Final EIR for the Villa Nueva Subdivision*, Burlingame, 1982; Earth Metrics, *Final EIR for the Villa Verde and Villa Nueva Subdivision*, Burlingame, 1986; Jones and Stokes, *Moro Cojo Inclusionary Housing Development Project Final EIR*, Sacramento, 1994.
- ¹²⁵ U.S. Department of Commerce, National Oceanic and Atmospheric Administration, *Coastal Wetlands of the United States: An Accounting of A Valuable National Resource*, Washington, D.C., February 1991, p. 55.
- ¹²⁶ California Coastal Commission, *Procedural Guidance for the Review of Wetland Projects in California's Coastal Zone*, San Francisco, 1994.
- ¹²⁷ Santa Cruz County. Code. Sections 16.32.070 &.080.
- ¹²⁸ See, for example: 1) Ray, Daniel and Woodruff, Wayne, *Mitigating Impacts to Wetlands and Estuaries In California's Coastal Zone*, paper presented at Association of State Wetland Manager's conference, New Orleans, October 11, 1986; 2) San Francisco Bay Conservation and Development Commission, *Mitigation: An Analysis of Tideland Restoration Projects In San Francisco Bay*, San Francisco, March 1988; 3) California Coastal Commission, *Humboldt Bay Wetlands Inventory Project: Data Interpretation and Summary*, January 1989; and 4) California Coastal Commission, *Wetland Task Force Final Recommendations*, memorandum by Les Strnad, Santa Cruz, November 1988, p. 10.
- ¹²⁹ U.S. Department of the Army, San Francisco District Corps of Engineers, *Habitat Mitigation and Monitoring Proposal Guidelines*, effective October 1991.
- ¹³⁰ California Coastal Commission, *Data Evaluation Report and Monitoring Framework for the Elkhorn Slough Watershed*, draft, by Patrick Cotter, Linda Mortello, and Les Strnad. Santa Cruz, November 1994.
- ¹³¹ Watersheds are theoretically easier to delineate, since they can be drawn from topographic maps. A complication does occur with artificial, unmapped drainages to other watersheds. As suggested in the final section of this chapter, the main issue with watershed delineations is how fine they are drawn; the referenced ICM and the State Water Resources Control Board currently aggregate individual stream drainages into larger hydrologic units. Standardized nomenclature is also lacking.
- ¹³² Timber Harvest permits, reviewed by the Department of Forestry and Fire Protection, and not subject to the CCMP, contain cumulative impact assessments, analyzing the effects of harvests on downstream wetlands.
- ¹³³ Jones and Stokes, *City of Santa Cruz Wastewater Treatment Plan Modification Addition of Secondary Treatment, Draft EIR Supplement*, Sacramento, November 1990.

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- ¹³⁴ Personal communication with Craig Vassell, U.S. Army Corps of Engineers, October 6, 1994.
- ¹³⁵ Both President Clinton and Governor Wilson have suggested common wetland regulations as differing requirements are a source of frustration to applicants. California Coastal Commission, "Briefing on Recently Issued State and Federal Wetland Policy Statements," memorandum, San Francisco, September 1993. While this is not a CCMP nor cumulative impact problem, the California Coastal Commission can participate in efforts towards coordination, consolidation, and standardization. For example, it would also be valuable to provide applicants information as to the various wetland regulatory requirements. This can occur at the Corps' interagency meetings. Using Figure 1 as a start, preparation of a guide compiling wetland permit requirements is a worthy interagency task.
- ¹³⁶ See Kusler, Jon. *Hydrology: An Introduction for Wetland Managers*, Berne, New York (n.d.).
- ¹³⁷ The two other EIRs did not list preparers' expertise, but at least in one case biologists were consulted. Those were earlier EIRs from the mid 1970's, and one was for a project never built.
- ¹³⁸ See California Coastal Commission, "Wetland Task Force Final Recommendations," memorandum from Les Strnad, Santa Cruz, November 1988, Recommendation #1C.
- ¹³⁹ California Coastal Commission, Memorandum by Thomas Crandall on the Department of Fish and Game, San Francisco, September 1994.
- ¹⁴⁰ See, for example, *National Wetlands Newsletter*, Vol. 16 #4, July/August 1994 for some discussion of this topic.
- ¹⁴¹ To date there are no such known examples in the pilot area, as management plans are either too new or reflect permit conditions (i.e., permit issuance preceded the development of the plan). However, some wetland enhancement projects have been proposed, at Neary Lagoon and Elkhorn Slough, pursuant to previously completed management plans.
- ¹⁴² See California Coastal Commission, "Post LCP Certification Permit and Appeal Jurisdiction" maps, various dates, which distinguish areas that remain under the Commission's permit jurisdiction (tidally-influences or potential public trust) from those that revert to local jurisdiction after local coastal program certification.
- ¹⁴³ Federal projects are reviewed under consistency review, rather than under coastal development permits. Federal consistency review is the one authority that the Coastal Commission now possesses to review federal projects and federally licensed projects affecting coastal zone resources.
- ¹⁴⁴ For example, see: (1) San Francisco Estuary Project, *Status and Trends Report On Wetlands and Related Habitats in the San Francisco Estuary*, Oakland, 1991; and (2) Oregon Division of State Lands, *Oregon's Wetland Conservation Strategy*, Draft, April 1993. Plans which attempt to rate wetland significance and provide lesser degrees of protection for some classes of wetlands would not be appropriate models, given the Coastal Act's protective policy framework and the significant historic wetland loss in California.
- ¹⁴⁵ Duncan & Jones and Ribera & Sue, *Parks, Recreation and Open Space Plan, Santa Cruz County, California*, Berkeley and Oakland, 1972; California State Coastal Conservancy, *Update of California Coastal Wetlands Enhancement Needs*, Oakland, March 1984; Dennis, Nona and Marcus, Mary. *Status and Trends of California Wetlands*, Sacramento, 1984, pp. 87-95; Santa Cruz County, *Coastal Land Use Plan*, Policies 1.14.3 and 1.14.4.
- ¹⁴⁶ This task is being undertaken by the California Department of Fish and Game, Office of Oil Spill Prevention and Response. Jeanne Lau, California Coastal Commission. Personal communication, November 1, 1994.
- ¹⁴⁷ California Resources Agency. *California Ocean Resources: An Agenda for the Future* (Draft), Sacramento, 1994.. Map 3 of 4, Central Coast, Appendix F.
- ¹⁴⁸ U.S. Department of Commerce, National Oceanic And Atmospheric Administration, National Ocean Service, *Monterey Bay National Marine Sanctuary Water Quality Protection Program Workshop Summary Report Issue Identification and Strategy Development*, Draft, June 1994.
- ¹⁴⁹ It would be beneficial at some point to link or merge SEA's database with the Coastal Commission's ReCAP wetland database.
- ¹⁵⁰ Other emerging efforts include (1) AMBAG's CAMPITS program, described in *Work Plan for Water Quality Management Planning Program on Coastal and Marine Water Quality Information Coordination, Integration and Outreach, A Pilot Program for the Monterey Bay Region*, July 1992; (2) Moss Landing Marine Laboratories' lead in

fostering a Monterey Bay and Salinas Valley Regional Watershed Plan with a main goal of holding fresh water in the watershed by restoring as much of the natural wetland system as possible. The initial report attempts to catalog various restoration projects underway in the Pajaro River valley, Elkhorn Slough, and Salinas River valley watersheds and suggest some future projects, Moss Landing Marine Laboratory's Outreach Program: Moss Landing Marine Laboratories, Benthic Lab, *Watershed Ecology Outreach Program First Progress Report*, Moss Landing, September 1994.

