

**MONTEREY PENINSULA WATER MANAGEMENT DISTRICT
PROJECT DESCRIPTION FOR SELECTIVE VEGETATION MANAGEMENT
IN THE CARMEL RIVER CHANNEL, BANK RESTORATION, AND CONCRETE
PIER AND DECK REMOVAL, SUMMER AND FALL 2017**

SELECTIVE VEGETATION MANAGEMENT

A series of strong hydrologic events occurred on the Carmel River in January and February of 2017. The highest peak flow occurred on February 21, 2017 at just over 9,500 cubic feet per second. These high flows scoured out trees and mobilized debris leading to the creation of debris piles and stacks of fallen trees throughout the river corridor. As a result, the risk of streambank erosion along riverfront properties has increased at several locations (see enclosed maps) should next winter's flows rise above the five-year return magnitude. Erosion can occur as high flows are directed away from the center of the channel by vegetation, downed trees, and debris dams into streambanks.

Fifteen areas impacted by vegetation encroachment, downed trees or debris piles in the channel bottom are proposed for selected vegetation management:

1. Highway One Bridge Area (encroaching vegetation and downed trees area approximately 500 ft²): at River Mile (RM) 1 upstream and downstream of Highway One Bridge willows encroaching into the active channel will be trimmed back with downed trees being cut into sections and branches being pulled up out of the channel and chipped. Large sections of the trunks will be left in the channel for large wood habitat.

2. Rancho Cañada Golf Course Area (downed trees and debris piles): at RM 2.1 upstream and downstream of Bridge Number 5, downed trees and debris piles will be pulled off of bridge piers as well as reducing the size of downed trees so they don't trap debris. Large trunks will be left in channel for large wood habitat.

3. Via Mallorca Bridge Area (downed trees and encroaching vegetation area approximately 200 ft²): at RM 3.2 upstream and downstream of Via Mallorca Bridge willows encroaching into the active channel will be trimmed back, as well as downed trees being cut off of Via Mallorca Bridge Piers.

4. Rancho San Carlos Bridge Area (downed trees and encroaching vegetation area approximately 200 ft²): at RM 3.9 upstream and downstream of Rancho San Carlos Bridge, willows encroaching into the active channel will be trimmed back. In addition, downed trees associated with wind storms and bank failure will be cut into large sections so they can pass downstream bridges. Branches will be removed from the channel and chipped while trunks will be left in place for large wood habitat.

5. Valley Greens Bridge Area (downed trees and encroaching vegetation area approximately 200 ft²): at RM 4.8 upstream and downstream of Valley Greens Bridge willows encroaching into the active channel will be trimmed back. In addition, several downed trees will be cut into smaller sections so they can pass bridges downstream.

6. Schulte Bridge Area (downed trees, debris piles, and encroaching vegetation area approximately 100 ft²): at RM 6.7 upstream and downstream of Schulte Bridge, debris piles have been forced up against vegetation. These debris piles will be broken up with hand tools and removed from live vegetation. Some trees may be trimmed to allow debris to pass through the constriction. In addition, downed trees in the area will have their crown branches removed with the trunks being notched in several places and left in place for large wood habitat.

7. Robinson Canyon Bridge Area (downed trees and encroaching vegetation area approximately 100 ft²): at RM 8.5 upstream and downstream of Robinson Canyon Bridge willows encroaching into the active channel will be trimmed back. In addition, downed trees will be cut into smaller sections with branches being removed and pulled out to be chipped and removed from the river corridor area.

8. Randazzo's Bridge Area (downed trees and encroaching vegetation area approximately 100 ft²): beginning at a private bridge known as Randazzo's Bridge at RM 10.1 tree branches will be trimmed that are encroaching into the active channel. In addition, several downed trees will be cut into smaller sections to prevent debris dams.

9. Garland Park Area (debris piles and downed trees): at RM 11.0 debris piles will be broken up and downed trees will be reduced in size so debris can safely pass during high flows.

10. West Garzas Road Area (downed trees and encroaching vegetation area approximately 200 ft²): at RM 12.1 willows encroaching into the active channel will be trimmed back with downed trees being reduced in size.

11. Boronda Bridge Area (downed trees and encroaching vegetation area approximately 200 ft²): at RM 12.6 upstream and downstream of Boronda Road Bridge encroaching willows will be trimmed back. These trees will have some of their lower branches trimmed to allow debris to pass. In addition, multiple downed trees will have their crown branches removed with their trunks being cut in several places.

