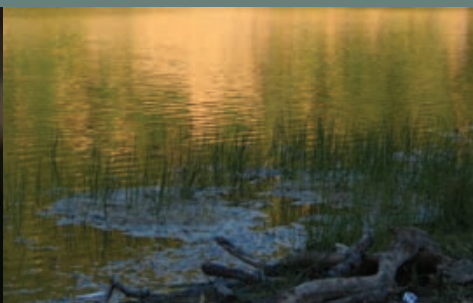


**LOWER CARMEL RIVER AND LAGOON FLOODPLAIN  
RESTORATION AND ENHANCEMENT PROJECT**



AN INITIATIVE TO IMPROVE  
FLOOD PROTECTION,  
RESTORE AND PROTECT  
RIPARIAN HABITATS AND  
WILDLIFE AND PROVIDE  
PUBLIC ACCESS AND RECREATION



## THE CARMEL RIVER -

### A Signature River of California: What's at Stake?

The Carmel River watershed, located on California's central coast in Monterey County, is nestled between two prominent coastal ranges – the Sierra de Salinas and the Santa Lucia Range. The region is home to a landscape of unique biodiversity and breathtaking beauty and is intimately tied to Monterey County's leading local industries, tourism and agriculture.

The Carmel River flows west approximately 36 miles from its headwaters in the Santa Lucia Mountains and empties into Carmel Bay, a state designated Area of Special Biological Significance located within the federally protected Monterey Bay National Marine Sanctuary. Carmel River State Beach, including its adjacent lagoon area and wetlands, serves as an important refuge for sensitive aquatic species and is a dynamic interface between marine and freshwater river systems.

The Carmel River supports declining California native aquatic species including the southernmost population of the federally protected South-Central Coast steelhead trout (*Oncorhynchus mykiss*), the federal and state protected California red-legged frog (*Rana aurora draytonii*) and the state-listed Western pond turtle (*Clemmys marmorata*). The floodplain area adjacent to the river supports some of the highest densities of migratory songbirds in California.

The focus of this initiative is the Carmel River's lowest reach – consisting of the lower three miles of the river, from Rancho San Carlos Road west to the Carmel River Lagoon and river mouth. This area is characterized by white sand beaches, floodplains, wetlands, riparian habitats and agriculture, as well as residential neighborhoods, golf courses and commercial centers. Where Highway One crosses the river, it also serves as a gateway between the urbanized cities of the Monterey Peninsula and the wild, rugged terrain of Big Sur's coast and mountain ranges where millions travel annually. Though some of the surrounding land has been preserved in perpetuity, human development in the form of water diversions, gravel mining, roads, levees, bridges, and buildings has dramatically altered the river, diminished and redirected flows, reduced floodplain acreage and threatened associated ecosystems.