- ¹⁵¹ An emerging geographical framework for performing resource planning is the natural community, which may consist of single or multiple habitats, and would likely not be coterminous with watershed boundaries. However, such boundaries are variable and are not yet defined. For a discussion of this topic, see, *National Wetlands Newsletter*, Vol 16, #5, September/October 1994.
- ¹⁵² U.S. Environmental Protection Agency. *The Watershed Protection Approach Annual Report 1992*. Washington D.C.: 1993. *Watershed Protection Approach: A Project Focus*. Washington D.C.: 1994. The 1976 Coastal Plan recommended watershed based planning. However, watersheds extended beyond the area determined to be appropriately state-regulated, which was the resultant coastal zone. Additional federal watershed legislation is also being considered by Congress, such as H.R. 3873 Urban Watershed Restoration, H.R. 3894 Conservation Reserve Program, H.R. 42113 River and Watershed Protection and Restoration Act. Congress, see *National Wetlands Newsletter*, Vol 16, No. 3, May/June 1994, p. 20. "Major legislation is expected to be introduced in the California Legislature in January [1995] on watershed management planning," according to *APA Northern News*, p. 5.
- ¹⁵³ Santa Cruz County Planning Department & California Resources Agency, *The San Lorenzo River Watershed Management Plan*, Santa Cruz, December 1979.
- ¹⁵⁴ Philip Williams & Associates and Harvey and Stanley Associates, *The San Lorenzo River Enhancement Plan*, February 1989.
- ¹⁵⁵ Monterey Peninsula Water Management District, *Draft Carmel River Watershed Management Plan* by John Williams, March 1984 and Monterey Peninsula Water Management District, *Draft Carmel River Watershed Management Plan* by Ken Greenwood, Monterey, April 1988.
- ¹⁵⁶ EIP Associates, *Supplemental Environmental Impact Report/Statement II Monterey Peninsula Water Supply Project*, 1993 lists over 300 documents associated with this project.
- ¹⁵⁷ Dickert, Thomas and Tuttle, Andrea, *Elkhorn Slough Watershed Linking the Cumulative Impacts of Watershed Development to Coastal Wetlands*, Berkeley, October 1980. See Strnad, Les and Hyman, Rick, "A Watershed Approach to Coastal Zone Management for the Elkhorn Slough Estuarine Complex," *Coastal Zone 1993 Vol 2, Proceedings of the Eighth Symposium on Coastal and Ocean Management*, edited by Orville Magoon, et. al. New York: American Society of Civil Engineers, 1993, pp. 1569-1583 for a history of attempts to plan for the Elkhorn watershed.
- ¹⁵⁸ CRMP Cooperating Agencies, *A Conservation Dilemma A Cooperative Solution*, undated brochure.
- ¹⁵⁹ The following management plans have been completed: Antonelli Pond 1981; Marina Vernal Pond #2 1986; Laguna Grande & Roberts Lake 1986; Younger Lagoon 1987; Marina Vernal Pond #3 1987; Elkhorn Slough (including Parsons Slough) 1989; San Lorenzo River mouth (including Jessie Street marsh) 1989; Soquel Creek Lagoon 1990; Gibson Landing Marsh/Lower Bennett Slough 1990; Neary Lagoon 1992; Ellicott Slough 1993; McCluskey Slough 1993.

The following seven wetland management plans were well underway in 1994 with review drafts available and included in the analysis: Carmel River Lagoon Enhancement Plan, Coastal/Vernal Ponds Comprehensive Management Plan (for all of Marina Vernal Ponds), Moro Cojo Slough Management and Enhancement Plan, Pajaro River Lagoon Management Plan (includes Lower Watsonville Slough), Salinas River Lagoon Management and Enhancement Plan, Restoration/ Management Options for Schwan Lake, and Wilder Wetland Restoration Plan.

Two other plans just commencing were for Waddell Creek Lagoon and for the six wetlands of the Watsonville Slough complex, the latter effort the result of many years of prodding by a local citizens group, Watsonville Wetlands Watch.

For complete bibliographic information see California Coastal Commission ReCAP Database Wetlands module, Wetlands Documents section.

¹⁶⁰ Wetlands lacking plans are Old Salinas River Channel, Upper Bennett Slough/Struve Pond, Scott Creek Marsh, Laguna Creek, and Corcoran Lagoon. The three next largest wetlands lacking management plans are all within Wilder Ranch State Park. Park officials hope to prepare restoration plans for each of them, as soon as the Wilder Lagoon plan is completed, according to personal communication with Ian Calderwood, November 1, 1994. Two large wetland areas (originally Woods Lagoon and part of the old Salinas River Channel) were transformed into harbors and are governed by Master Plans, excerpted into the Santa Cruz City and North Monterey County LCPs respectively. These plans do not contain and could benefit from environmental management components akin to wetland management plans.

¹⁶¹ The lack of a plan or of a topic does not necessarily mean that management or some aspect of management is not occurring. Rather, it is an indicator of a potential deficiency in attempting to achieve resource protection. A further evaluation of the adequacy of these management measures that are in place is beyond the scope of ReCAP, as is an analysis of the actual implementation of these measures. It can be said, however, that many of these plans have yet to be fully implemented.

¹⁶² Most of the management plans have been prepared by consultants. The lead agency is usually a local government. In some cases technical advisory groups have helped guide plan preparation. Some plans have gone through a public hearing process, others have not. Individuals and groups, such as Friends of Neary Lagoon, occasionally provided public input.

¹⁶³ For some of the more recent management plans (e.g., for Moro Cojo Slough), detailed work programs were prepared and revised based on input from Coastal Commission staff and others. For general procedural guidance, see Local Councils of Governments, "Hints on Preparing A Comprehensive Wetland Management Plan," Eugene, February 1992.

Funding to date has come from a variety of sources, such as the State Coastal Conservancy, State Water Resources Control Board, local governments, and applicants. Some management plans have been required as permit conditions (to address adverse impacts of the permitted developments), while others have been submitted along with applications (e.g., for Lower Bennett Slough and Ellicott pond). Based on recent court cases, there may be a need to more closely scrutinize permit conditions requiring applicants to pay for management plans; however, to date funding for wetland planning has not generated significant controversy and has been readily available.

¹⁶⁴ See Kusler, Jon, *Advanced Planning of Wetlands: Wetlands and Watershed (Water Resources) Management A Background Paper*, Berne, New York, February 1993, pp. 8-18 for a discussion of the relationships between watershed management plan components and wetland protection issues.

¹⁶⁵ The Elkhorn Slough Management Plan was called for in the local coastal program, then prepared. While Coastal Commission staff did work extensively with the local government (Monterey County) in preparing the plan, it was not formally submitted to the Coastal Commission as a local coastal program amendment (after originally noticing it as one).

The issue of incorporation of management plans into local coastal programs would benefit from further review. Depending on the wetland's size and issues raised, a good management plan will likely run some 50 to 150 pages and include a fair amount of background information. Since LCPs themselves are already quite bulky documents and any revision to them requires Coastal Commission review, the advisability and popularity of adding entire management plans to them may be low. Alternatives, such as incorporating into the LCPs just policy excerpts from management plans (see next endnote) or separately incorporating plans directly into the CCMP, thus deserve review.

¹⁶⁶ All but one of the completed management plans have been reviewed and either approved by, or formed the basis of a project approved by, the Coastal Commission or local government issuing coastal permits. In two cases the plans provided the background for regulatory review (one permit, one federal consistency) but were not formally approved by the Coastal Commission. In some cases, the essence of the plans (but not the entire documents) have been incorporated into local coastal programs certified by the Coastal Commission. The Coastal Commission retains jurisdiction (e.g., through original permit jurisdiction, appeals, enforcement remediation, previous condition compliance, federal consistency, or State Parks public works plan approvals) over all of the management plans currently under preparation, except for the one on Marina's Vernal Ponds. A plan just released, *Habitat Restoration Group and Mitchell Swanson & Associates, Coastal/Vernal Pond Comprehensive Management Plan*, Felton, 1994 does not incorporate many of the Coastal Commission staff's comments.

¹⁶⁷ Some wetland (and former wetland) areas, although shown as privately-owned on assessor's rolls, may be subject to the public trust.

¹⁶⁸ California Coastal Commission permit file 3-90-104.

¹⁶⁹ Harvey & Stanley Associates and William Farrel Associates, *Wetlands Management/Enhancement and Restoration Program for the Laguna Grande/Roberts Lake Local Coastal Program*, Alviso and Santa Cruz, December 1983.

¹⁷⁰ Belden, Timothy, et. al., *Policy Strategy to Reduce Erosion in the Elkhorn Slough Watershed*, Berkeley: University of California School of Public Policy, May 1994, pp. 15-17.

¹⁷¹ Jones & Stokes Associates, Inc., *Final Neary Lagoon Management Plan*, Sacramento, 1992.

¹⁷² These plans can likely be completed in the next two years; other mentioned plans in preparation, such as for Watsonville Slough, Schwann Lake, and Soquel Creek and Pajaro River watersheds can also be incorporated, if completed within a similar time frame.

