

EXHIBIT NO. 4A

APPLICATION NO.

1-11-039

CALIFORNIA DEPARTMENT
OF TRANSPORTATION
REVEGETATION PLAN
(1 of 25)

Klamath River Bridge Hinge Replacement Project

Revegetation, Mitigation and Monitoring Plan

November 2011



Del Norte County

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INTRODUCTION

The California Department of Transportation (Caltrans) is proposing to replace hinges at spans 2, 8 and 11 on the Klamath River Bridge (Bridge #1-28). This revegetation plan addresses the site restoration and revegetation of coastal wetlands and riparian upland areas disturbed by project activities and impacts from temporary support structures and staging areas, which are necessary for project construction.

Field data has been collected characterizing existing vegetative types in the project area. Species composition and relative cover by vegetation type and stratum was determined, and revegetation success criteria and monitoring methodology developed.

ENVIRONMENTAL SETTING

The Klamath River Bridge is 3.5 miles upstream from the confluence of the Klamath River and the Pacific Ocean. The project area encompasses part of the Klamath River estuary and its associated wetland and upland riparian habitats.

The river is approximately 650 feet wide where it flows under the bridge. The project area immediately adjacent to the bridge is low and relatively flat, with an elevational range of zero to 40 feet above mean sea level. The upper limit of the 100-year flood plain through the project area generally follows the 20-foot contour line. The low elevations adjacent to the bridge support riparian (willow, cottonwood and alder) forest, while higher elevations in the vicinity are dominated by coniferous (Douglas fir: *Pseudotsuga menziesii*) forest. Developments have resulted in disturbance and the removal of some riparian forest around the bridge.

The project area is situated within California's north coastal forest, characterized by steep, rugged mountains and relatively fast-flowing rivers. The climate is Mediterranean, characterized by wet winters and dry summers. The project vicinity receives 80 inches of precipitation per year and has an average low and high temperature of 45 and 61 degrees Fahrenheit, respectively (Western Regional Climate Center data for Klamath Station).

Much of the riparian corridor in the project area surrounding the Klamath River is dominated by a mix of willow species, *Rubus* scrub, and perennial grassland dominated

by non-native plant species. A mature gallery of black cottonwood (*Populus balsamifera* ssp. *trichocarpa*) occurs along the south bank of the river, west of the bridge and outside of the project footprint.

The native vegetation types in the vicinity of the project area include shining willow groves, red alder forest, Sitka willow thickets, sandbar willow thickets, black cottonwood forest, and coastal brambles (see Figures 1 a, b and c).

These native vegetation types are further described below, along with non-native/ruderal components. The vegetation types cited are based on the classification system utilized in the California Natural Diversity Data Base Natural Hierarchical List of Natural Communities with Holland Types (CDFG, September 2010).

Native Vegetation Types (*G and S codes defined below Table 1*)

***Salix lucida* ssp. *lasiandra* (Shining willow groves) Alliance** (sensitive status; G4 S3). Pure stands occur at the south end of the bridge. Directly under the bridge deck, shining willow drops out and the understory of stinging nettle (*Urtica dioica* ssp. *holosericea*) dominates. This is a tree-dominated vegetation type characterized by shining willow with a dominant understory of stinging nettle, and other riparian understory species such as California blackberry (*Rubus ursinus*), thimbleberry (*Rubus parviflorus*), salmonberry (*Rubus spectabilis*), black twinberry (*Lonicera involucrata* var. *ledebourii*), red elderberry (*Sambucus racemosa* var. *racemosa*), coast man-root (*Marah oreganus*), and common scouring rush (*Equisetum hyemale* ssp. *affine*).

***Alnus rubra* (Red alder forest) Alliance** (non-sensitive status; G5 S4). Occasional red alders occur on-site, but there are no stands within the project area. Adjacent to the project area on the south side of the river, pure stands of red alder occur, and are classified further as Red Alder Riparian Forest Association, which is a sensitive vegetation type G3 S2.2. This is a tree-dominated vegetation type characterized by red alder with many of the riparian understory species cited for shining willow.

