JORDAN CREEK MIGRATION BARRIER REMOVAL PROJECT

SECTION 1
DESCRIPTION OF CONDITIONS BEFORE PROJECT WAS EXECUTED

Jordan Creek is located in Del Norte County and is a tributary to Lake Earl (T17N, R1W, Sec. 34) (figures 1 & 2). It is well documented as a valuable tributary to Lake Earl. The two 5-foot diameter corrugated metal pipe located upstream from the concrete box culvert at Parkway Drive were deteriorated and a migration barrier to adult and juvenile species of salmonids (figure 3). The California Department of Transportation (Caltrans) installed the two corrugated metal pipes under a frontage road parallel to Parkway Drive, once State Highway 101/199. The corrugated metal pipes were installed under the frontage road, in 1950. The corrugated metal pipes were also undersized and caused flooding with the adjacent lands during high winter flows.

These corrugated metal pipes exhibited high winter flow velocities and low summer flows. The outfall of the corrugated metal pipes were elevated and had deteriorated bottoms (figures 3 & 4). With the migration barrier removed down stream forty feet, the new elevation of the corrugated pipes would result in a migration barrier to the upper reaches of Jordan Creek, which originates within the boundaries of Jedediah Smith Redwoods State Park. A study prepared by the CDFG in 1975 recognized Jordan Creek as essential habitat for the maintenance of salmonid populations for Lake Earl.

The project site location is approximately three miles east of Crescent City, next to Parkway Drive, a well traveled County maintained road (figure 2). The project site was well within the expanded right-of -way of Parkway drive and little offsite work was anticipated. The CDFG and National Marine Fisheries Service (NMFS) concluded that due to the bulk of the material to be removed from the concrete box culvert mitigation barrier on Parkway Drive, and the immediate proximity of corrugated metal pipes, both barriers would have to be removed and replaced during the same construction period.

SECTION 2
DESCRIPTION OF THE RESTORATON AND PLANNING TECHNIQUES USED

The project was consistent with adopted Local Coastal Plan, the County General Plan, and State goals of protecting and enhancing resource habitat. The stream corridor for Jordan Creek in this area is well established with substantial riparian vegetation upstream and downstream of the project site. The property owner signed an access agreement for any work on this project that encroached upon his property. The existing improved area for Parkway Drive provided adequate room for equipment operation, storage, water treatment, and general access to the project.

A Stream Alteration Agreement was obtained by CDFG, which included the downstream migration barrier project that was adjacent to the project site. A Coastal Development Permit was obtained. Compliance with the California Environmental Quality Act was conducted and completed by County Planning Staff. The United States Army Corps (Corps) reviewed the project in consultation with representatives from United States Fish and Wildlife Service (USFWS), NMFS, and the Regional Water Quality Control Board (RWQCB). Their conclusions were that there were no adverse effects from the project and issued a permit. The project design

was prepared with the participation of staff from the CDFG, Corps, and NMFS, along with several hydrologists, fish biologists, and civil engineers. The final project was designed to provide