6

INFORMATION MANAGEMENT

Summary

To manage cumulative impacts more effectively, the Commission needs to be able to manage information more effectively than it has to date. Analysts reviewing projects under tight time requirements need to have quick and easy access to information about coastal resources and about other projects that have been proposed or already approved nearby. This capability does not currently exist, although the Commission is moving rapidly in the right direction, in part due to the efforts of ReCAP. Experience gained by ReCAP in its pilot cumulative analysis project has already been used to guide agency-wide investments in new technology, revise the basic permit application form, and develop new information management tools such as resource and permit tracking databases. The Commission should continue to distribute these new tools to its district offices, develop additional information management capabilities -- including links to the databases of local governments and other resource agencies, and eventually build its own Geographic Information System (GIS). The goal would be to make "big-picture", contextual information available to permit analysts as they review individual permits so that each project could be reviewed in light of its contribution to cumulative impacts on coastal resources.

Currently, much of the information about resources used by Commission analysts comes in bits and pieces from permit applications, the "institutional memory" of staff members, or contacts with outside experts. As a result, knowledge about the status of resources is patchy, with recent data only in areas that have recently seen permit activity. Moreover, once applications have been reviewed, the resource information available in them is usually filed away with the permit, where the information is essentially lost from the system. If that information were entered into a database, it could be used to help track resource trends and provide context for future permit decisions.

Better information management and a better information base would do more than just aid the Commission's permit review functions. They would also enable the Commission and its resource management partners to plan for and manage coastal resources more pro-actively, as envisioned by the Coastal Act and as suggested throughout this report. Without a complete picture of what is happening to the resources, the Commission too often finds itself in a position of reacting to the development proposals of applicants or the management initiatives of other agencies rather than advancing its own management objectives. With a better information base, the Commission could begin implementing better strategies for managing cumulative impacts, including helping local governments keep their LCPs up-to-date, and could play a bigger role in guiding the development of regional resource management plans, regardless of who initiates them. Instead of relying solely on permit applicants and other agencies to provide information about coastal resources, the Commission could track resource trends itself and assist local governments in developing pro-active programs to prevent and reverse resource degradation.

Management of information across agencies in the region also needs to be improved. Incompatible computer systems and database structures, along with data ownership issues, hamper data exchange. Regional information management initiatives are beginning to address the problem. The Commission should continue to support and, where necessary, initiate efforts to facilitate greater sharing of resource and regulatory information. This would help prevent duplication of effort in gathering data and assure that all agencies are able to consider regional and cumulative perspectives in their work.

Background

HOW INFORMATION IS CURRENTLY MANAGED IN THE REGION

Each agency in the ReCAP region collects information critical to its own mission. State Parks collects visitor use information, County Assessors collect land use and property value information, and the Commission and local governments collect information on development proposals and the resources they impact.

Once collected, the information is stored either within hard-copy documents -- for example, technical reports, management plans, and Environmental Impact Reports (EIRs) -- or, to a growing extent, in electronic form in computer databases and GIS systems. Santa Cruz County, Monterey County and the City of Santa Cruz each have permit tracking databases where they enter basic information about the permits they review. The County Assessors in both ReCAP counties keep tax code information in databases. Santa Cruz County and a few other agencies in the region have operational GISs and a number of others, including the Commission, are at various stages of developing GIS capability.

With the right equipment, this electronic information is much easier to access and analyze than information kept in hard-copy sources. However, because each agency has a different type of computer system and a unique structure to its database or GIS, sharing electronic information across agencies requires working out data transfer protocols which can sometimes be quite complicated. There are technological obstacles to overcome -- for example, translating data from one format to another and rectifying geographic reference points. In addition, there are often data ownership issues that need to be addressed through some kind of formal or informal agreement. In ReCAP's experience, most agencies are willing to provide data, but they look much more favorably on two-way data exchanges in which they get something they need in exchange for what they give. Collecting information is a costly endeavor, and even public agencies are reluctant to give away for free something which required an investment of their budget to obtain. Where information has been acquired from private companies, there may even be contractual restrictions on whether and how the information can be shared with others.

Currently, few formal mechanisms exist in the ReCAP region for exchanging either hard-copy or electronic information between agencies. Although a good deal of information is exchanged on an informal "request-reply" basis, formal information exchanges are generally

Database vs. GIS

Databases are a vast improvement over hard-copy sources in terms of accessing information quickly and doing such analytical tasks as sorting data into categories, summing and averaging. Such capability is crucial for cumulative impact assessment.

The next step up from a database is a Geographic Information System (GIS). A GIS is a database which allows information to be displayed in a mapped form. (Databases display information in tables or lists.)

For many aspects of a cumulative analysis, tabular data is sufficient. But for analyzing spatial relationships, such as the distribution of permits within a region, a GIS is better than a database.

With a database, locational information can be entered as text into a table, but the analyst must translate that into a "mental map" before the locational information means anything. A GIS does that as part of its function, and, unlike a "mental map", the GIS can handle millions of separate data points and make complex calculations that quantify the spatial relationships between those data points.

A GIS also serves as a communication tool because it can display the results of analysis in a mapped form that is easier for most people to understand.

The down side to GISs is that they are more complex and therefore more expensive to develop and operate than databases.

In spite of the greater cost, most resource agencies that can afford to are investing in GIS technology; however, none of them are throwing out their databases. The best option seems to be to have both, starting with a database and later building a GIS that can link to the database. This is the course ReCAP recommends for the Commission.

limited to those required for multi-agency permit review tasks (for example, review of wetland permits by federal, state and local agencies), program oversight tasks (for example, when local governments send the Commission copies of their coastal development permits), or specific regional planning efforts (for example, transportation or water supply planning).

The need for better regional information management in the Monterey Bay area has recently received attention. Spurred in part by the designation of the Monterey Bay Marine Sanctuary in 1992, the Commission launched its "Monterey Bay Initiative" with the goal of encouraging greater coordination among coastal planning and management authorities in the region. A key objective is sharing information and support resources between agencies. The Initiative operates through such mechanisms as inter-agency meetings where program managers discuss ongoing projects and data collection efforts in the region and explore opportunities for collaboration, data sharing and program integration. This work has also led to the Integrated Coastal Management process -- discussed earlier in the wetland section of this report -- which includes efforts to collect, synthesize and distribute information.

The other major effort towards regional information management is the Coastal Aquatic and Marine Projects Information Transfer System (CAMPITS), initiated by the Association of Monterey Bay Area Governments (AMBAG) with technical assistance from the Naval Postgraduate School's Cooperative Institute for Research in the Integrated Ocean Sciences. CAMPITS is envisioned as a regional information management entity that will keep track of what information is collected by which agencies, how the information is kept and how agencies can access the information. Eventually, CAMPITS will be a repository of environmental, land use and population data from throughout the region, utilizing a GIS to integrate diverse information from the region's resource agencies. Because it is funded largely through grants under the Federal Clean Water Act, CAMPITS has focused on water quality data so far. However, CAMPITS has laid the foundation for a regional GIS by surveying the region's agencies, finding out what information they have, how it is formatted, and what data "layers" each agency would like to see in a regional GIS. CAMPITS is also coordinating the establishment of data standards so that information from throughout the region can be shared more easily.

HOW INFORMATION IS CURRENTLY MANAGED IN THE CCMP

Achieving management goals of the Coastal Act requires knowing what is happening to coastal resources, but the CCMP has not had the resources to implement a systematic monitoring program. Basic resource data was collected as part of developing the original LCPs, but for some jurisdictions that was five to ten years ago, and not all areas in the ReCAP region are covered by LCPs. Since then, information about coastal resources has come primarily from permit applicants, in EIRs and other technical documents filed with an application or as a result of project monitoring requirements initiated through permit conditions.

As stated earlier, information management at the Commission occurs mostly through hard-copy means. Permits are tracked primarily using hand-written log books. This makes it difficult and time-consuming to retrieve information about specific permits. In the Central Coast office, each analyst tracks the progress of the permits under his or her review. However, there is no systematic method to ensure that conditions which require future follow-up, such as monitoring requirements, are tracked. Analysts each have their own system for monitoring permits, such as lists, card files, or memory, none of which will actively alert the analyst if a condition deadline is missed. This somewhat informal system also suffers when staff changes occur.