12. Trail and Saddle Club Area (downed trees and encroaching vegetation area approximately 200 ft²): at RM 13.2 a large sycamore has fallen across the Carmel River this tree will be modified so debris can pass this area. Some large trunks will be cut with branches being chipped. The main trunk will be cut in several sections and left in place as large wood habitat. Other smaller downed trees may also be modified. Some encroaching willows upstream will be cut back.

13. DeDampierre Area (downed trees, debris piles, and encroaching vegetation area approximately 200 ft²): at RM 13.7 willows and cottonwoods encroaching into the active channel will be trimmed back and some debris piles will be broken apart. In addition, several downed trees in the active channel will be reduced in size to allow debris and high flows to pass.

14. Esquiline Bridge Area (downed trees and encroaching vegetation area approximately 200 ft²): upstream and downstream of Esquiline Bridge at RM 14.5 trees growing on gravel bars will be trimmed. Some downed trees and debris piles located in overflow channels will be reduced in size to allow high flows and debris to pass. All large wood will be left in the river corridor for large wood habitat.

15. Ward Bridge Area (downed trees and encroaching vegetation area approximately 200 ft²): upstream and downstream of Ward's private bridge at RM 15.0; several large downed trees have hung up in a section with a split channel. These trunks will be cut in several places to allow debris to pass. The large sections of tree trunks will be left in the flowing stream to provide large wood habitat. In addition, some encroaching vegetation will be trimmed back.

In general, a width of up to 30 feet of open channel is desired. A total of approximately 2,600 square feet of stream cover encompassing approximately 0.06 acres in the channel bottom may be affected by the vegetation removal.

Woody species in the center of the channel, including sycamore, alder, cottonwood, and willow, will be cut by hand, using chainsaws, loppers, and other hand tools. As described in Monterey Peninsula Water Management District's (MPWMD) "Guidelines for Vegetation Management and Removal of Deleterious Materials for the Carmel River Riparian Corridor" (2012), a minimum of work will be carried out in order to maintain an open passage for flow and debris. The debris piles will be broken apart with hand tools and spread around the area. A portion of the cut branches and tree trunks will be placed along stream edges to provide shade and cover for aquatic species. Encroaching vegetation will be trimmed and chipped. Vegetation on the banks will be left in place to maintain bank stability.

MPWMD proposes to conduct vegetation management between approximately mid-August and mid-October 2017. Because vegetation will be cut using hand tools, no stream diversions or erosion control plans are necessary. Both steelhead and California red-legged frogs (CRLF) may be present in the reaches targeted for vegetation cutting.

Avoidance and minimization measures proposed to protect steelhead include the following:

1. Where possible, trees will be cut to fall away from stream areas that may contain steelhead. Where trees cannot be cut to fall away from stream areas, the direction of fall will be to areas that steelhead are less likely to occupy, such as shallow or open water areas.
2. Work will be conducted in the fall when long stretches of the Carmel River are dry. Where water is present water temperatures may be less affected by the removal of shade along the stream edge because larger canopy trees on the banks still provide shade.

Avoidance and minimization measures to protect CRLF include the following:

1. A qualified biologist will survey project areas using United States Fish and Wildlife Service survey guidelines prior to conducting work in the channel.
2. A qualified biologist will conduct a training session for any workers who have not already participated in such a session.
3. A qualified biologist will inspect project areas daily for the presence of CRLF prior to conducting work in the channel.
4. If CRLF are found at a project site and it is determined that vegetation removal may impact

