

**TEN MILE CREEK BRIDGE**  
**Spanning Ten Mile Creek on the Oregon Coast Highway**  
**Yachats vicinity**  
**Lane County**  
**Oregon**

**HAER NO. OR-146**

HAER  
OR-146

**PHOTOGRAPHS**  
**WRITTEN HISTORICAL AND DESCRIPTIVE DATA**

**HISTORIC AMERICAN ENGINEERING RECORD**  
**Pacific West Regional Office – Seattle**  
**National Park Service**  
**909 First Avenue**  
**Seattle, Washington 98104-1060**

# HISTORIC AMERICAN ENGINEERING RECORD

## TEN MILE CREEK BRIDGE

HAER No. OR-146

**Location:** Spanning Ten Mile Creek on the Oregon Coast Highway, Yachats vicinity, <sup>Lincoln</sup> Lane County, Oregon.

**Date of Construction:** 1931

**Engineer:** Conde B. McCullough

**Builder:** Union Bridge Company

**Present Owner:** Oregon Department of Transportation

**Present Use:** Highway Bridge

**Significance:** The Ten Mile Creek Bridge is significant as one of the earliest examples of reinforced concrete tied-arch bridge construction in the Pacific Northwest region. The bridge is also significant for its association with the development and completion of the Oregon Coast Highway (US 101) in the 1930s. The Oregon Coast Highway was a major public works effort to establish an uninterrupted route from California to Washington. The effort was aided in the years after the completion of the Ten Mile Creek Bridge by the Oregon Coast Bridges Project in which the federal Public Works Administration provided funds for the construction of five major bridges to replace ferry service. The completion of the Oregon Coast Highway became a major factor in the development of commerce and tourism in Oregon's coastal regions, and the highway has since become one of the most notable scenic routes in the United States.

The Ten Mile Creek Bridge is also significant as the work of a master, Oregon State Bridge Engineer Conde B. McCullough. McCullough served as State Bridge Engineer, and later as the Assistant State Highway Engineer, from 1919 until his death in 1945. McCullough is significant for his use of innovative bridge technology and for his visually appealing designs. He attained international recognition for the structures he designed along the Oregon Coast Highway in the 1930s. Eric DeLony, Chief of the Historic American Engineering Record, stated in his book Landmark American Bridges that "this family of bridges represents some of the best and most innovative concrete and steel bridges in the world."

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## I. DESCRIPTION AND ENGINEERING HISTORY

The Ten Mile Creek Bridge is a reinforced concrete through tied arch structure. The 120-foot long main span is flanked by one 30-foot long reinforced concrete deck girder span on each end, giving the bridge a total length of 180 feet. The design of the tied arch ribs of the main span is based on an elliptical curve and features slender hangars and massive rhombic cross braces to maintain the rigidity of the superstructure. The hangars are regularly spaced within the elliptical arch, and support the transverse floor beams below the roadway. The roadway, curb-to-curb, is 27 feet with two travel lanes. Seven foot wide sidewalks are located on each side of the roadway.

The bridge has an ensemble of architectural elements that combines classical and Art Deco details. Ornate curved brackets support the sidewalks at each transverse floor beam. The sidewalk railings are comprised of precast concrete balusters under a weathered concrete cap. Intermediate rail piers are located above each support bracket, each with stylized fluting in an Art Deco style. The end piers are flared out from the roadway with inset bush hammered panels extending from a larger fluted end pier. The approach spans have flattened arch curtain walls.

The Ten Mile Creek Bridge was altered in 2000 during a rehabilitation project that modified the cross bracing at the portals. The "X" shaped bracing was changed to resemble a "lazy K" by removing the bottom legs of the "X" and installing a horizontal member in their place. This project increased the vertical clearance of the bridge and provided a uniform clearance across the entire roadway. A similar project was completed in 1998 for the Big Creek Bridge, and the Wilson River Bridge is scheduled to have the cross bracing modified in 2005.