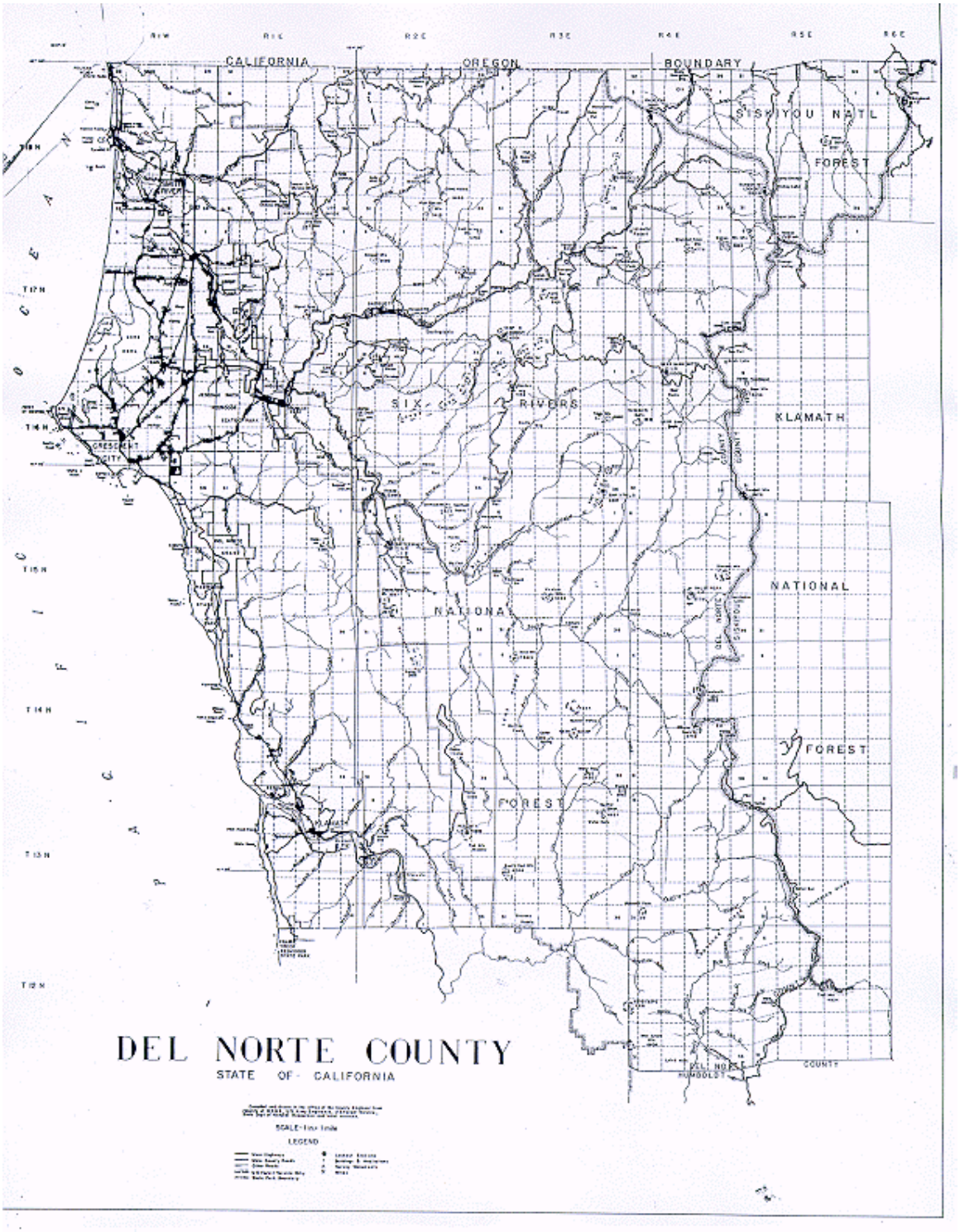

Figure 1 - Map of Del Norte County, California

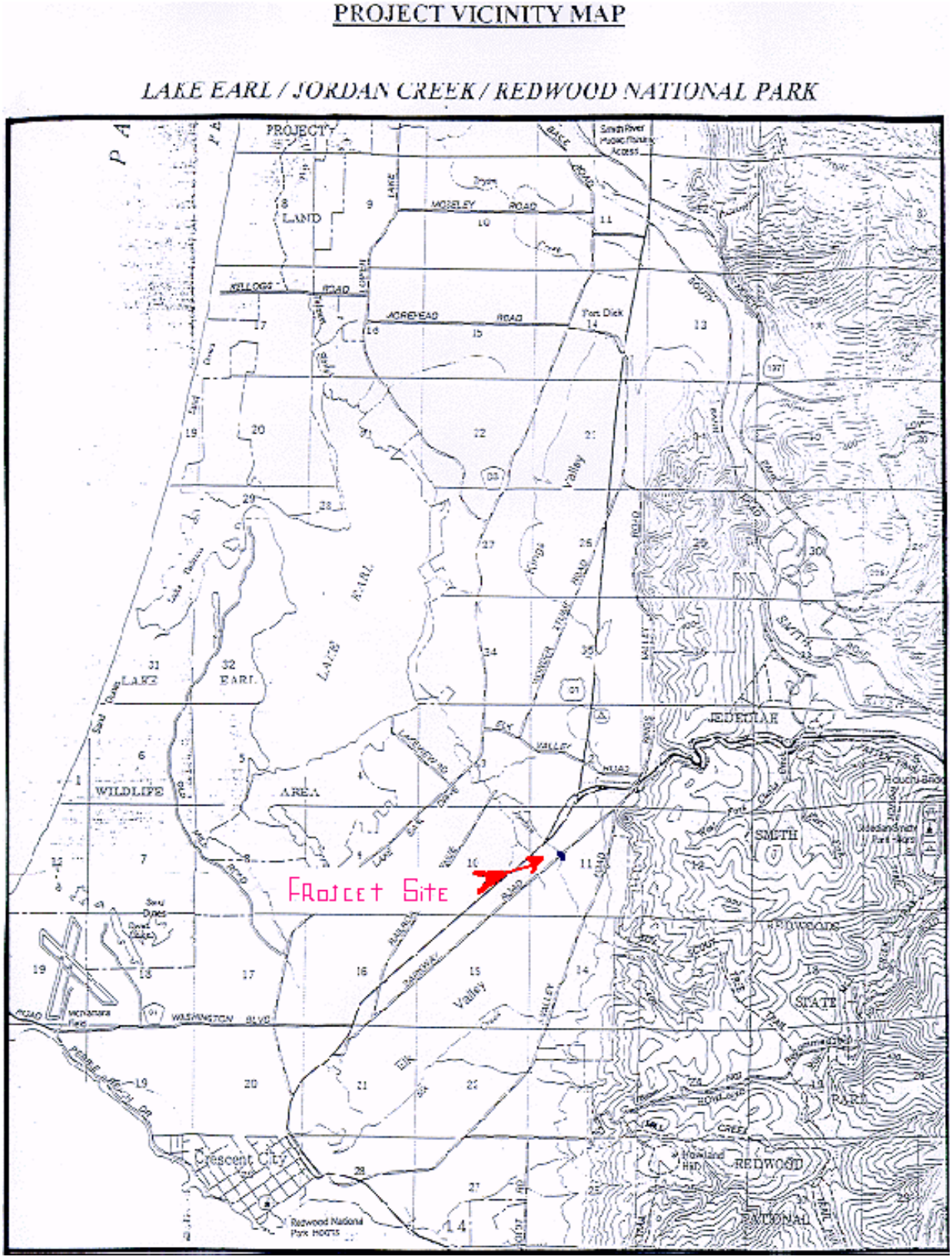

Figure 2 - U.S.G.S. 7.5 minute topographical map illustrated the location of the project site

natural channel conditions providing for year round unobstructed salmonid fish passage and increased fish habitat including species listed as threatened or endangered and candidate species.

The project design included removing the existing migration barrier, widening the stream channel, restoring the stream bank with a natural bottom, with ½ ton boulders staggered every 10 feet to allow juvenile anadromous fish to rest while swimming upstream, and installing a flatcar bridge

SECTION 3

DESCRIPTION OF THE RESULTS OF THE PROJECT

Before commencing the project, County staff requested and was granted from the Board of Supervisor permission to temporarily close the section of County road 'Parkway Drive' containing the project area from September 13th to November 1st (figure 5). This action allowed the contractor to complete the work promptly, without the obstruction of rerouting traffic through the project area. On September 15th, a team from CDFG arrived at the project site and relocated fish from the site using electro shocking equipment and moved the captured salmonids down stream of the work area. Over two hundred cutthroat and steelhead trout were captured at this time (figure 6 & 7). During the same time period, the by-pass system was installed (figure 8 & 9), along with the setting of block nets above and below the work site preventing fish from moving back into the project area as the stream was diverted (figure 10). Under the direction of CDFG, as the project site was dewatered, a Del Norte County project inspector monitored the site and with dip net caught and safely released another one hundred fish of mixed size and species.