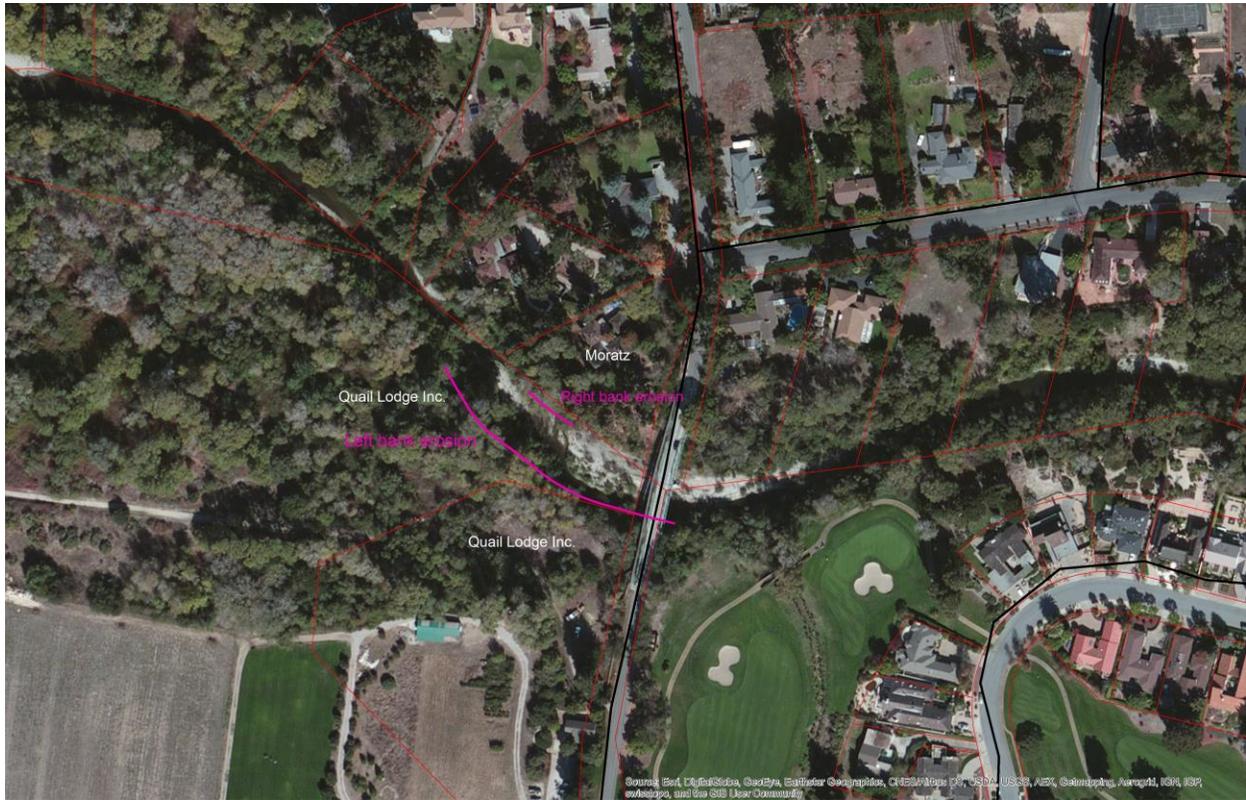
frogs, MPWMD will delay vegetation removal until the frogs move or relocate frogs to another area of the river if delay is not feasible.

Temporary impacts from vegetation management may include the loss of cover and shade. MPWMD conducts ongoing revegetation activities along the Carmel River that mitigate for such temporary impacts. In addition, MPWMD routinely removes non-native plant species in the riparian corridor which allows for the expansion of native plants and removes competition associated with non-natives.

MORATZ AND QUAIL LODGE INC. STREAMBANK RESTORATION

Streambank erosion occurred along approximately 75 feet of the right streambank and up to 400 feet of the left bank just downstream of the Rancho San Carlos Road Bridge at RM 3.8 in the winter of 2017. The right streambank initially started showing signs of instability in 2011 when moderate flows were directed by a large gravel bar directly into the streambank. However, the right bank continued to show only minor adjustments during drought years 2012-15. Then in the winter of 2017 during a high flow events in January and February the left bank on the outside of the meander bend had a significant failure where approximately 10 to 15 feet of property over approximately 300 plus feet eroded into the river as several large cottonwoods fell out of the streambank. Temporary measures to stabilize the right bank including installation of jute net, sand bags, large wood, and willow cuttings do not appear to be adequate to protect the bank from large flow events. Now with the new erosion of the left bank on the outside of the meander bend and the foreseeable loss of additional land, including a portion of the only remaining mature riparian forest along the lower 15 miles of the river, the District would like to restore these two streambanks to prevent a large scale erosion event in future winters. The intent of the project is to stabilize the streambanks, encourage deposition between the vanes, and focus the energy of the river into the center of the active channel.

A series of rock vanes/barbs (without the J-hook extending into the middle of the channel) consisting of ¼ to two ton rip rap is proposed to be installed along with some rock placed on the slope. Filtering to prevent piping would be accomplished with an appropriately sized gravel filter. For the right bank, approximately 30-40 cubic yards of rock (about 60 to 80 tons) would be imported to the site and placed along the streambank to form a vane/barb. For the left bank, approximately 125 cubic yards of rock (about 250 tons) would be imported to the site and placed along the streambank to form a series of vanes/barbs. Work would be carried out when the river dries up or during very low flows when the river could be contained in a small low flow channel through the reach. Access into the river bottom would be through an existing ramp into the river located about 200 feet downstream of the bank erosion (the San Carlos well ramp) or through Quail Lodge Inc. property. Limited vegetation removal would be required for construction equipment access. Willow cuttings would be placed into the streambank and channel bottom along the rock vane/ barbs as part of the installation.



