City of Carmel-by-the-Sea

SHORELINE MANAGEMENT PLAN

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CARMEL-BY-THE-SEA

SHORELINE MANAGEMENT PLAN

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1 INTRODUCTION: A Shoreline To Be Managed

To some, the concept of managing Carmel's shoreline may seem, at first, an impossible task. So many of its characteristic features appear to be out of our control: sparkling white sands that disappear and re-appear each year, ancient dunes, bluffs, rocky promontories, and decades-old Monterey cypress that are exposed to erosion from wind and wave, a vast and powerful ocean whose sea level appears to be on the rise, and intense winter storms generated by weather patterns that seem to be less predictable than in the past.

Photo 1 – *The Carmel Shoreline*

Yet, in the face of these powerful forces, the City of Carmel-by-the-Sea has shown that it is possible to maintain, protect, and even enhance its shoreline. Over the past half century, the City has embarked on a series of projects and programs that have:

- helped protect Carmel's coastal dunes, bluffs, and Scenic Road (including its infrastructure and houses) from erosion;
- provided and maintained ample horizontal and vertical shoreline access;

- maintained a landscape of native drought-tolerant and "natural-looking" plants that protect the dunes and upper bluffs; and most important; and
- provided for the health, safety, and welfare of the residents and visitors who enjoy the City's shoreline.

1.1 MANAGEMENT OF THE CARMEL SHORELINE

1.1.1 *City Departments, Commissions, Task Forces*

For many years, management of Carmel's shoreline was the responsibility of its Department of Public Works. In 1988, the City created a separate Forestry and Beach Department that shared some of the beach maintenance responsibilities with Public Works. Then, in 1995, Forestry and Beach became the Department of Forest, Parks, and Beach, a name that more accurately reflected its mission.

Even now, responsibilities along Carmel's shoreline are still shared between the Public Works and Forest, Parks, and Beach Departments. The two departments work cooperatively on issues affecting the Carmel shoreline. They are both housed in the same building (on Junipero Avenue), and there is extensive formal and informal dialogue between the leadership of the two departments. Regular maintenance along the Beach Bluff Pathway, litter and trash pick-up from the Pathway and beach areas, maintenance of trees, landscape plants, Pathway irrigation system, beach access stairways, and restroom facilities are all performed by personnel from the Forest, Parks, and Beach Department or by City contractors. Maintenance and repairs of shoreline walls and revetments, beach access stairways and ramps, the Beach Bluff Pathway, storm drains, Scenic Road, and other structures, are the responsibility of the Department of Public Works.

The City's Forest and Beach Commission also deals with issues affecting the coastline. Members of this advisory group are appointed by the Carmel City Council. As with the department it advises, the Forest and Beach Commission grew out of the Forestry Commission in 1988.

On at least two occasions, the City Council has appointed task forces to deal with specific issues related to Carmel's shore. In response to the extraordinary damage to the City's beach bluffs and shoreline structures caused by the devastating 1982/83 El Niño storms, the Carmel Beach Rehabilitation Task Force was created in 1983. It worked with City staff and consultants to oversee structural repairs during Phase I of the Carmel Beach Rehabilitation Project. From 1984 through 1988, this Task Force assisted in Phase II: the planning and development of the Carmel Beach Bluff Pathway project.

Then, in 1996, the City Council created the Carmel Beach Master Plan Task Force. This group worked with City staff and produced the *Beach Master Plan*, which was approved by the City Council in 2000.