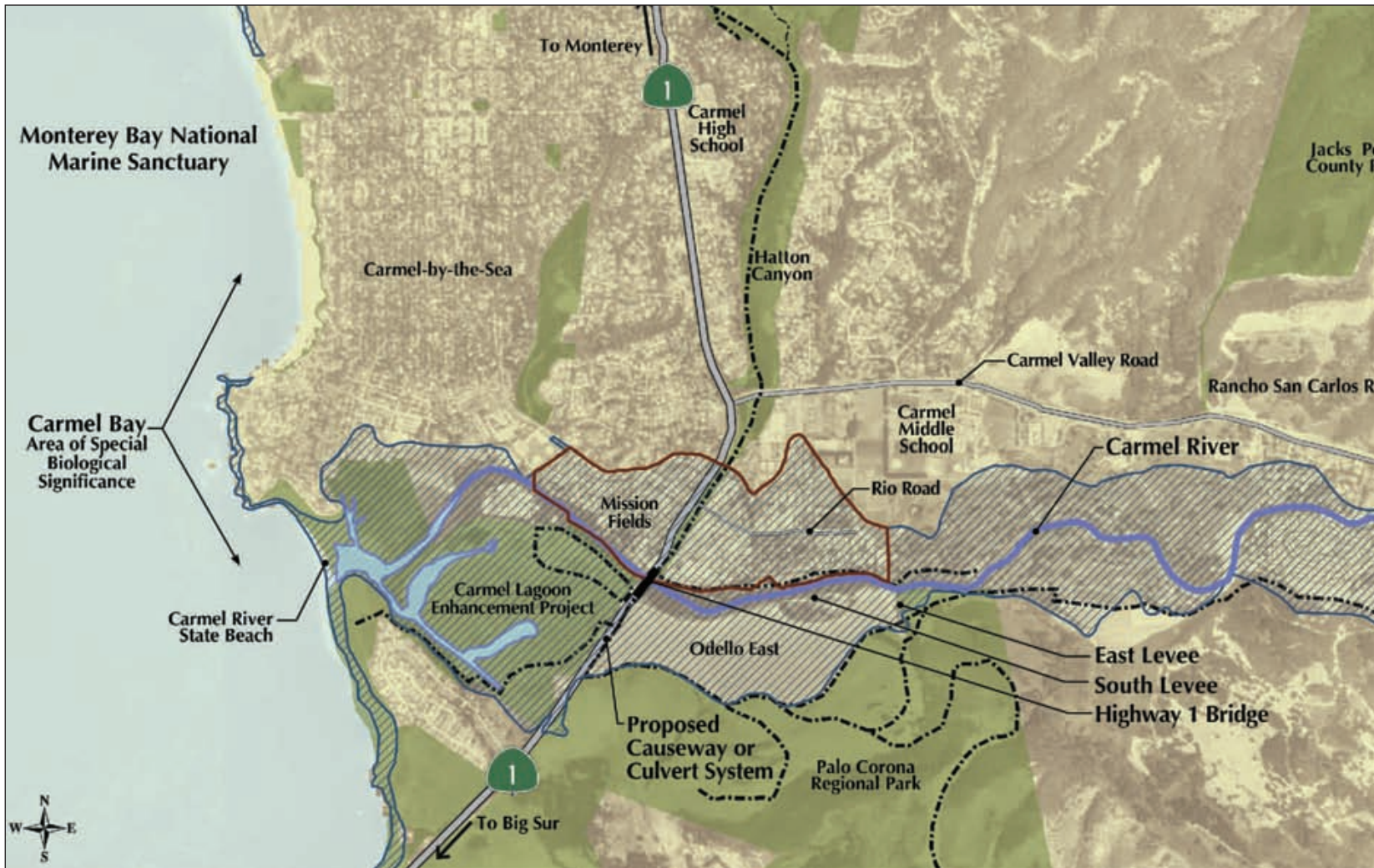
To address this critical situation, local agency managers, nonprofit partners and private entities have come together and identified several key interrelated projects that, if implemented, would provide a comprehensive solution to long standing floodplain loss and flood management problems that plague the lower Carmel River watershed. Such a program is now ripe for state bond funding and other funding through a collaborative, multi-agency effort.

*Human development in the form of water diversions, gravel mining, roads, levees, bridges, and buildings has dramatically altered the river, diminished and redirected flows, reduced floodplain acreage and threatened associated ecosystems.*



## Projects Focus on Providing River-Wide Benefits

Two projects have now been identified that could effectively address long standing flood issues and habitat restoration needs for the lower Carmel River and lagoon. These projects focus on improving habitat and management of the seasonal lagoon west of Highway One and on restoring the floodplain east of Highway One.