Another problem with the current information system is that access to past staff reports depends on knowing the specific permit numbers to look for. This often requires a manual hunt

through the log books or past Commission meeting agendas if the only known piece of information about the permit is the applicant's name or the project location. Every district office has identified as a priority for better information management the ability to easily find permit information based not just on permit number but on applicant's name, project street address, and/or assessors parcel number.

Section 30343, added to the Coastal Act in 1982, called for the creation of a Coastal Resource Information Center (CRIC). With the establishment of the CRIC, the Commission began to improve its information management: the library was reorganized and a computerized cataloging system was developed to allow easier access to scientific studies and technical data in the library. In the late 1980's the Commission also attempted to develop a computerized permit tracking database as part of CRIC. While the Commission's existing computer technology was not adequate to support the kind of system envisioned by CRIC, a great deal was learned about how permit information could be managed more efficiently in the agency, and ReCAP was able to benefit from that work in designing the databases used for its cumulative assessment.

This past year, the Commission has begun to augment its existing computer system with high-speed desktop personal computers. The new computers support database software that is much more flexible and user-friendly than anything available even a few years ago. With better technology available, the Commission is in a good position to benefit from the experience gained through the CRIC effort and by ReCAP's database design and development work.

At the local level, electronic databases are used more extensively and have been important components of information management for a number of years in several jurisdictions. The three jurisdictions with databases -- Santa Cruz and Monterey Counties and the City of Santa Cruz -- account for approximately 90% of the local coastal permits issued to date. These databases are used to track permits through the review process so that statutory deadlines are not missed; however, their usefulness for cumulative impact analysis is limited because environmental impact information -- for example, whether a wetland or a public access site was affected or what length of seawall was erected -- is not entered. Instead, the project description is entered as a single, generally worded text string which makes sorting into categories or extracting particular descriptors very difficult.¹ The incorporation of cumulative perspectives in day-to-day permit review remains elusive in spite of the permit tracking databases currently available in part because the databases are not being used to track impact information.

Santa Cruz County has a fully functional GIS -- the first in the region -- which shows the development constraints and opportunities for each parcel in the County. Because the impacts of projects are not entered into the GIS, the ability to analyze cumulative impacts for each project is somewhat limited. However, the GIS does allow projects to be reviewed within a broader context and could be expanded to support cumulative impact analysis. Monterey County is in the early stages of developing a GIS. Because financial assistance is coming from the Ft. Ord re-use program, data "layers" have been developed mostly for the Ft. Ord area. However, the County plans to expand the system to cover the entire County in the future.

INFO MGMT PROBLEM ONE

Easier Access To Information Is Needed

Information about coastal resources and about previous or on-going regulatory activities and their impacts is not readily available to the Commission's permit analysts. As a result,

cumulative impact management strategies are very difficult to include in the Commission's day-to-day permit review activities.

ANALYSIS

Part of the problem is that up-to-date resource trend information is scarce in the region. Although resource information was collected as part of the LCP development process, much of that information is now out of date. Few formal mechanisms (i.e., resource monitoring programs) exist in the region to systematically update the LCPs with new data. Thus, the kind of trend information that ReCAP found to be important for doing a cumulative assessment is often lacking. For example, beach use figures were available only for State Parks and one city beach, leaving out some of the most popular beaches in the region. Up-to-date information about wetlands, such as acreage and habitat types, is not available for most wetlands. When new information is available, the old is often discarded because it is no longer seen as useful for day-to-day decisions. Yet the older information is crucial for assessing resource trends over time. When basic resource, use, and development trends are sketchy, cumulative impacts are very difficult to analyze and the conclusions derived from that analysis are less reliable than they should be.

Because the Commission does not independently monitor resources, current information about coastal resources is received primarily from permit applicants -- in EIRs and other technical reports filed with permit applications or as a result of project monitoring requirements initiated through permit conditions. This presents several problems: (1) the information available about any resource is patchy both geographically and temporally; (2) the information is collected in different ways by different permit applicants, making it difficult to analyze trends over time; (3) the information is presented to elicit favorable consideration of a project, and may not accurately document long-term adverse changes in resources over time; and (4) the information is tailored to the project and its impacts and may not comprehensively address the site's resources.

Not only is basic information scarce, but what is available is often inaccessible to Commission analysts. In spite of the growing availability of electronic information, ReCAP found that most of the resource-related information the Commission has access to (given its current technological capabilities) is still found in hard-copy sources. Many of the most important source documents are located only in permit files. Typically, once information has been used to review a project, the documents are filed away with the permit and rarely used again, partly because people forget they are there and partly because of the difficulty of retrieving the documents from permit files. Thus, the current system of information management is cumbersome and relies heavily on the memory of long-term staff members to locate basic information needed for cumulative impact assessment.

A primary deficiency that makes cumulative impact analysis difficult is that project impact information -- descriptive measures of how a project will impact coastal resources -- is not kept by local governments or the Commission in a form that is easily retrieved. Project impacts are evaluated with each project, but the information is not recorded anywhere outside the staff report or permit, so it can not be easily combined with the impacts of other projects to make a cumulative assessment. Even the local governments that have computerized permit tracking databases do not use them to store impact information. As a result, neither the local governments nor the Commission can, for example, provide a running total of how many acres of wetlands were disturbed this year or how many square feet of beach was covered by rip-rap revetments this year. That kind of information needs to be easily available to permit analysts when the next wetland or rip-rap proposal comes in, otherwise cumulative impacts are too difficult to include in permit review. Analysts usually do not have time to search for information buried in permit files.

As noted above, the Commission does not currently have a GIS. Yet, as ReCAP found out, regional or cumulative impact assessment cannot be done without some sort of geographic analysis. Looking at tables of data simply does not provide an adequate representation of the relationships among development projects. Because the Commission does not have a GIS, ReCAP had to map much of its information by hand on maps that cannot easily be reproduced or distributed to other agencies seeking similar information. With a GIS, mapping the information would have been much easier, and the results could have been shared much more easily with other agencies.

Thanks to the cooperative efforts of Santa Cruz County, ReCAP had the chance to gain some valuable experience using the County's GIS as an analytical tool. The County Assessor's office uses a database to keep track of how each property in the County is used. Although the information is collected for tax assessment purposes, ReCAP asked the County to plot the data on its GIS, with different colors for different categories of land use (e.g., residential, commercial, visitor accommodations, vacant, etc.). The result was a map of current land uses that proved very useful in analyzing land use patterns and identifying where future development might occur. Because the analysis was performed using the GIS, it can be easily repeated in years to come, allowing planners to visually track changes in land use patterns over time and even to quantify those changes. The maps could be used, for example, to compare how changes occurring inside the Coastal Zone may differ from what is happening outside.

The joint venture with Santa Cruz County demonstrated to ReCAP the power of GIS as an analytical tool. But GIS is also increasingly becoming the preferred format for storing resource information. Without a GIS, Commission analysts will have no way to access the growing body of resource information that is available only in GIS format.

RECOMMENDATIONS

In the Short Term, the Commission Should

- Expand the ReCAP database into an agency-wide computerized permit tracking system with complementary resource databases. The Commission should evaluate the usefulness of information collected during the ReCAP pilot assessment and, based on that evaluation, develop useful and user-friendly databases for entering, storing and retrieving baseline data about resources, about Commission and locally issued permits, LCP amendments, and about the impacts that development projects are expected to have on coastal resources. As new procedures are developed in response to ReCAP's recommendations (e.g., monitoring guidelines for wetland mitigation projects), the Commission should incorporate the appropriate data fields in the databases to make data entry efficient and cumulative assessments easy enough to include as a routine part of permit review.
- Develop guidance manuals on how to use the databases to enter and retrieve information, and a set of standardized reports that speed administrative procedures and help the Commission monitor its own activities better (e.g., standardized quarterly activity reports, Commission meeting agenda items, automated public notices, shared mailing lists, etc.).
- Build upon existing CRIC procedures to improve the ability for Commission analysts to locate and retrieve EIRs, technical reports, management plans, and other documents with resource-related information. Extra copies of such documents should be requested from permit applicants, cataloged and placed in the Commission's District library.

- Develop procedures to enter basic data about resources from environmental documents into a database so that the information is easily accessible to permit analysts reviewing other projects. Even if the Commission develops its own resource monitoring program or data exchange protocols with other agencies, project-related documents will continue to be an important source of information that helps the agency track what is happening to the resources over time. Data from these reports should be easily available, with an effective system in place for tracking down the original document for any additional details not in the database.
- Review and improve the District's record storage, archiving, and retrieval system for important permit-related documents. Develop a more effective system for keeping storage areas organized (i.e. schedule periodic file room clean-up days).

