

Attachment A

Route-101, Post Mile 23.64 Revegetation Plan

Introduction

The following revegetation and monitoring plan is for a project to install rock rip-rap downstream from the culvert outlet at PM 23.64 that carries an unnamed intermittent drainage (ditch) along the west side of Route-101 just north of Crescent City. The rock rip-rap will reduce the opportunity for further erosion that is currently occurring.

The ditch now carries an intermittent stream that eventually drains into the Elk Creek Wetlands Wildlife Area. The ditch in its current condition is eroding at its banks creating an incised ditch with steep banks. The bank in its current condition is steep, and poses a potential risk to the driving public as any vehicle that would make its way off the highway could end up in the upended in this ditch. Currently the ditch is only vegetated at the tops of the banks with bunch grasses, no riparian or wetlands species are present inside the banks of this feature.

The addition of rock rip-rap would serve to gently slope the banks, and to prevent further incision and erosion. Incorporating willows into this feature would create a bioengineered solution that would serve as an enhancement of the existing condition and provide a more permanent fix to the erosion problem. As well, the bioengineered solution would increase the current beneficial uses by providing shading, aquatic wildlife habitat, erosion control, and more substrate for filtration.

Revegetation Goal

The goal of this revegetation effort is to offset the permanent fill to the intermittent ditch that will result from installation of the rock rip rap. The revegetation will enhance the natural plant community, provide additional stability to the stream banks, and decrease invasive species' establishment. In addition, successful revegetation will help shade the watercourse, which will provide cooler water temperatures for aquatic species.

Revegetation Methods

The nature of the permanent impacts to jurisdictional features will include the placement of 140-cy rock slope protection (RSP) that will extend 350-linear ft. downstream from culvert outlet. This impact will serve as an increase of beneficial uses by preventing further incising of the drainage ditch. All work will be completed in the dry season to avoid impacts such as turbidity. Temporary disturbances will be necessary of ground cover for access to make repairs to currently failing eroding ditch. These repairs should be an increase to beneficial uses.

In order to fulfill the requirement to plant within the confines of the available right-of-way and the ditch, revegetation will consist of planting approximately 130 Hooker's willow (*Salix hookeriana*) cuttings. It was calculated that 109 willows would be sufficient for the area needed for planting, a 20 percent increase was added to account of loss of survival. Willows have not

been observed in the project area, possibly due to the amount of scour currently occurring at the site. The choice of using willow cuttings is based on the following:

- Willows have been seen along other streams and in ditches not far from this site.
- Planting willow cuttings would result in quicker plant growth adjacent to the stream than if container plants were used.
- Site conditions, including the limited area for planting and potential for high stream flows, are not suitable for installing container plants.

Willow sprigging will be implemented as follows:

- Harvest and plant cuttings when willows are dormant (early winter to early spring), after first set of seasonal rains and no later than March.
- A staggered line or group planting of willows 5 to 10 feet on center.
- Cuttings should be harvested from local and native sources, and include a variety of willows present to maintain genetic and sexual diversity (generally willows have separate sexes). Also any collection efforts should be well dispersed so as to not adversely impact existing riparian vegetation.
- Cuttings should be selected from young shoots/wood with small cuttings approximately 1 inch by 18 inches and larger cuttings 2 to 3 inches by 18 to 36 inches. Length of the cutting can vary depending on depth to ground water contact.
- Cuttings need to be hydrated between harvest and planting. Preferably soaked in water several days to a week to stimulate rooting prior to planting, but not over two weeks when rooting begins and shearing of new roots would occur with sprigging.
- Branches should be trimmed off of the cuttings above the branch collar with the bottom end cut to a point for easier installation and identification of the bottom end during installation. A wooden or plastic mallet is recommended for driving in the cuttings as it tends not to split the shoot, and a dab of pruning tar on the top of the cutting will help minimize desiccation.
- Cuttings should be planted to depth of 75 to 80 percent of their length, and care taken to plant cutting with buds pointing up and bottom end of cutting in ground water throughout growing season.
- A total of \$35,000 has been allocated to perform the revegetation efforts, and will include hiring crews for collecting and planting native willow vegetation.

Monitoring and Success Criteria

Monitoring will be performed to ensure that the revegetation goals are met, and provide a mechanism for corrective action if necessary. Monitoring will characterize extant conditions in the field, and data collection will be reproducible and collected in a consistent manner. Monitoring will be conducted for five years by a Caltrans Revegetation Specialist and/or project Biologist with appropriate field survey experience.

Monitoring will consist of:

- Evaluation of cover by willow cuttings. The qualitative method for evaluating cover will include use of a percent cover reference guide.
- Monitoring weed cover qualitatively through the use of and comparison with standard vegetation percent cover diagrams to estimate cover in the revegetation area.
- Establishing reproducible photo points prior to plant installation and revisited each year to document vegetation establishment and cover changes. Photos will be provided with the annual and final monitoring reports. Additional or alternate photo points may need to be installed if the original photo points fail to capture enough visual data.
- During the first two years, monitoring will be conducted to assess progress toward the success criteria and identify and/or implement remedial or adaptive management measures. The final monitoring will assess whether the success criteria have been met. If survival is lower than expected, but natural recruitment of native species has supplemented this shortfall, the success criteria may be adjusted.

Success Criteria will consist of:

- Cover by cuttings will be evaluated annually to ensure canopy (shade) cover is increasing over time. Less than 5% relative cover of noxious weed species (per the most recent USDA California State noxious weed list). It can be very difficult to keep noxious weeds out of a recently-disturbed construction area. Factors contributing to why and how noxious weed species infiltrate revegetation sites include amount of disturbance; amount of weed species on adjacent lands; direction from which wind and water is coming from and whether they may bring weed seeds into the planted area; seed dispersal by birds; and non-use of herbicides on Caltrans' revegetation areas. An objective of revegetation efforts at this site is that eventually, a mature woody canopy will shade out many noxious weeds.
- Less than 10% cover of bare soil (to prevent soil erosion).
- The timeline for meeting the success criteria will be five years after planting. Species richness or diversity should be similar to previous and adjacent vegetation types. If during the monitoring period it appears the success criteria may not be met by the end of year five, Caltrans and the agencies will work together to determine potential reasons for failure to meet the criteria and develop remediation measures and/or revised criteria.

Remedial Actions and Adaptive Management

Dead or low vigor (less than 25% green material) plant material will be replaced as needed in the fall or winter following the start of the seasonal rains during the plant establishment and monitoring period to fill planting gaps, and to meet the revegetation goal and monitoring success criteria. If any particular plant species within the revegetation areas demonstrates failure to thrive, then other regionally appropriate native species may be substituted within the planted area. Other remedial or adaptive management measures may be undertaken as necessary to achieve compliance with the monitoring success criteria. All remedial or adaptive management measures will be documented in the annual monitoring reports.

If sprigging methods are unsuccessful, container pots of suitable species may be installed. However, due to the limited space, this may not be a viable option.

Reporting

Monitoring will occur for a minimal of three years (if success criteria are met) to five years. Annual revegetation monitoring reports will be submitted to the California North Coast Regional Water Quality Control Board by the end of January, beginning three years after the bioengineered solutions has been completed. The reports will include site photos. A final monitoring report will be drafted in year three (or five if success has yet to be met) and submitted for approval by the California North Coast Regional Water Quality Control Board. The report will evaluate how successful the restoration was with regard to the revegetation plan's goal, objectives, and success criteria. The report will include a compilation of all monitoring data and photo point documentation.