***Salix sitchensis* (Sitka willow thickets) Provisional Alliance** (potential sensitive status; G4 S3?). This alliance has elements of Hooker's willow (*Salix hookeriana*) and shining willow, and occurs throughout the project area on the north side of the river. This is a

tree-dominated vegetation type characterized by Sitka and other willows with often a sparse component of riparian understory species (NOTE: in the Natural Environmental Study (NES) and Initial Study (IS), this was categorized as a combination of willow alliances; here it is more accurately identified as Sitka willow thickets.)

***Salix exigua* (Sandbar willow thickets) Alliance** (non-sensitive status; G5 S4). This alliance occurs near the river's edge, along both the north and south shores. It is a shrub-dominated vegetation type characterized by sandbar willows with little or no riparian understory species.

***Populus trichocarpa* (Black cottonwood forest) Alliance** (sensitive status; G5 S3). Occasional black cottonwoods occur on-site, but there are no stands within the project area. A gallery of black cottonwoods occurs west of the project, along the south edge of the river. This gallery is classified further as North Coast Black Cottonwood Riparian Forest Association, which has a sensitive status of G1 S1.1. This is a tree-dominated vegetation type, characterized by black cottonwood with similar riparian understory species as the shining willow groves and red alder forest.

***Rubus* (*parviflorus*, *spectabilis*, *ursinus*) (coastal brambles) Alliance** (sensitive status; G4 S3). This alliance occurs under the bridge deck and in mesic (moist) riparian forest openings. This is a shrub-dominated vegetation type where thimbleberry (*R. parviflorus*) often dominates, and is associated with other riparian vegetation components of black twinberry, coast man-root and common scouring rush.

Within all of these native riparian vegetation types there are scattered and minor tree components of Oregon ash (*Fraxinus latifolia*) and cascara (*Rhamnus purshiana*).

Table 1. Natural Communities present in the Project Area

Natural Community (CDFG, 2010)		Global Rank	State Rank	Sensitive Status?
Scientific Name	Common Name			
<i>Alnus rubra</i> Alliance	Red alder forest	G5	S4	Yes, in some cases
<i>Populus trichocarpa</i> Alliance	Black cottonwood forest	G5	S3	Yes
<i>Rubus parviflorus, spectabilis, ursinus</i> Alliance	Coastal brambles (thimbleberry, salmonberry, California blackberry)	G4	S3	Yes
<i>Salix exigua</i> Alliance	Sandbar willow thickets	G5	S4	No
<i>Salix lucida</i> Alliance	Shining willow groves	G4	S3	Yes
<i>Salix sitchensis</i> Alliance	Sitka willow thickets	G4	S3?	Yes

Rarity and Global and State Ranks One purpose of the classification is to assist in the determination of significance and rarity of vegetation types, and therefore those types that are of high priority for tracking. Ranking of alliances according to their degree of imperilment (as measured by rarity, trends, and threats) follows NatureServe’s [Heritage Methodology](#), in which all alliances are listed with a G (global) and S (state) rank. If an alliance is listed with a S3 or more imperiled rank (S2, S1), this implies that all of the associations within it are also considered of high inventory priority. A question mark (?) denotes an inexact numeric rank due to insufficient samples over the full expected range of the type, but existing information points to this rank.

GLOBAL RANKING

The *global rank* (G-rank) is a reflection of the overall condition of an element throughout its global range.

SPECIES OR NATURAL COMMUNITY LEVEL

G1 = Less than 6 viable element occurrences (EOs) OR less than 1,000 individuals OR less than 2,000 acres.

G2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres.

G3 = 21-100 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres.

G4 = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern; i.e., there is some threat, or somewhat narrow habitat.

G5 = Population or stand demonstrably secure to ineradicable due to being commonly found in the world.