In the Short Term, Local Governments Should

- Expand their databases and GISs (where available) to include impact information derived from review of development permits (e.g., acres of wetland disturbed, length of shoreline protective devices erected, etc.). The revisions should incorporate those data fields found to be useful in ReCAP's analysis. The fields should be added in such a way that local governments and the Commission have information that corresponds and can be combined to get a picture of what is happening in the region's entire coastal zone. ReCAP can assist local governments in the pilot region by transferring the information collected on local permits as part of the ReCAP effort in addition to the records of Commission permits that pre-date local certification.

In the Long Term, the Commission Should

- Develop a Geographic Information System (GIS). The GIS should be able to show permit analysts where past, present, and known future development projects are located, identify the resources potentially impacted by a project, and perform analysis on the cumulative impacts of that and other nearby projects.
- Develop a resource monitoring program of its own to fill in needed information that cannot be obtained from other agencies. This would provide two important benefits: (1) the Commission would have a more complete picture of the resources it is charged with managing, thus enabling better management decisions; and (2) it would provide data that the Commission could trade for data that other agencies are collecting. Without having something useful to trade, it is unlikely that other agencies would continue to provide the Commission with information that they had to spend money to collect.
- Encourage local governments without GISs to develop such systems by providing technical assistance and identifying potential funding sources. Local governments should be encouraged to develop systems that are compatible with others in the region, including the Commission's.

INFO MGMT PROBLEM TWO

An Improved System for Tracking Permit Conditions Should be Implemented

The Commission has no automated system for tracking permit conditions. As a result, certain types of permit conditions -- especially those that call for future actions such as monitoring reports -- are easily overlooked.

ANALYSIS

Permit conditions are a primary tool used to manage the impacts of development under the CCMP. Most permit conditions call for some action to be completed before a final development permit is issued. These are relatively easy to track because the official permit is not issued until such conditions are signed off by the analyst.

Other permit conditions can be more difficult to track under the current system. For example, projects affecting wetlands may receive a permit on the condition that mitigation be performed at the same time that the project is being built. In such cases, the permit usually requires monitoring reports to be submitted periodically to monitor the progress of the mitigation and to substantiate its success at offsetting the impacts of the project. Some types of projects -- such as seawalls -- might call for periodic monitoring reports that assess the continued proper functioning and public safety of a structure.

These monitoring reports serve several important functions. First, they provide a way of making sure that impacts are truly mitigated and structures continue to perform as required by the permit. If a monitoring report reveals problems, corrective measures can be taken; otherwise such problems may go unnoticed. Second, they provide a means for the Commission to learn which mitigation and structural techniques work best. This knowledge can be used to improve the success and reduce the costs of future mitigation. Third, because the Commission does not monitor resources itself, these monitoring reports serve as an important source of information about the affected resources.

During ReCAP's investigations, monitoring reports could not be found for half of the seawall permits that required monitoring as a condition of the permit and a third of the wetland mitigation projects that required monitoring.² The inconsistent follow-up on these permit conditions seems to be due to the difficulty of tracking them once a permit is issued. Sometimes monitoring reports are due years after a permit is issued. Although each analyst has his or her own system for tracking permit conditions, none are designed to actively notify the analyst when a permit condition compliance item -- such as a monitoring report -- is due. With hundreds of permits issued each year, it is not surprising that some of these post-permit conditions go unnoticed.

ReCAP has already begun to address this problem by designing a computerized permit tracking system. It is intended that, when complete, the system will track permit conditions and whether compliance was achieved for each permit condition. This should provide an easy, efficient means of ensuring that permit conditions are fulfilled and helping to assure that the impacts of development projects are mitigated properly.

RECOMMENDATIONS

In the Short Term, the Commission Should

- Continue developing improved procedures for tracking permit conditions which require post-permit review, such as monitoring. The permit tracking database currently being developed by ReCAP should be designed to include a standard report that lists all permits with outstanding permit conditions, the nature of the conditions, the due dates of any materials required under the condition (e.g., monitoring reports), and the name of the analyst responsible for each item.

INFO MGMT PROBLEM THREE

Greater Information Sharing Among Agencies Would Improve Coastal Resource Management

Information about resources and regulatory activities occurring in one jurisdiction are not easily shared with other jurisdictions. As a result, resources are often managed without a regional perspective. Sometimes the same information is collected by more than one agency, unnecessarily duplicating effort. Resource agencies in the region are not always aware of what information is available from other agencies and are not able to access information that is available because of technical and political obstacles.

ANALYSIS

Managing resources regionally will require development of data transfer protocols that address both technological issues and ownership issues. For cumulative impact management to become an everyday reality of coastal permit processing, quick and easy access to information from all available sources will be necessary. Individual agencies simply can't afford to spend money on collecting information that they could get from someone else for less. Fortunately, there are universal computer languages that enable transfer of data between most systems. With a little effort, ReCAP was able to transfer electronic data from other agencies' databases in almost every case where such data was available.³ For example, ReCAP received use figures from the State Department of Parks and Recreation and the Monterey Bay Aquarium; permit data from several local governments, the California Department of Fish and Game and the federal Office of Ocean and Coastal Resource Management; water quality data from the Surfrider Foundation; and information about access offers-to-dedicate from the Commission's old computers -- all via electronic data transfer. Development of data transfer protocols takes time, but it is usually a one-time, front-end investment and once the protocols are developed, data exchange can become a routine affair. The costs associated with exchanging information are minimal compared to the costs of collecting such information initially.

The data ownership issues can be a bit more difficult to work out. As noted in the Background section above, data is rarely given away for free because it costs so much to collect and put into a useful form. Most agencies are willing to engage in data sharing provided they get something useful in exchange for what they provide. Alternately, some jurisdictions have "production shops" where they will digitize information from hard-copy maps into a GIS format or provide a novel synthesis of their data for a fee. Santa Cruz County is an example of such a

jurisdiction. For less expensive data sets -- for example, raw tabular data from an agency's permit tracking database -- an informal agreement is usually sufficient. For more expensive data sets -- for example, GIS data layers -- more formal arrangements may be necessary.

RECOMMENDATION

In The Short Term, The Commission Should

- Support the development of, and where necessary initiate, data sharing protocols with other agencies in the ReCAP region. Where possible, the protocols should be formalized in Memoranda of Agreement, including agreements to share the costs of collecting information. To the extent possible, the Commission should continue to coordinate with CAMPITS and through the Monterey Bay Initiative in order to develop such protocols and agreements.

INFO MGMT PROBLEM FOUR

Additional Staffing and/or Training is Needed

Additional staffing and/or training is needed to support the modern information management tools currently being developed by the Commission. In addition, adequate staff time needs to be set aside for training analysts and support staff in how to use these tools efficiently and effectively.

ANALYSIS

In conducting its assessment, ReCAP found that a considerable obstacle to improved information management for the project was the initial investment in staff time required to set up the computers and software so they worked properly, to train analysts and support staff in how to use the equipment, and to keep the equipment working properly. ReCAP analysts spent a significant portion of their time performing these functions, some of which should more properly have been performed by information management specialists. One of the important lessons to be learned from the ReCAP pilot is not to underestimate the commitment of staff resources needed to get a good information management system up and running -- and to keep it running.

RECOMMENDATION

In the Short Term, the Commission Should

- Expand its staffing in information management and/or increase training to existing staff to provide for a hardware technician and a software technician that are familiar with the new generation of desktop computers, networks, and software. Providing adequate technical support for analysts as they learn the new system will be crucial to successful implementation of better information management.

By following the recommendations listed above, the Commission could greatly improve its information management and make it possible to incorporate cumulative impact management into the day-to-day permit review process.

¹ For example: *COASTAL DEVELOPMENT PERMIT FOR SINGLE FAMILY DWELLING, ACCESSORY STRUCTURES AND GRADING; USE PERMIT FOR SENIOR CITIZEN UNIT, etc..*

² ReCAP database, Hazards and Wetlands Sub-Modules.

³ The exception was the Army Corps of Engineers' permit database which did not have the capability of identifying which permits were located in the ReCAP area. ReCAP had the choice of getting all the data (an unmanageable quantity) or none at all.