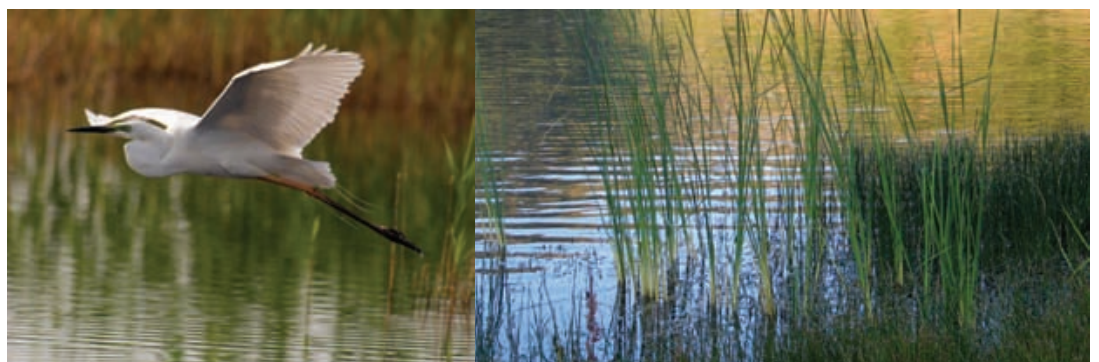


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CARMEL, CALIFORNIA



### Legend

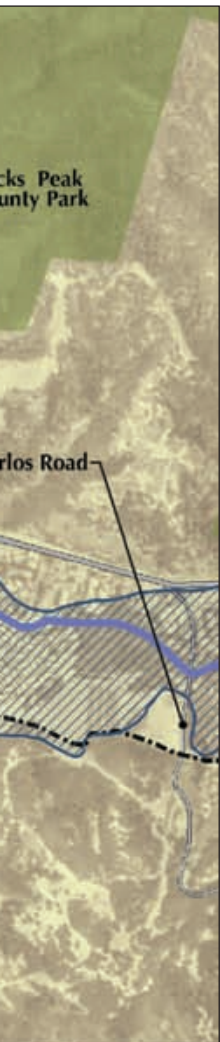
-  Carmel River
-  Carmel River Lagoon
-  FEMA 100-year Floodplain
-  Monterey County Service Area 50
-  Major Roadways
-  Public Trail System
-  Public Open Space



## FLOOD CONFLICTS WHERE THE RIVER MEETS THE OCEAN: AN ADAPTIVE MANAGEMENT APPROACH

Carmel River State Beach is located where the Carmel River delivers sediment via river flows and where the river and

dynamic Pacific Ocean meet. Carmel River State Beach and surrounding bluffs have been developed with homes, roads and recreational infrastructure within the 100-year floodplain, and below Ordinary High Water elevations of the Carmel River Lagoon. In the summer and the fall, wind and waves build the beach into a natural barrier to the river's winter rainy season flows causing the lagoon to fill to a level that threatens adjoining residential areas with flooding. Consequently, this area has been the focus of intense management activities to reduce flood elevations in the lagoon. In many winters since the early 20th century, private property owners, the State or the County have excavated an outflow channel across the beach to lower lagoon water surface elevations to prevent flooding of agricultural fields or developed properties. Importantly, this breaching of the beach through winter and spring seasons to reduce the flooding hazard (until flows have nearly ceased in late spring or early summer) compromises the quantity, quality and function of the lagoon – an ecosystem crucial to the survival of threatened fish and wildlife species – most notably steelhead trout and California red-legged frogs.



This complex situation has prompted a comprehensive effort by affected federal, state and local public agencies to analyze and devise a viable long-term beach and lagoon management program to protect against floods as well as safeguard the threatened fish and other species that use the lagoon as habitat. Funds in the amount of \$850,000 are now being sought to support needed technical studies and engineering investigations of adaptive management solutions for creating a sustainable natural lagoon ecosystem.

## LETTING THE RIVER USE ITS FLOODPLAIN

The hydrologic and floodplain modeling done thus far has demonstrated that multiple actions within the lower Carmel River floodplain on the east side of State Highway One – known locally as the Odello East area – would need to be implemented in order to gain positive outcomes for flood protection, restoration and recreation. A project involving the following actions is currently under design by local agencies and nonprofit partners:

- Removing portions of the east and south levees to let flood flows access the floodplain
- Restoring the natural floodplain on 70 acres of land on Odello East
- Installing a causeway or series of culverts which would allow for flood flows to access the flood plain on the west side of Highway One. The existing roadway south of the Carmel River Bridge currently creates a barrier to river flow during large storm events and needs to be addressed if significant flood benefits are to be realized. Current flood flow modeling indicates that a major benefit would be realized by elevating the road with a causeway which would reduce water surface elevations by up to three feet during a 100-year flood, would reduce flow within the main channel and would lower the water surface in and adjacent to the Mission Fields area. This would effectively remove the 100-year flood hazard in this area. The option of installing culverts would only be marginally beneficial in terms of flood control benefits.

The flood control and restoration benefits associated with these projects makes them ideal candidates for funding through recent State bonds, specifically Propositions 50, 84 and 1E. It is estimated that implementation would cost between 12-15 million dollars for the actions described.

# A HISTORY OF FLOODING:

## The Local Economy and Public Safety Compromised

The Carmel River has experienced numerous floods throughout history. Floods in 1995 and 1998 caused millions of dollars in damage and destroyed the State Highway One Bridge accessing the Big Sur coast, causing a temporary closure of the highway at that location, and stranding many people in the area. Visitors to and residents of the Big Sur coast were forced to use a one-lane "Bailey" bridge for six months during emergency work to rebuild a permanent bridge. The area is one of the highest repetitive loss areas in California in the federal flood protection program. During the last ten years, no significant flood protection projects have been implemented in the area due to funding constraints. The recent history of flooding in the lower area of the river and its minimal flood protection level clearly necessitate a comprehensive approach to floodplain planning by local agencies and the community. Without such an effort local and state governments, as well as the Monterey Peninsula and Big Sur communities, will continue to bear the consequences of future flooding including property damage, economic loss and public safety impacts.