The Ten Mile Creek Bridge is one of the earliest examples of reinforced concrete tied arch bridge construction in the Pacific Northwest region of the United States. The tied arch is an adaptation of the "bowstring arch truss" developed by Squire Whipple in 1841 and first expressed in a concrete form as one of the variations of the "rainbow arch" bridges designed and popularized in the 1910s and 1920s by Iowa bridge engineer James B. Marsh. The Ten Mile Creek Bridge was designed by Oregon State Bridge Engineer, Conde B. McCullough, and is one of three nearly identical single span tied arch bridges built in 1931 along the Oregon Coast Highway (the Wilson River (Tillamook County) and Big Creek (Lane County) bridges each used the same 120-foot long tied arch design with slightly varying approach span configurations). The tied arch design was selected for these lowland coastal locations due to inadequate foundation conditions which would have rendered laterally stressed abutments unstable, and due to the need for minimum profile supporting piers to accommodate high water during flood periods and extreme tidal conditions. By utilizing a tied arch configuration, lateral stresses were removed from the arch ends, and did not need to be compensated for by massive abutment structures. Since the lateral forces were balanced within the arch itself, the bridge loads were transmitted vertically through the piers, allowing for the narrow low mass pier design needed for the tidal flat area at the bridge site. McCullough considered this design and the use of a tied arch configuration as an approach to solving the problems of lowland coastal sites to be rare and innovative in the United States. His particular adaptation of the tied arch design was credited in the technical literature as having the unique feature of using the bridge deck

slab itself as the structural “tie” member. McCullough later incorporated the tied arch, both in steel and concrete, into many of his larger multi-span bridges.

The Ten Mile Creek Bridge is also significant as the work of a master, Oregon State Bridge Engineer Conde B. McCullough, and due to its thematic association with the design and construction of several other major reinforced concrete bridges designed by McCullough and erected along the Oregon Coast Highway in the 1930s. McCullough served as State Bridge Engineer, and later as the Assistant State Highway Engineer for Oregon from 1919 until his death in 1946. He authored a number of books and technical articles on bridge design and construction. McCullough is significant for his use of innovative bridge technology and for his visually appealing designs. He has attained international recognition for the large scale structures he designed to span the major rivers and estuaries along the Oregon coast for the completion of the Oregon Coast Highway. These bridges, including the Rogue River (Gold Beach), Yaquina Bay, the Alsea Bay, the Coos Bay (McCullough), the Siuslaw River (Florence), the Umpqua River (Reedsport), the Wilson River, Big Creek, and a number of thematically similar concrete beam and girder structures, were built during a period of about six years from the early to mid-1930s to complete the route of the Oregon Coast Highway from Washington to California. The bridges used many common design themes and elements, including stylized bridge railing balustrades, curved bracketing, arched fascia walls, bush hammered inset panels, and Art Deco ornamentation which often appears as fluting and embellishment of entrance pylons, columns, stringers, piers, and other vertical structural members. Eric DeLony, Chief of the Historic American Engineering Record (HAER) states in his book Landmark American Bridges that the family of bridges on the Oregon Coast Highway “represents some of the best and most innovative concrete and steel bridges in the world.”

The Ten Mile Creek Bridge is also significant for its association with the development and completion of the Oregon Coast Highway (US 101) in the 1930s. The completion of the Oregon Coast Highway was a major public works effort to establish an uninterrupted coastal vehicular transportation route from California to Washington. The effort was aided by the PWA-sponsored Oregon Coast Bridges Project which provided funds for the construction of five modern bridges to replace the existing slow, cumbersome ferries which serviced the crossings of the larger bays, rivers, and estuaries. The completion of this route was a major factor in the development of commerce and tourism in Oregon’s coastal region, and has since become one of the most notable scenic routes in the United States and has been designated as a National Scenic Byway. The aesthetic of the Ten Mile Creek Bridge is considerably enhanced by its outstanding scenic coastal site and isolated environment.

The other two tied arch spans, the Wilson River Bridge (Tillamook County) and the Big Creek Bridge (Lane County) have both been previously determined eligible for listing on the National Register of Historic Places. These two bridges have also been documented by the Historic American Engineering Record (Wilson River Bridge HAER No. OR-39 and Big Creek Bridge HAER No. OR-86).

## II. SOURCES

DeLony, Eric. Landmark American Bridges. New York: American Society of Civil Engineers and Bulfinch Press, 1993.

Hadlow, Robert. *Ten Mile Creek Bridge, National Register of Historic Places Nomination Form*. Portland: Oregon Department of Transportation, 2004.

Norman, James. *Big Creek Bridge Written Historical Data (HAER No. OR-86)*. Salem: Oregon Department of Transportation, 1995.

Oregon Department of Transportation. ODOT Bridge Section Records, including original drawings of the Ten Mile Creek Bridge #01181.

Smith, Norman, Dykman, Historic Highway Bridges of Oregon. Portland: OHS Press, 1989.

## III. PROJECT INFORMATION

This documentation has been prepared by the Oregon Department of Transportation in conjunction with the project to list eleven of the major Oregon Coast Highway bridges on the National Register of Historic Places.