1.1.2 *Previous Carmel Shoreline Management Documents*

Over the years, three documents have provided information and direction for management of the Carmel shoreline:

Beach Bluff Pathway Landscape Plan

Between 1985 and 1988, the Carmel Beach Rehabilitation Task Force and landscape architects Royston, Hanamoto, Alley, and Abey (RHAA) of Mill Valley, California, developed the landscape design plan for the Carmel Beach Bluff Pathway.[1] Plants utilized in the design were chosen because they "fit" well with the Carmel shoreline environment; these native or "native-like" plants could thrive when exposed to salty air, coastal winds, and limited water.[2] This landscape plan and its accompanying plant list were approved by Carmel's Forestry Commission, Planning Commission, and City Council, as well as the California Coastal Commission. The plan provides the framework for the City's current shoreline landscape. Approval of Coastal Development Permits for some of Carmel's recent shoreline projects has been based, in part, on conditions specifying that the City continue to follow the RHAA landscape plan.

Shoreline Emergency Action Response Plan

In 1989, coastal biologist David Shonman and Assistant City Administrator Greg D'Ambrosio developed emergency response guidelines for dealing with damage to Carmel's beach and bluff. The *Shoreline Emergency Action Response Plan* was written primarily in the form of worksheets, describing procedures for shoreline monitoring and erosion repair. Carmel's *Beach Master Plan*, described below, recommends that the City:

> "Continue the implementation of the BEACH EMERGENCY ACTION RESPONSE PLAN[3] … to minimize the dangers to public

[1] The Carmel Beach Bluff Pathway is detailed in the project EIR (City of Carmel-by-the-Sea. 1986. Carmel Beach Restoration Phase II Final EIR). The project's landscape plans are on file with the City Forester.
[2] The Task Force and landscape architects also chose plants whose leaves and flowers were "subdued" in color, to better match existing native coastal plants.
[3] The *Beach Emergency Action Response Plan* is now called the *Shoreline Emergency Action Response Plan*

safety and facilities that may be caused by winter storms or other natural disasters."[4]

Beach Master Plan

The *Beach Master Plan* was the City's first planning document to establish goals, objectives, and policies for the Carmel shoreline. This Plan was developed by the Beach Master Plan Task Force and amended by the Carmel Planning Commission and City Council. The *Beach Master Plan* was approved by the City Council in September 2000.

Each of these documents deals with some aspect of managing Carmel's shoreline, but no one document constitutes a complete management manual. The RHAA design plan, written more than a decade ago, has not been assiduously followed by the City. Many of the plants recommended in this City-approved landscape design have since been replaced by other species, for reasons that have never been documented. The *Beach Master Plan* omits mention of the numerous seawalls and revetments that line and support the beach bluffs. The *Shoreline Emergency Action Response Plan* only deals with conditions that might be encountered along the shoreline south of Eighth Avenue. None of these plans provides guidance regarding the level of action along the shoreline that will require review by City planners in order to conform to the Carmel LCP and State coastal law. Finally, none of these plans serves as a practical document that City staff can use for managing the shoreline.

In 2001, the City received approval from the California Coastal Commission to repair its shoreline damaged during the 1997/98 El Niño storms.[5] One of the conditions of permit approval was that the City prepare a "comprehensive shoreline management plan."

1.1.3 *Carmel Shoreline Management Plan*

This *Carmel Shoreline Management Plan* (SMP) is a response to the Coastal Commission's 2001 directive. It also responds to concerns expressed by City staff and consultants regarding the need to consolidate prior documents into a single useable plan.

[4] City of Carmel-by-the-Sea. Beach Master Plan, section (VI)(E)(OM-4). Sept. 2000.
[5] The permit was for the "Carmel Bluff and Beach Access Improvement Project" (Coastal Development Permit # 3-00-140), approved on April 13, 2001.

The *Shoreline Management Plan* is an appendix to the Carmel Local Coastal Program's Implementation Plan. It replaces the Carmel *Beach Master Plan*, while incorporating its Goals, Objectives, and Policies. It utilizes principles that guided the original Beach Bluff Pathway landscape design. It also incorporates and updates the *Shoreline Emergency Action Response Plan*, bringing it into compliance with the City's Local Coastal Program and the California Coastal Act.