7

ECONOMIC EFFECTS of RECOMMENDATIONS

Summary

The recommendations of this report are not presented in any priority and do not constitute a mandate on local jurisdictions. Many factors will undoubtedly enter into a decision by the Commission or local government as to which of these recommendations to pursue first. Included in these factors will be the economic effects of implementing the recommendation and identification of a suitable funding source, if needed. Many of the recommendations are not very costly and could be implemented through minor changes in the ongoing activities of coastal planners. Project resources preclude the Commission staff from conducting detailed cost/benefit analysis on each of these recommendations. However, it is important to consider the general economic effects -- positive and negative -- that may occur as a result of these suggested program improvements. ReCAP will be looking for opportunities to implement recommendations in conjunction with ongoing, funded initiatives.

Background

Economic activity along the coast is influenced by a number of factors, some of which are beyond the scope of coastal management (e.g. population growth). Recent studies have documented the positive economic benefits of sound coastal management.¹ A recent report by The Resources Agency concluded that seven ocean-dependent industries contributed \$17.3 billion dollars to the state's economy in 1992 and supported 370,000 jobs in the state. Ocean and coastal tourism and recreation alone contributed \$9.9 billion in 1992, the largest spending component of the industries examined in the study.² In addition, the shoreline area supports a significant amount of residential development which contributes to the economies of local communities. As the following sections illustrate, it appears that implementing these recommended program improvements will contribute to the overall economic benefits of coastal management.

HAZARD RECOMMENDATIONS

The recommendations of the ReCAP report for improving hazards management suggest improvements designed to minimize additional armoring of the shoreline and attendant loss of sandy beach area, and measures to protect sources of sand for maintaining natural shoreline processes needed to maintain the beaches. The recommendations also include minimizing development in geologically unstable areas, thereby avoiding hazards. These objectives would be achieved in part by implementing regional management plans for hazardous areas and by improving policies for new development.

Implementing these recommendations could result in significant benefits. Public costs associated with disaster relief, construction of protective armoring, government assistance insurance, and environmental costs from armoring on public trust lands are minimized or avoided when development avoids hazardous sites.³ Public beaches which are critical to the

local tourism economy would be protected from encroachment of shoreline protective devices, and the need for beach replenishment would be also reduced. Beach replenishment, while resulting in public benefits from protecting property and recreation areas, is costly. Nationwide, the Army Corps of Engineers has nourished an estimated 118 miles of beaches at a cost of \$306 million.⁴ The use of public funds for subsidized loans to rebuild houses destroyed by waves would also be lessened. For property owners, implementation may result in less costs for construction of protective devices. (The cost of armoring varies by type of structure, but typical costs for installation of riprap ranges from \$500 to \$1000 per linear foot.⁵) Frequent repair, rebuilding or maintenance costs for the structures would be lessened. After management plans are implemented, they will provide better information for property owners regarding identified and mapped hazard areas, erosion rates and alternative options; use of this improved information can reduce costs by speeding the siting and permit processing.

While development may be sited for greater long term stability, it may have less dramatic edge-of-the-bluff private views. Property owners may incur costs from removal of temporary emergency structures but will incur savings from not having to continually place emergency armoring each year. Such program improvements will, however, require funds for developing or revising specific land use and engineering plans, implementing ordinances and codes, and more specific monitoring and follow-up measures. The largest public costs would be associated with any recommendations that lead to the condemnation and purchase of unbuildable lots on hazardous sites. Such recommendations were specifically identified only as a last resort if other measures were ineffective and if public benefit was considered greater than the costs.

Pursuing modification to the Coastal Act would require Commission and local government staff time to develop a workable legislative response; the resulting improvements to coastal management may serve to protect the beach and shoreline resources which many local economies rely upon for recreational and tourism revenues.

ACCESS RECOMMENDATIONS

The recommendations of the ReCAP report for improving access management suggest improvements to maximize access by improving the mitigation of impacts from development, addressing issues beyond the provision of physical access, and ensuring the long-term quality of the recreational opportunities in the region. Coastal tourism plays a vital element in the economies of a number of communities in the ReCAP area; implementing the ReCAP recommendations, particularly the management plans, will help to protect the long-term value of the shoreline for recreation and tourism.

Suggested program improvements to revise procedures to record public easements and delineate state public trust lands could create more opportunities for public use of the shoreline and would protect existing public areas from encroachment of development. Revising procedures could also result in some savings for property owners by streamlining the time required to process development permits. In addition, information management improvements would contribute to reduced time and costs associated with these procedures. Revising plans and procedures will, however, require commitment of state and local staff time.

As noted above, implementation of the hazard recommendations also helps to maximize public access and recreation use. While planning costs and local staff time will be incurred in developing LCP amendments, implementation of revised LCP policies on hazards will contribute to the long term protection of sandy beach and improved aesthetic quality of recreation areas which is critical for continued growth of tourism and for growth of related commercial recreation.

Since few agencies currently track and monitor access and recreation on a consistent basis, implementing the recommendation to develop baseline information and improved tracking

of visitor use and demand could help management agencies improve the allocation of limited resources to best respond to user needs; this will contribute to better access to recreation resources in the long term. Increased demands on local park and recreation agencies for developing baseline information and monitoring could be minimized by incorporating efforts as much as possible into the current operational routines of the local agencies and by developing partnerships with community organizations that benefit directly from well-managed beach access (e.g. dive groups, swim clubs, visitor associations, etc.)

Implementing changes in plans and procedures designed to maximize parking and upland support facilities could result in more areas designated for upland commercial recreation development thus contributing to the local economy and maximizing access to the shoreline. Carrying out these changes will have costs associated with revising LCPs and ordinances. Additional construction costs may be incurred by developers to incorporate parking changes into project designs.

As part of the longer term recommendations, development of a regional access strategy could result in increased governmental efficiencies through joint management and operation of areas and sharing of limited resources among jurisdictions. The provision of upland support facilities could improve as a result of a more coordinated access strategy among jurisdictions. Developing interjurisdictional access strategies will require time and resources from all relevant agencies. Implementing a strategy may result in additional costs to accept and open high priority access easements.

Long term protection and management of significant shoreline resource areas for a variety of users will result in contributions to the tourism segment of the economy by helping to assure a wide range of diverse recreational experiences. Preservation of resource areas will contribute to maintaining the quality of the access experience and thus a higher tourism value. Research on user demands and the changing demographics of users would also help recreation planning more directly serve the public and help increase the use of the facilities and resources. However, additional costs may be required to complete resource management plans for sensitive areas where access is provided. Planning and survey costs to assess and respond to user demand would be significant, estimated to be at least \$50,000.

WETLAND RECOMMENDATIONS

The ReCAP recommendations generally focus on measures to improve wetland and watershed management to further protect these sensitive areas. Many of the recommendations do not suggest major new initiatives but rather improvements on existing efforts by incorporating revised procedures or policies. Some of the recommendations could result in improved management of these sensitive resources upon which tourism and fishing segments of the economy depend, but may change the activities allowed adjacent to sensitive wetlands, such as restricting some activities within larger buffers. Generally, however, the recommendations do not contemplate changes in the currently permitted uses of wetland areas.

Several of the wetland recommendations involve commitment of local and state agency time and resources to conduct technical planning studies and to develop and implement LCP amendments that would improve management of wetlands and the watersheds critical for their long term health. While this may require project applicants to conduct different studies and submit additional information, the effort recommended to compile inventories and to standardize procedures could result in substantial savings to applicants and reviewing agencies by streamlining regulatory review and increasing clarity in the application process.

Longer term improvements to develop regional wetland and watershed plans and interagency management strategies could yield greater savings through more efficient uses of limited resources and more effective management of resources. A shift to greater interagency

coordination may require a commitment of agency staff time. An overall watershed planning effort will also help ensure that property owners and planners have better information in advance of project planning, leading to improved resource protection and streamlined permitting procedures. Also, such long range planning and management could contribute to improved water quality in the Monterey Bay Sanctuary. Much federal funding is currently directed to water quality planning and it is anticipated some of these efforts could be undertaken in conjunction with these programs.