STATE RANKING

The *state rank* is assigned much the same way as the global rank, except state ranks in California often also contain a threat designation attached to the S-rank.

S1 = Less than 6 EOs OR less than 1,000 individuals OR less than 2,000 acres

S2 = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres

S3 = 21-100 EOs OR 3,000-10,000 individuals OR 10,000-50,000 acres

S4 - Apparently secure within California; this rank is clearly lower than S3 but factors exist to cause some concern; i.e. there is some

S5 - Demonstrably secure to ineradicable in California. NO THREAT RANK.

REFERENCE: http://www.dfg.ca.gov/biogeodata/vegcamp/natural_communities.asp

Semi-natural stands, and Non-Native and Invasive Vegetation

Rubus armeniacus (Himalayan blackberry brambles) Semi-natural Stands.

These occur on both the north and south sides of the river, and are especially widespread on the north side in disturbed areas. Himalayan blackberry is an invasive non-native plant, rated *High*¹ by the California Invasive Plant Council Invasive Plant Inventory (Cal-IPC 2006).

Conium maculatum - *Foeniculum vulgare* (poison hemlock and fennel patches)

Semi-natural Stands. Fennel (*Foeniculum vulgare*) predominates on the north side of the river in disturbed areas, and is extensive and deeply rooted. Fennel is an invasive non-native plant, rated *High*¹ by the Cal-IPC.

Many of the herbaceous species found at the project site are non-native and typical of ruderal habitats. Several species are also rated with a *High to Limited*¹ invasiveness by the Cal-IPC, including thistles (*Centaurea solstitialis* and *Cirsium* sp.), foxglove (*Digitalis purpurea*), poison hemlock (*Conium maculatum*), English ivy (*Hedera helix*), Klamath weed (*Hypericum perforatum*), Italian ryegrass (*Lolium multiflorum*), weedy pampas grass (*Cortaderia jubata*), French broom (*Genista monspessulana*), bouncing bet (*Saponaria officianalis*), and pennyroyal (*Mentha pulegium*).

¹Cal-IPC ratings definitions

High – These species have severe ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal and establishment. Most are widely distributed ecologically.

Moderate – These species have substantial and apparent—but generally not severe—ecological impacts on physical processes, plant and animal communities, and vegetation structure. Their reproductive biology and other attributes are conducive to moderate to high rates of dispersal, though establishment is generally dependent upon ecological disturbance. Ecological amplitude and distribution may range from limited to widespread.

Limited – These species are invasive but their ecological impacts are minor on a statewide level or there was not enough information to justify a higher score. Their reproductive biology and other attributes result in low to moderate rates of invasiveness. Ecological amplitude and distribution are generally limited, but these species may be locally persistent and problematic.

PROJECT IMPACTS

No permanent impacts are anticipated, as all disturbed areas are for temporary supports for the bridge, which will be removed after the work is completed.

Temporary impacts to 0.63 acre will occur from three staging areas, each 84 ft by 110 ft (9240 square feet, 0.21 acre), one located beneath each hinge to be repaired. Of this 0.63 acre, 0.54 acre is coastal wetland (of which 0.04 acre is *Other Waters*) and 0.09 acre is upland. These areas are described in more detail below.

Wetlands: Coastal Forested, Coastal Herbaceous and Coastal Scrub-Shrub

Wetland delineations identified 0.501 acre of coastal wetlands (as defined by Title 14 California Code of Regulations, Section 13577) that would be temporarily affected by the project (see Table 2). The temporarily affected wetlands are comprised of 0.069 acre of forest, 0.424 acre of scrub-shrub and 0.008 acre of herbaceous. Additionally, there are 0.04 acre of U.S. Army Corps of Engineers *Other Waters* (as defined by 33 Code of Federal Regulations 329) within the project areas, in the Hinge 8 Work Area..