In the case of development review, it is important to note that the majority of the actual beach and base of bluff area at Carmel Beach (including the revetments and the seawalls) is located within the California Coastal Commission's retained coastal permitting jurisdiction. Because of this, the standard of review for development in this area is the Coastal Act. In those cases, the General Plan/Implementation Plan can and will provide non-binding guidance to the Commission in making permitting decisions, but the decisions will be based on the policies of the Coastal Act.

The *Shoreline Management Plan* is a comprehensive document that will guide future management of the City's shoreline area, including its beaches, dunes, bluffs, landscape, and associated infrastructure. Periodically, it will be updated to reflect new ordinances, policies, plans, and information necessary for optimal management of the City's shoreline. Pertinent information from the upcoming Del Mar and North Dunes Master Plan will be added to the *Shoreline Management Plan* upon adoption.

1.2 A Word About Words

This management plan deals with Carmel's beach, dunes, bluffs and bluff tops, Ocean Avenue, Del Mar, Scenic Road, adjacent streets, and pedestrian access/ drainageways. In the past, the City, its departments, commissions, task forces, documents, reports, and plans, all have used the word "beach" to refer to different parts of Carmel's coast. Sometimes "beach" has actually meant Carmel's sandy beach, but other times, it has referred to portions of the City's coastline, including its dunes, bluffs, and surrounding areas. In this management plan, "beach" specifically refers to the portions of Carmel's shoreline where sand is naturally deposited by wave action. "Dunes" refers to areas of wind-blown sand, especially landward of the beach. When referring to Carmel's coastal area in general, this management plan uses the words "coast" "shore" and "shoreline."

2 THE CARMEL SHORELINE

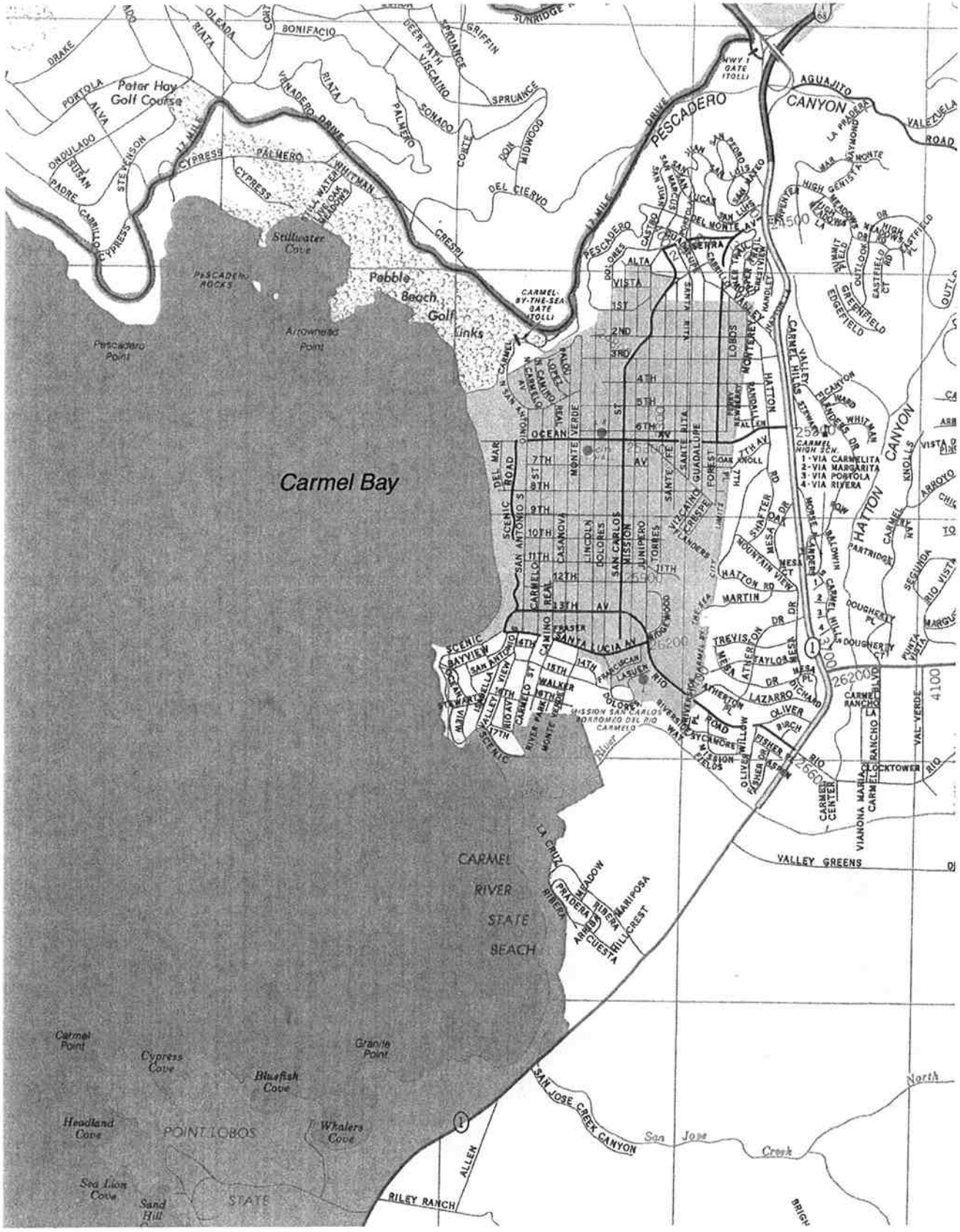
The Carmel shoreline is situated mid-point along the coast of Carmel Bay. It consists of a broad white beach that is backed by steep coastal bluffs in the far northern and southern reaches and by gently sloping dunes in the remaining portions.