## A COMPREHENSIVE APPROACH: WHAT'S BEING DONE

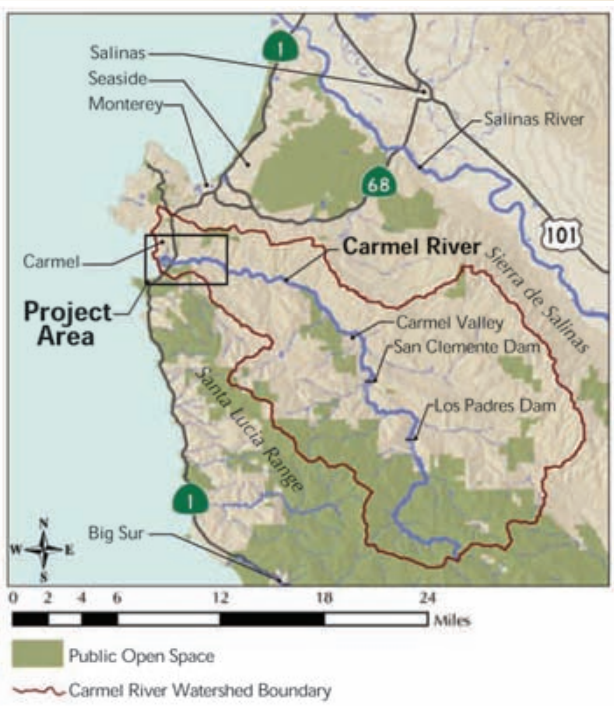
Fortunately in recent years the State has begun to invest some funds to help restore key landscapes in the lower Carmel River to protect residential areas from flooding and to provide for vital habitat for fish and wildlife.

With \$4 million in State funds from the California Coastal Conservancy, the California Department of Parks and Recreation (State Parks) implemented the Carmel River Lagoon Enhancement Project to expand the lagoon by restoring an agricultural parcel adjacent to it. The project included excavation of a remnant south arm of the lagoon on the west side of Highway One to expand aquatic habitat for steelhead and riparian associated wildlife.

With funding from the State's Integrated Regional Water Management Grant Program, the Big Sur Land Trust (BSLT) has completed the first phase of a floodplain modeling study of the lower Carmel River floodplain on the east side of State Highway One (just across from the State Parks project) to identify various floodplain restoration alternatives and improve habitat. BSLT is pursuing a multi-objective project that provides accessible floodplain for flood waters, restoration of riparian habitat, as well as recreational access via an integrated and compatible trail system along the lower Carmel River and mouth of Carmel Valley.

Through creative partnerships with local and State agencies and nonprofits, including The Nature Conservancy, State Parks, the Monterey Peninsula Regional Park District, the Transportation Agency of Monterey County, and Monterey County Public Works, BSLT is working on creating an extensive network of open space and trails along the Lower Carmel River. Six miles of public trails are planned for the area allowing access to thousands of acres of public lands.

The Carmel River is also under study and design for the removal of the San Clemente Dam in the upper watershed. This project is currently under environmental review and has support of both federal and State resource agencies. This is yet another reason to work towards holistic restoration of the Carmel River floodplain and riparian habitat.



## Partners

Entities and interests working collectively to implement this broad vision include the Big Sur Land Trust, Monterey Peninsula Water Management District, Monterey County Service Area 50, California State Parks, California Coastal Conservancy, NOAA Fisheries, Transportation Agency of Monterey County, Monterey County Department of Public Works, California Department of Transportation, Monterey County Water Resources Agency, Carmel River Steelhead Association, Carmel River Watershed Conservancy, Monterey Peninsula Regional Park District, Carmel Development Corporation, California American Water, California State University at Monterey Bay, Carmel Area Wastewater District, Carmel River Lagoon Coalition, California Coastal Commission, California Department of Fish and Game, U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service.

FOR MORE INFORMATION, CONTACT:

**Big Sur Land Trust**

126 Clock Tower Place, Suite 101, Carmel, CA 93922 831-625-5523



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