Table 2. Temporary Coastal Zone Wetland Effects

Work Areas	Coastal Zone Wetlands			Total Acres
	Forested (acres)	Herbaceous (acres)	Scrub-Shrub (acres)	
Hinge Work Area 2	0.069	-	0.143	0.212
Hinge Work Area 8	-	0.008	0.069	0.077
Hinge Work Area 11	-	-	0.212	0.212
Total Acres	0.069	0.008	0.424	0.501

Wetland delineations did not identify any three-parameter wetlands, as defined by Section 404 of the Clean Water Act, within the project limits.

Uplands

The remaining area (0.09 acre) that will be temporarily disturbed by hinge repair activities is upland, comprised of native, non-native/invasive and ruderal upland vegetation.

The vegetation communities and plant species specific to each proposed staging area are described in detail below.

South side of Bridge

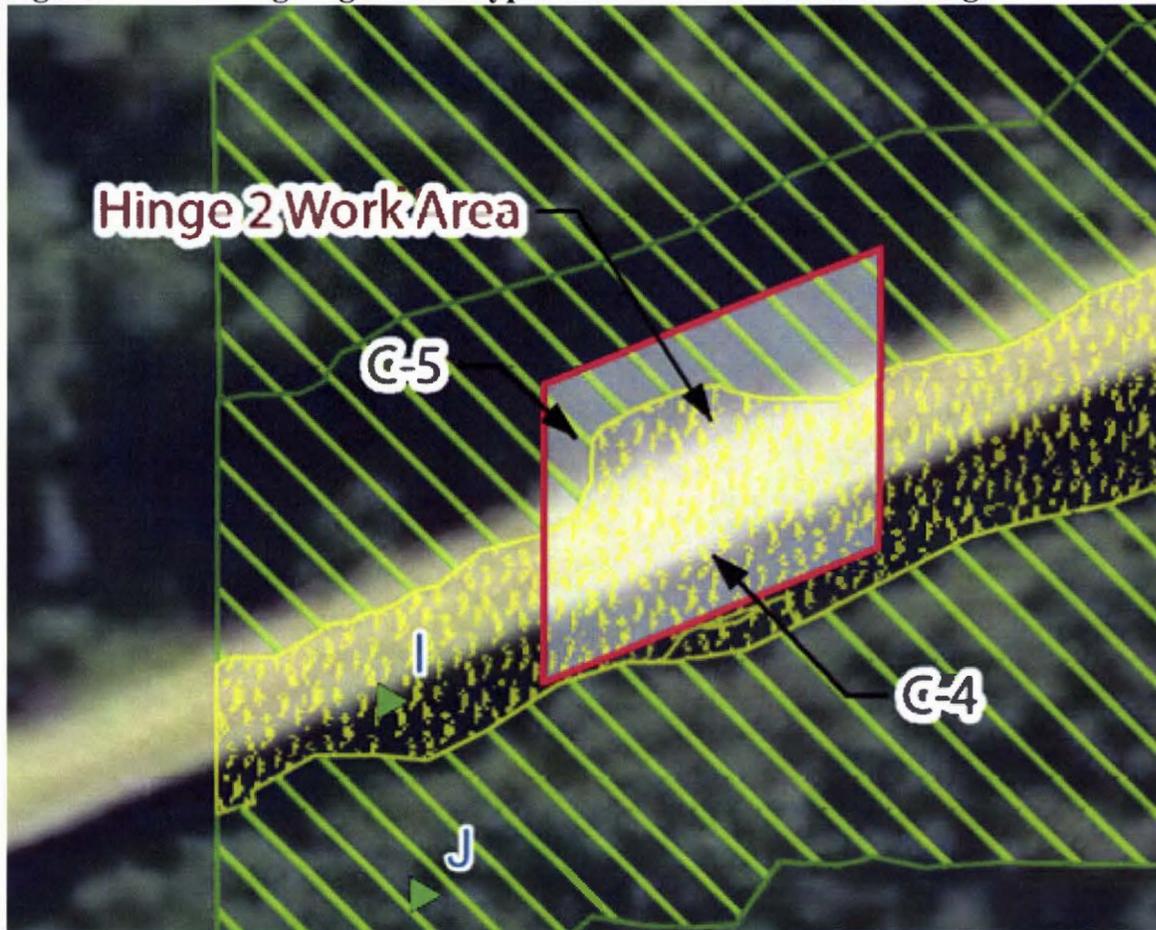
Staging Areas 1 and 2: Staging Areas 1 and 2 are existing maintenance turnouts, located adjacent to the highway. The areas consist of compacted dirt and gravel.