Carmel's shoreline is the most dynamic of all the City's public lands. Portions of the coastline are in a state of almost constant change: the amount of sand on its beach, the shape of its dunes, the location of its coastal bluff edge and its waterline – each may fluctuate yearly, seasonally, daily, or even hourly. The natural forces that alter the Carmel shoreline also have a direct consequence on City facilities and visitor-serving amenities, on Scenic Road and its infrastructure, and on nearby private homes. The geologic, oceanographic, and meteorologic forces that have shaped, and continue to shape, Carmel's shoreline are described in detail by Simpson (1972)[6] and Johnson (1984).[7] This section of the *Carmel Shoreline Management Plan* provides an up-to-date summary of what is currently understood about the Carmel shoreline.[8]

2.1 CARMEL BAY

Carmel Bay is a 2.8 mile-wide open bay that is protected by the granitic headlands of Pescadero Point in the north and Point Lobos in the south (Fig. 1). The Bay is divided into two smaller cells, separated by Carmel Point in the middle. The City of Carmel's shoreline is located in the northern cell;[9] the southern cell[10] contains Carmel River Beach and San Jose Creek Beach ("Monastery Beach").[11] Though the two cells appear nearly contiguous, their physical features differ in important

[6] Simpson, John Page III.1972. The Geology of Carmel Bay, California. Unpublished M.S. Thesis. Naval Postgraduate School, Monterey, California. (Document on file in the "Carmel Beach Document Collection" at the Carmel-by-the-Sea City Hall.)
[7] Johnson, Rogers E. and Associates. 1984. Carmel Beach Coastal Erosion. Phase I. Final Report. Unpublished report. (Document on file in the "Carmel Beach Document Collection" at the Carmel-by-the-Sea City Hall.)
[8] An in-depth discussion of the oceanographic forces that impact the Carmel shoreline appears in Appendix 9.1.
[9] Called "Northern Carmel Bay" in Storlazzi and Field (2000)
[10] Called "Southern Carmel Bay" in Storlazzi and Field (2000)
[11] Both Carmel River Beach and San Jose Beach are part of the Carmel River State Beach.