INFORMATION MANAGEMENT RECOMMENDATIONS

The recommendations of ReCAP are directed to using electronic technology to make day-to-day regulatory activities more efficient. Implementing new electronic information management measures can result in great savings in staff time required to analyze information and can provide quicker service to the public who need access to Commission information. Implementation of the recommendations to improve information management and sharing will require a larger investment in obtaining needed equipment, developing programs and procedures, and training staff in the use of new technologies and equipment. Some local agencies have already taken this step and future costs would generally be needed for expanding existing capabilities. However, much greater costs will be incurred by remaining with slower, predominately manual information retrieval. Improving information sharing among agencies could also lead to increased benefits to property owners by making the regulatory review process quicker and easier.

CONCLUSION

While there are costs and benefits associated with each individual recommendation, overall, the picture that emerges from the pilot project is a positive one. Major efficiencies can be gained, resource management savings achieved, and recreation and tourism segments of the economy enhanced for the price of the initial investment in planning and policy improvements in the LCPs.

It is a continuing objective of ReCAP implementation to find ways to assist local agencies in helping to implement these recommendations, including finding alternative funding sources.

¹ Coast Alliance, *State of the Coasts*, June 1995.

² State of California, The Resources Agency, *California's Ocean Resources: An Agenda for the Future*, July 1995 (Draft), pg. ES-3, and 5G-1.

³ Griggs, G. et. al. *California's Coastal Hazards: A Critical Assessment of Existing Land Use Policies and Practices*, California Policy Seminar Research Report, University of California, 1992, p.60.

⁴ Griggs, p. 58.

⁵ Griggs, p. 56.

A

APPENDIX A: CHANGES IN ACCESS OPPORTUNITIES IN THE RECAP REGION

This Appendix summarizes the changes that ReCAP identified with respect to public access opportunities in the pilot region for the period between 1981 and 1993. To facilitate its assessment, ReCAP divided the pilot study area into geographic sub-regions, or complexes. These complexes are broadly divided based on location, environment, and types of use received. The name and location of each complex is shown on Figure 4-4, page 47.

NORTH SANTA CRUZ COUNTY

Although several formal vertical access sites exist in the complex (e.g., Greyhound Rock), much of the access in this section of the coast has historically been achieved through informal trails down cliffs and sometimes across private property. While these informal trails continue to provide much of the access available today, several new beaches were opened for public use since 1981: the County developed Scott Creek Beach and the California Department of Parks and Recreation opened Wilder Ranch State Park. Prior to 1981, Four Mile Beach (part of Wilder Ranch State Park) had been available for public use; however, the opening of the rest of the park provides the opportunity for public use at several additional beaches. Several private beaches in the complex also became available for use: Davenport Landing Beach, Davenport Beach, Panther Beach, Yellowbank Beach, and Laguna Creek Beach.¹ These additional beaches represent approximately 3.7 miles of shoreline. However, it should be noted that especially in this region of the coast, many of these beaches may have been well used prior to their "official" opening.

Although a significant loss of trails to the beach and along the bluffs had been identified between 1948 and 1980,² Commission staff review of aerial photographs between 1986 and 1993 show minimal changes in access paths in the region. However, field visits indicate severe erosion along many of the bluffs, which may affect the ability to use some of the existing trails.³

WEST CLIFF DRIVE

Since 1981, the City of Santa Cruz has installed several stairways along this stretch of coast; only one vertical accessway was available previously.⁴ In addition, the former Lighthouse City Park expanded and became part of the State Park System, although it is managed by the City of Santa Cruz. The city also developed the park with facilities and a walkway along the top of the bluff overlooking the beach.

SANTA CRUZ CITY

Significant improvements to the Santa Cruz Harbor have occurred since 1981, including several stairs/walkways to and around the harbor, picnic tables, parking, and summer moors for boats. Several improvements at Twin Lakes State Park are evident: an accessway to the beach was added, San Lorenzo Point overlook was opened, and a blufftop pathway was completed. In addition, Antonelli Pond was improved for public access.

EAST CLIFF DRIVE

Physical access to this part of the coast was significantly improved between 1981 and 1993 with the addition of access to the beach at Corcoran Lagoon Beach, 26th Avenue, and an

overlook at Rockview Drive. Two stairs that were closed in 1981 (Pleasure Point and Opal Cliffs) were reopened, although Opal Cliffs access requires payment of a fee to receive a key to a locked gate. Additional stairs have also been added to the Pleasure Point Beach area. The opening of these beaches represents approximately one mile of beach access.

CAPITOLA

The primary change in physical supply of access noted is the addition of a stairway from the Capitola Wharf to the beach. Capitola, however, has had a significant amount of access points to the beach existing prior to 1981. The California Coastal Conservancy acquired Hooper Beach, a private beach which has historically allowed public access, and installed a stairway down the bluff to improve access.

SOUTH SANTA CRUZ COUNTY

The County provided new access at Hidden Beach, representing increased access to approximately one-tenth of a mile of beach for public use. A significant amount of the coastline in this complex that is not under the jurisdiction of the California Department of Parks and Recreation has been, and remains, inaccessible to the public due primarily to a lack of vertical access in the La Selva area. The new development at Seascapes, however, provided access north of Lundborg Beach. The Manresa State Beach uplands campground was also opened.

NORTH MONTEREY COUNTY

A primary change in access in this complex is evident through the installation of boardwalks at Zmudowski, Salinas, and Moss Landing State Beaches. While the boardwalks do not add new access points, they significantly improve the accessibility of existing sites. In addition, the repair of Sandholdt Road restored access to Moss Landing State Beach after the 1989 earthquake. Further improvements around Moss Landing include expanded boat facilities and public parking at Moss Landing Harbor.

Access was also improved significantly with the development of trails in the Elkhorn Slough Reserve and through the construction of the Kirby Park boat launch. Access easements will also provide access along Moro Cojo Slough when they are accepted and opened for public use.

MARINA

The Monterey Peninsula Regional Park District acquired approximately seven acres of coastal dunes for public use. Access at Marina State Beach was improved through the extension of boardwalks, and a hang-gliding concession and platform were installed. Two new parks were also developed at Locke Paddon and KIDD pond.

SAND CITY/SEASIDE/MONTEREY

Much of the coastal access in this complex is informal trails to the beach. A new vertical access point to the beach was developed from Roberts Lake since 1981. Access across the Post-Graduate Naval School was improved and formalized with a boardwalk through the dunes; this area had previously been posted with No Trespassing signs, although public use of the beach was evident through informal paths across the dunes. Boardwalks were also installed at Del Monte Beach, and a pedestrian path was developed around Laguna Grande for public access.

MONTEREY CITY

A primary improvement to access in this area was the development of the Monterey Peninsula Recreation Trail. Vertical and lateral access was also improved with the development of several new beach parks and access points at San Carlos Beach, Aeneas Beach, and Macabee Beach, as well as several public plazas near the shoreline. Many of the access improvements resulted from conditions of coastal development permits.

PACIFIC GROVE

As with the Monterey City area, the development of the Monterey Peninsula Recreation Trail significantly improved access along the shoreline throughout Pacific Grove. Perkins Park, a bluff top park, was also developed, although access to the shore already existed from this area. Access at Asilomar was improved by formalizing access points and providing a boardwalk through the dunes to the shore in conjunction with dune restoration.

DEL MONTE FOREST

Access at Del Monte Forest was significantly improved during this time period, in large part due to the conditions on two permits granted for development. The public gained use of Stillwater Cove, a private beach, although the hours and total number of people allowed at a given time are limited. Access was improved to several other beaches in the northern section of the forest through the development of two pedestrian trails, one of which connects to the Asilomar State Park boardwalk. However, approximately 136 acres of vacant land that had historically been used for recreation was converted to the Spanish Bay Resort. Though access through the Del Monte Forest has historically been allowed, a fee is required to enter by car.

CARMEL

Historically the Carmel complex had a significant number of vertical access points to the beach area. Two additional stairs were added since 1981. Access to Carmel River State Beach was improved by formalizing an access trail, and two access points from Carmel Meadows (south of Carmel River State Beach) were developed.⁵ The city also created a pedestrian walkway and replaced stairs along Scenic Drive that had been damaged by storms in 1983.

POINT LOBOS

No significant changes in access were noted in this complex since 1981.

¹ Although the California Access Guides do not identify these beaches as available for public use in 1981, the Santa Cruz County Local Coastal Plan does identify trails to the beaches in 1980. California Coastal Commission. 1991. *California Coastal Access Guide*.

² Santa Cruz County. 1980. *Working Paper: Public Access for Santa Cruz County Local Coastal Program*.