Hinge 2 Work Area: This area (Figure 1a) will be a newly created work area under the bridge, approximately 225 feet from the river's south bank. Pure stands of shining willow groves occur at the edges of the work area, with trees reaching 30-40 feet in height. Directly under the bridge deck, shining willow drops out and an understory of stinging nettle (1-6 feet in height) dominates. The temporary effects associated with this work area are the clearing of 0.212 acre coastal wetland, comprised of 0.069 acre of riparian forest (shining willow groves alliance) and 0.143 acre of scrub-shrub (shining willow groves alliance, where stinging nettle dominates). The work area is bordered (outside of the project area) by red alder forest. For a more complete description of these vegetation alliances, see the section *Native Vegetation Types*.

Invasive species in this area include those described above for the south side of the bridge under the heading, *Semi-natural stands, and Non-Native and Invasive Vegetation*. Himalayan blackberry and English ivy are especially pervasive here.

The Hinge 2 Work Area is the only area with anticipated tree removal, with the take of five trees with diameter at breast height (dbh) of four inches or greater necessary to complete the hinge repair. These include four 5-inch dbh and one 6-inch dbh shining willow (*Salix lucida var. lasiandra*).

Figure 1a. Existing Vegetation Types and Coastal Wetlands: Hinge 2 Work Area



C4 - Shining Willow Groves where Stinging Nettle dominates
(0.143 acre scrub-shrub coastal wetland)

C5 - Shining Willow Groves (0.069 acre riparian forest coastal wetland)