Source: H. M. Gousha

Figure 1
Carmel Bay

ways. The northern cell is served by a single small seasonal watercourse, Pescadero Creek. The southern cell is also served by a small seasonal creek (San Jose Creek), but is dominated by the Carmel River, which delivers substantial amounts of sediment into Carmel Bay during late fall, winter, and early spring.

The southern cell is deeply etched by the Carmel Submarine Canyon,[12] which is an offshoot of the Monterey Submarine Canyon. The head of the Carmel Canyon begins just offshore of Monastery Beach, then quickly reaches a depth of 300 feet within a quarter-mile of shore. Both the Carmel River and the Carmel Canyon have significant impacts on the Bay's southern cell but do not appear to have a noticeable impact on the Carmel shoreline in the northern cell.

2.2 CARMEL BEACH

Carmel Beach is recognized as one of the world's most beautiful public beaches. It is a crescent-shaped pocket beach that extends from the upper portion of Carmel Point (sometimes referred to as Abalone Point) about one and one-quarter miles northward to Pescadero Canyon.

Like beaches everywhere, Carmel's beach is subject to periodic changes. Successful management of Carmel Beach requires an understanding of the dynamic processes that are responsible for these changes.

2.2.1 *Beach Processes*

Beaches are composed of any available material, of sufficient size and composition, which can be deposited on the shore by ocean waves. Throughout the world, beaches are made from a wide variety of materials: broken coral, mollusk shells, foraminifera tests (the shells of single-celled amoeba-like organisms), and rocks of various sizes, from boulders to cobbles to sand grains. As beach material varies in composition, it also varies in color, from the pink beaches of Bermuda (foraminifera) to the black beaches of Hawaii and Shelter Cove, California (eroded volcanic rock) to the tan sands of Monterey Bay and Big Sur to the sparkling white sands of Carmel.

Typical Beach Formation

Carmel's white sand beach is formed by processes that differ somewhat from those that generate most typical California beaches. Sands on those beaches are

[12] The Carmel Submarine Canyon is also referred to as the "Carmel Canyon" or the "Carmel Offshore Canyon."

produced by the erosion of inland mountains, hills, and fields. Erosion produces sediment that is carried by streams and rivers out to the ocean where it is sorted and distributed along the shore by wave action. The color and texture of these beaches results from the materials that have been discharged by local rivers, not just during present times, but throughout past millennia.

Once sediment has reached the coast, it is usually acted upon by two different transport mechanisms. The first, "littoral drift," is a natural process that moves sediment either upcoast or down coast, depending on the angle at which waves strike the shoreline. These waves produce a current ("longshore current") that transports sand along the shore, parallel to the beach. Sediment carried by this current can often be seen to pile up on one side of a coastal structure (e.g. a rock jetty). Along the Pacific Coast, littoral drift usually moves sediment southward, though during winter storms, the direction may be reversed.

The second mechanism is the onshore/offshore sand cycle, an annual process that typically deposits sand onto a beach during summer months and then moves that sand off the beach during winter. This occurs because waves that usually reach the shore during summer are "constructive" waves: low energy waves that pick up subtidal sand and deposit it onto the beach. Waves that reach the shore during winter, however, are usually "destructive" waves: high energy, steep waves that strike the shore with tremendous force, scouring sand from the beach. At many locations, this sand is deposited onto offshore sand bars, where it can then be re-deposited back on the beach by future summer waves.[13]

Within a coastal cell, sand will continue to be moved by the longshore current until:

- it is moved onto the land via the onshore/offshore sand cycle. There, it might either be blown farther landward by onshore winds, or returned to the ocean (and the longshore transport) by shoreline erosion; or
- it is moved by powerful storm waves into deeper water, where it will remain out of reach of the longshore transport. In some areas, sand may be transported down into a coastal submarine canyon, from which it will not likely return to the shoreline without global tectonic changes.

[13] There are exceptions to this pattern. Summer storms can generate destructive waves, and benign winter conditions can create constructive waves, but these are unusual seasonal variations.