³ California Coastal Commission staff. January 1-February 2, 1994. Field observations.

⁴ California Coastal Commission. 1981. *California Coastal Access Guide*.

⁵ California Coastal Commission staff. June 29-30, 1993. Field observations.

B

APPENDIX B: QUANTIFYING PHYSICAL ACCESSIBILITY

One of the key issues in assessing public access is determining if improvements are keeping pace with population growth, use, and/or development in the area. In order to undertake this analysis, ReCAP needed to quantify the improvements in access and compare them with growth in the region. To do so, ReCAP identified all vertical access points in the region existing in 1993 and areas of the coast that could support access but currently do not; areas with steep bluffs dropping directly into the sea were not included since access to the shore would be infeasible.¹ ReCAP then rated these areas according to the availability of access, based on the scale below, for a base year of 1981 and for 1993.²

Access Ratings:

- 0.0 no access
- 0.2 unknown, but historic use probable due to location/geography of site
- 0.3 private beach with informal trails to beach
- 0.5 public beach with informal trails to beach
- 0.7 private beach with developed access to beach (i.e. stairs or boardwalks)
- 0.9 public beach with developed access (i.e. stairs or boardwalks)
- 1.0 site meets access standards in local coastal program and has developed accessway

Table B-1 shows the results of the analysis. A weighted rating was calculated for each site by multiplying the site's rating by the miles of beach at that site. A total was obtained for each complex by summing the weighted ratings of all the sites in that complex. Except for Point Lobos, which already provided excellent public access in 1981, every complex in the region improved the supply of vertical access.

Table B-1: Comparative Improvement in Physical Access to the Coast in the ReCAP Region

Complex	Total Miles of Beach	Sum of 1981 Weighted ratings	Sum of 1993 Weighted ratings	Improvement from 1981 to 1993
North Santa Cruz County	6.35	3.9	5.9	50.6%
West Cliff Drive	0.80	0.5	0.8	66.7%
Santa Cruz City	3.55	2.3	3.4	49.4%
East Cliff Drive	1.90	0.9	1.8	97.8%
Capitola Area	1.08	1.0	1.1	5.7%
South Santa Cruz County	11.45	7.6	9.1	20.1%
Santa Cruz County Subtotal	25.13	16.2	22.0	36.4%
North Monterey County/ Elkhorn Slough	10.50	3.7	4.3	16.1%
Marina Area	1.65	1.2	1.3	9.4%
Sand City/Seaside/Monterey	7.25	1.4	1.5	11.9%
Monterey City Area	1.15	1.0	1.2	17.9%
Pacific Grove Area	4.30	3.5	3.6	2.5%
Del Monte Forest Area	2.40	1.5	1.7	13.1%
Carmel Area	3.00	2.4	2.6	10.9%
Point Lobos	4.20	4.2	4.2	0.0%
Monterey County Subtotal	34.45	18.8	20.4	8.4%
TOTAL	59.58	35.0	42.5	21.4%

To relate these improvements to the increase in demand for access, ReCAP needed to compare the areas having increased use with improvements to access in those areas. Since the data for actual use of sites is limited, ReCAP used both population increases and the amount of new development for the various areas in the ReCAP region as indicators of increasing use. While these figures do not indicate actual use of coastal access sites, they do indicate areas of growth; it is likely that an increase in population and development corresponds to an overall increase in use of the area, especially in areas known for high coastal recreation like the pilot region. In fact, since an increase in tourism is not considered, the actual increase in use will likely be greater than that estimated from population growth in the region and development increases.

Table B-2 shows the population growth for the coastal zone cities in the ReCAP region, and for each county as a whole. While Table B-1 and Table B-2³ show a general correlation between areas with population increase and improved access, a few exceptions are evident. While Watsonville grew significantly since 1980, the city does not physically border the coast, and therefore cannot improve its coastal access. However, the increased population probably places additional demands on coastal access sites near Watsonville. Although many areas within Monterey County significantly improved coastal access, the overall improvement falls well below the population growth for the County, particularly due to growth in the Marina area. The City of Marina did however develop two parks: Locke Paddon and KIDD pond. Although they do not provide coastal access, the parks do provide recreational opportunities. In addition, although the City of Capitola grew in population at a fairly high rate, its improvements to access supply are minimal. However, Capitola has historically provided significant amounts of beach access; the improvements undertaken between 1981 and 1993 appear to have maximized physical access in the City to the greatest extent possible.

Table B-2: Population Growth in ReCAP Cities, 1980-1990

Jurisdiction	Estimated Growth	Jurisdiction	Estimated Growth
Santa Cruz County		Monterey County	
Capitola	11.8%	Carmel	10.5%
Santa Cruz	18.2%	Marina	28.0%
Watsonville	31.4%	Monterey	15.8%
		Pacific Grove	2.3%
		Sand City	5.5%
		Seaside	6.4%
Santa Cruz County: incorporated area	21.9%	Monterey County: incorporated area	23.9%
Santa Cruz County: unincorporated area	22.2%	Monterey County: unincorporated area	18.9%
County Total	22.1%	County Total	22.5%

Adopted from Department of Finance

The ReCAP region has experienced significant development since 1981. Much of this development has probably contributed to the overall increase in recreation use. Review of aerial photos (1978 and 1993) shows major areas of development in Santa Cruz County south of Capitola through the La Selva area, along with infilling in the Live Oak area. In Monterey County, significant development was seen in the Marina area. While not all of this development may be in the coastal zone, and most is not directly adjacent to the beach, it likely leads to increased demand for access. Improvements to access in these areas include several stairways in the Live Oak area, significant improvements at Santa Cruz harbor, two new access points in southern Santa Cruz County, and the development of two parks in Marina.

Many of the areas that currently do not meet the access standards identified in LCPs have had significant amounts of development nearby. However, many of these areas cannot support additional vertical access, due to the geography of the site. These areas include West Cliff Drive, Opal Cliffs Drive, and the southern end of Capitola Beach to New Brighton Beach. In addition, areas near the Hopkins and Long Marine labs and north of Marina dunes area probably could not support access due to research needs and conflicts with habitat protection.

To assess the amount of future vertical access feasible, ReCAP compared the ratings calculated in Table B-1 to a theoretically possible rating of 1 for each access site for 1981 and 1993. Totals for each complex were then determined (see Table B-3). These calculations show the extent that access could still improve in each complex. The percent of maximum does not indicate the percent of coastline in the complex with available access, but represents how much *additional* access can physically be provided. For example, West Cliff Drive shows maximum physical access is now available. While there are stretches of the coast in this complex without vertical access, those areas cannot physically support access due to physical constraints. Where access can be provided, it exists and meets the standards of the local coastal plan; therefore the complex provides access at 100% of the maximum possible. This analysis suggests that much of Santa Cruz County is at, or near, its capacity to provide physical access to the shore.

Table B-3: Percent of Maximum Physical Accessibility, 1981 and 1993

Complex	% of Max, 1981	% of Max, 1993
North Santa Cruz County	61.8%	93.1%
West Cliff Drive	60.0%	100.0%
Santa Cruz City	63.5%	94.9%
East Cliff Drive	47.6%	94.2%
Capitola Area	94.7%	100.0%
South Santa Cruz County	66.2%	79.5%
Santa Cruz County Subtotal	64.3%	87.7%
North Monterey County/Elkhorn Slough	35.0%	40.6%
Marina Area	74.2%	81.2%
Monterey/Seaside Area	18.6%	20.8%
Monterey City Area	84.8%	100.0%
Pacific Grove Area	82.3%	84.4%
Del Monte Forest Area	61.9%	70.0%
Carmel Area	79.7%	88.3%
Point Lobos	100.0%	100.0%
Monterey County Subtotal	54.6%	59.2%
TOTAL	58.7%	71.3%

¹ It should be noted that bluff top lateral access could often be achieved in these areas.

² ReCAP based the ratings on the development of vertical access, but did not include improvements to facilities such as parking or picnic areas at a site. Although the availability of such facilities is important to the use of a site, they do not affect whether the actual physical supply exists. For this particular analysis, ReCAP sought to quantify only the increase in physical supply.

³ The City of Santa Cruz encompasses the complexes of West Cliff Drive, Santa Cruz City, and East Cliff Drive.

⁴ Department of Finance. 1992. *Population and Housing Estimates for California Cities and Counties*. Report E-8090CITY.