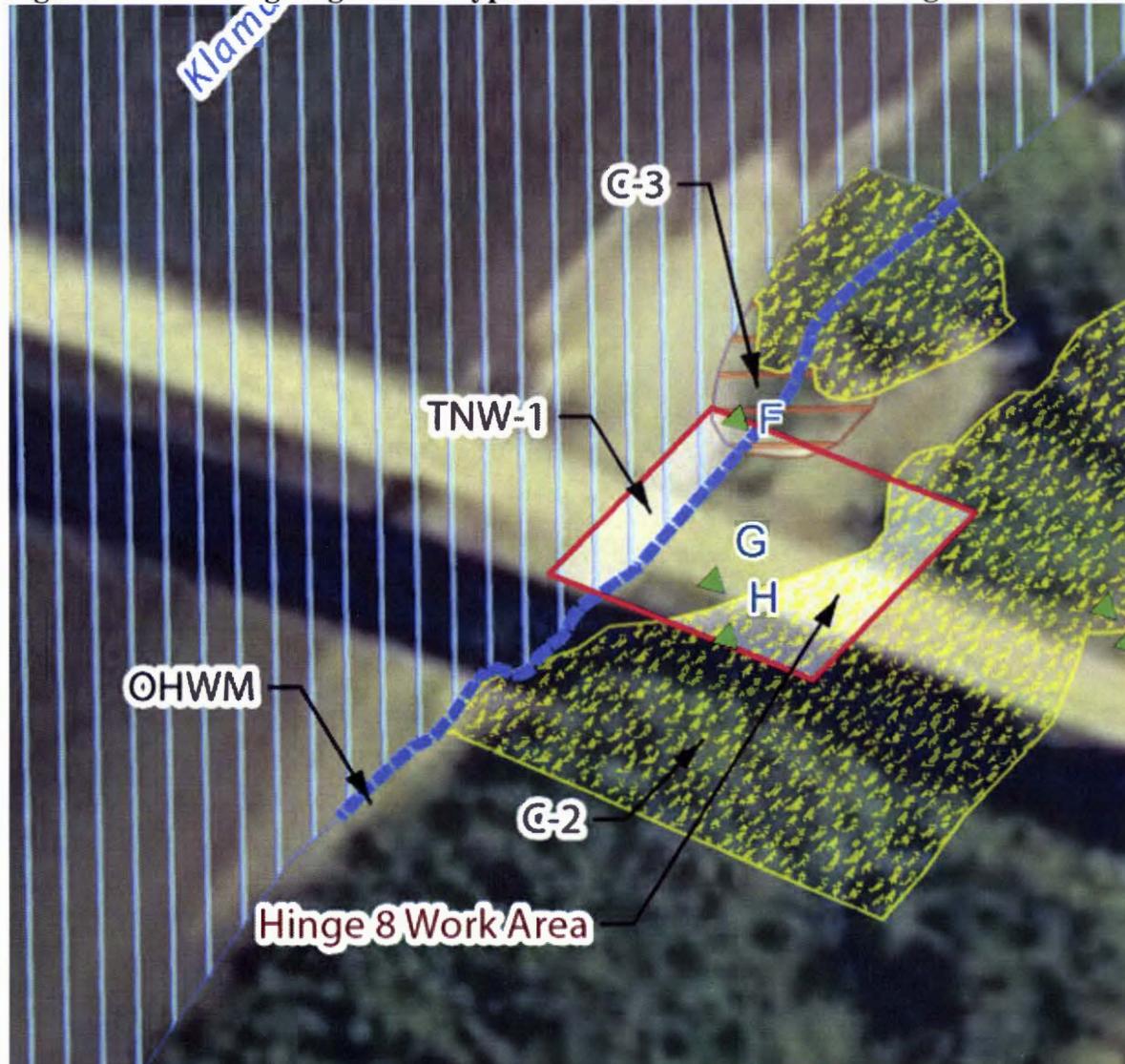
North Side of Bridge

Hinge 8 Work Area: This area (Figure 1b) will be a newly created work area (0.212 acre) under the bridge, approximately 60 feet from the river's north bank. The temporary effects associated with this work area are the clearing of 0.077 acre coastal wetland. The coastal wetland is comprised of 0.069 acre scrub-shrub (sandbar willow thickets interspersed with sapling black cottonwood) and 0.008 acre herbaceous (ruderal vegetation, coastal brambles, and thickly overgrown Himalayan blackberry brambles). For a more complete description of these vegetation alliances, see the section *Native Vegetation Types*. The remaining acreage inside the 0.117 acre impacted area is 0.095

acre of dirt road/turnaround area that is frequented with campground traffic accessing the river.

Invasive species in this hinge work areas include those described above for the north side of the bridge under the heading, *Semi-natural stands, and Non-Native and Invasive Vegetation*. Especially widespread is Himalayan blackberry.

Figure 1b. Existing Vegetation Types and Coastal Wetlands: Hinge 8 Work Area



C2 – Ruderal vegetation, coastal brambles, and thickly overgrown Himalayan blackberry brambles (0.008 acre herbaceous coastal wetland).

C3 - Sandbar willow thickets interspersed with sapling black cottonwood (0.069 acre scrub-shrub coastal wetland).

Hinge 11 Work Area: This area (Figure 1c) will be a newly created work area under the bridge, north of Hinge Work Area 8, and approximately 500 feet from the river's north bank. The temporary effects associated with this work area are the clearing of 0.212 acre, coastal wetland, comprised entirely of riparian scrub-shrub (Sitka willow thickets alliance with occurrences of sapling black cottonwood). For a more complete description of these vegetation alliances, see the section *Native Vegetation Types*.