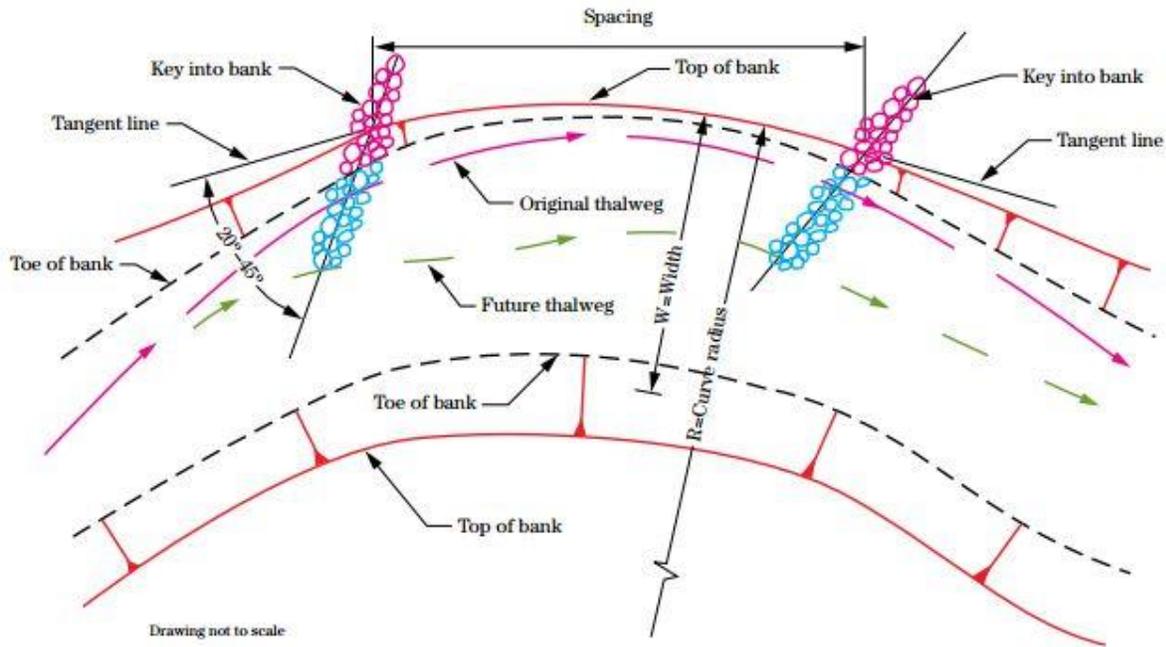
Aerial Image showing locations of erosion just downstream of Rancho San Carlos Rd. Bridge



Right bank area susceptible to erosion along Moratz property, Carmel River, Monterey County, California, March 27, 2017.



Left bank erosion on outside of meander bend with mature cottonwood forest trees dropping into river during high flows along the Quail Lodge Inc. property, Carmel River, Monterey County, California, March 27, 2017.



TS14H-8

(210-VI-NEH, August 2007)

Conceptual design for outside meander bend (Left Bank) protection and restoration with rock barbs. Additional protection would be placed on the inside of the meander bend because a gravel bar sometimes directs flow straight into the bank. Part 654 Stream Restoration Design, National Engineering Handbook, United States Department of Agriculture Natural Resources Conservation Service

CONCRETE BRIDGE PIER AND BRIDGE DECK REMOVAL

During the March 10, 1995 flood, the furthest downstream bridge on the Rancho Cañada Golf Course collapsed. A concrete center pier and a portion of the bridge deck are still located in the streambed. Now that the Rancho Cañada Golf Course has closed and land along the Carmel River corridor will be donated to the Monterey Peninsula Regional Park District, the MPWMD believes there is an opportunity to remove the concrete pier and deck with hand held jack hammers, or with a crane that could lift the bridge deck out. The pieces of concrete would be carried out by hand to a truck to be disposed at a recycling center. It is important to note, that this reach typically goes dry in a normal rainfall year. However, this year has been extremely wet so a low flow may still pass this reach. MPWMD hopes that both of these structures will be out of the flowing stream when work is carried out. MPWMD has carried work like this in the past with low flows by isolating the work area with straw bales (see final picture).

The concrete structures prevent spawning where they cover the channel and affect the substrate up and downstream of the structures by causing a backwater condition and unusual turbulence near the structures. Removal of the structures would permanently re-establish natural hydraulic conditions that would quickly result in additional spawning and rearing habitat for steelhead.



Concrete Bridge Pier during higher flows in March 2017



Concrete Bridge Deck during higher flows in March 2017



Example of concrete pier removal that was carried out in 2008.

Additional information about these activities is available by contacting Thomas Christensen, MPWMD Riparian Projects Coordinator, at (831) 238-2547.

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