Upon the completion of the fish shocking and the installation of the by-pass system, heavy equipment began removing the cover material in preparation for the downstream migration barrier removal project (figure 11-14). Once the migration barrier was removed and the new stream channel was developed, it was obvious that the flow line in the twin pipes would create another migration barrier (figure 15). After removing the corrugated metal pipes, work quickly began rebuilding the stream banks and channel. Once the stream banks were shaped to the correct angle and the streambed excavated to the desired depth, geo-fabricate was installed to prevent erosion (figure 16 & 17). After the geo-fabricate was in place, ½ ton boulders were placed individually, from the bottom of the streambed to the top of the stream banks (figure 18-20). At the location of the flatcar bridge, the boulders were grouted together with a concrete mortar mixture to insure stabilization (figure 21 & 22). Under the direction of CDFG personnel, the placement of a grade control upstream from the project was constructed (figure 23-28). The grade control was a very important part of the project to prevent upstream scouring. This activity was not originally in the project description but both County and CDFG personnel believed that this was an important element in preventing problems upstream from the project. Imported local river run material (gravel and cobble) was used to create a "natural" streambed between the stream banks and covered the boulders used for the grade control (figure 29 & 30).

Once the stream restoration was completed, the footings for the flatcar bridge were built. The footings were constructed one foot deep concrete, five feet long and ten and a half feet wide. They were far enough from the stream bank to prevent erosion from transpiring (figure 31-34). California

Figure 3 - Migration Barrier Jordan Creek

Figure 4 Deteriorated Corrugated Metal Pipe

Figure 5 Parkway Drive Road Closure Sign

Figure 6 CDFG Personnel Elector Shocking

Figure 7 CDFG Personnel Removing Fish

Figure 8 Installing By-Pass System

Figure 9 By-Pass System Upstream from Culvert

Figure 10 Block Nets Install Up and Downstream

Figure 11 Heavy Equipment Removing Cover

Figure 12 Upstream Construction Site

Figure 13 New Footings for Upstream Structure

Figure 14 Approximate Level of New Streambed

Figure 15 Removal of Twin Culverts

Figure 16 Reconstructing Stream Channel

Figure 17 Reconstructing Streambanks

Figure 18 Installing Rip Rap Rock

Figure 19 Installing Rip Rap Rock

Figure 20 Installing Rip Rap Rock

Figure 21 Installing Concreted-Rock Slope Protection

Figure 22 Finished Concrete-RSP

Figure 23 Installing Upstream Grade Control

Figure 24 Installing Upstream Grade Control

Figure 25 Installing Upstream Grade Control

Figure 26 Grade Control Finished

Figure 27 Grade Control Finished

Figure 28 Grade Control Finished

Figure 29 Covering Grade Control with River Run

Figure 30 Finished Stream Channel

Figure 31 Concrete Footing on the Eastbank

Figure 32 Concrete Footing on the Westbank

Figure 33 Concrete Footing for Flatcar Bridge

Figure 34 Concrete Footing Placement on Eastbank

Figure 35 CDFG, Americorps, and CCC Planting

Figure 36 Flatcar Bridge Arrival

Figure 37 Preparing to Unload Flatcar Bridge

Figure 38 Preparing to Unload Flatcar Bridge

Figure 39 Unloading Flatcar Bridge from Trailer

Figure 40 Finishing Unloading Flatcar Bridge

Figure 41 Dragging Flatcar Bridge to Project Site

Figure 42 Dragging Flatcar Bridge to Project Site

Figure 43 Preparing the Concrete Footing for Flatcar Bridge

Figure 44 Pulling Flatcar Bridge over the Creek

Conservation Corps and Americorps members, under the direction of CDFG staff, began revegetating the project area (figure 35).

There was a minor delay delivering the flatcar bridge. These problems were with the flatcar bridge supplier and not the contractor hired to install the bridge. The bridge finally arrived at noon and was unloaded with the same two excavators that restorated the streambed and stream bank. The process could have gone easier if a large crane was used to unload and install the flatcar bridge on to the footings. But the extra expense of bringing a large crane from Medford, Oregon, did not warrant its use. After an hour, the flatcar bridge was unloaded and transported to the project site (figure 36-42). A steel plate was bolted on the footings so that once the flatcar bridge was in place it would be welded to the concrete footings (figure 43). One of the excavators crossed Jordan Creek, by way of Parkway Drives culvert replacement, while the other brought the bridge as close as it could to the stream crossing. At the stream crossing, the excavator on the other side of the stream attached a cable to the flatcar bridge and began pulling it across the stream while the other lifted the back end of the bridge and carried it forward (figure 44-48). Within three hours after the flatcar bridge was delivered to the project side, the installation was complete (figure 49 & 50).

After several months, the project site has a natural appearance (figure 51-55).

The costs breakdown on the project is as follows:

County Engineering Staff	$3,984.81
County Road Staff	$5,930.18
Concreted-Rock Slope Protection Under Flatcar Bridge	$300.00
Flatcar Bridge	$24,595.00
Grade Control Boulders	$175.00
Planting Trees	$560.00
Rip Rap 1/2 Ton Rock	$12,161.63
River Run Material Used to Recreate the Stream Bed	$1,467.94
25% of Base Contract Price (labor, and equipment)	$55,897.50
Concrete Footings for Flatcar Bridge	$2,100.00
TOTAL PROJECT COSTS	$107,172.06

The County's total funding from SB 291 for the project was $83,766, which was 78% of the total project's cost. The County obtained a grant from National Fish and Wildlife Foundation was $23,000, which was used to purchase the flatcar bridge from Skip Gibbs Company, Inc. of Redwood Valley, California. County staff believes the flatcar bridge project design to be feasible for many other stream crossing restoration projects in the Del Norte County.

During the months of January, February, and June, County staff exhibited a power point presentation of the Jordan Creek Rehabilitation Project to the following organizations:

- Del Norte Sunrise Rotary
- Five Counties Salmon Restoration Coalition
- Society of Civil Engineers Del Norte County Branches
- Society of Civil Engineers Humboldt County Branches
- National Marine Fisheries Service
- California Regional Water Quality Board
- California Fish and Game

Figure 45 Other Excavator Lifting and Pushing Bridge

Figure 46 Flatcar Bridge Halfway Across Creek

Figure 47 Flatcar Bridge Hitting Embankment

Figure 48 Excavator Lifting Bridge in Place

Figure 49 Flatcar Bridge in Final Position Eastbank

Figure 50 Bridge in Final Position Westbank

Figure 51 Grade Control After Several Months of Flow

Figure 52 Flatcar Bridge with Cattle Guards

Figure 53 Westbank Entrance to Flatcar Bridge

Figure 54 Flatcar Bridge from Parkway Drive

Figure 55 Planted Tree