Invasive species in this hinge work area include those described above for the north side of the bridge under the heading, *Semi-natural stands, and Non-Native and Invasive Vegetation*. Especially widespread is Himalayan blackberry and fennel, which is extensive and deeply rooted.

Figure 1c. Existing Vegetation Types and Coastal Wetlands: Hinge 11 Work Area



C1 - Sitka willow thickets with occurrences of sapling black cottonwood (0.212 acre riparian scrub-shrub coastal wetland).

Staging Area 8: This is an existing maintenance turnout, located adjacent to the highway, north of the project area. The area (40 x 500 ft) consists of compacted dirt and gravel, and is vegetated with ruderal, mainly non-native species.

REVEGETATION GOALS

The revegetation goals are: 1) restore self-sustaining native plants appropriate to the region, vegetation type, and stratum in the three areas beneath the hinges disturbed by project activities, and 2) restore a 0.790 acre area located between Hinge Work Areas 8 and 11 from its existing condition as a monoculture of invasive Himalayan blackberry to a diverse native vegetation community. This will be accomplished by decreasing invasive plants to less than 10 percent cover and restoring self-sustaining native plants in an invasive species removal and restoration area (ISRRA, see *Revegetation Areas*, below). The revegetation of the hinge work areas and restoration of the ISRRA is proposed as mitigation (at a ratio of 2.58:1) for the temporary impacts of the project on coastal wetlands and riparian areas. These goals would be fully implemented by the end of the monitoring period.

SITE PREPARATION

Materials and equipment will be lowered by crane from the bridge deck to the hinge work areas. This construction method eliminates the need for access roads, thereby minimizing soil disturbance and native plant removal.

Clearing and grubbing is required to prepare the site for construction, and will be limited to Hinge Work Areas 2, 8, and 11, plus 0.790 acre of invasive plants located between Hinge 8 and Hinge 11. Vegetation removed from these areas will be lifted to the bridge and disposed of outside the project limits, as approved by Caltrans, to minimize the potential for contamination by non-native species.

Each hinge work area will be 84 feet by 110 feet and will need to be graded flat. The grading will require the movement of up to 20 cubic yards of material at each location. No stockpiling of material will occur within the work areas, and importing and exporting of material from the work area would not be necessary.

Vegetation adjacent to the work locations will be protected by Environmentally Sensitive Area (ESA) fencing. ESA fencing will limit and enclose each hinge work area. ESA fencing will also be placed to protect native vegetation adjacent to the invasive species removal area.

Sediment control measures such as fiber rolls will be placed adjacent to the ESA fencing at the downgradient limits of the hinge work areas, as needed, to prevent sediment transport by storm water.

After the hinges have been replaced, all construction-related equipment (e.g., falsework materials, crane mats, temporary support frames, etc.) will be removed via a crane to the bridge deck. A small tractor will then be lowered to the work areas in order to re-grade and re-contour the slopes, with the work areas being restored to as close to pre-construction contours as is feasible. Soil compaction will be no greater than 85%. Upon completion, the grading equipment, fiber rolls, and ESA fencing will all be removed by crane.

Prior to completion of construction, all disturbed soil areas will receive permanent erosion control measures. Biodegradable fiber rolls will be placed along sloping ground. The work areas will be revegetated via permanent erosion control seeding, consisting of a mix of sterile grass, California native grasses, and low growing forbs (see Table 3). The seed will serve to quickly establish an herbaceous cover. Hydroseeding will be accomplished with equipment parked on the bridge deck and lowering hoses from the deck to the areas requiring seeding.

Table 3. Erosion Control Seed Mix

Botanical Name	Common Name	Pounds Pure Live Seed per Acre
<i>Achillea millefolium</i> ¹	White Yarrow	1
<i>Artemisia douglasiana</i> ¹	Mugwort	1
<i>Bromus carinatus</i> var. <i>maritimus</i> ¹	California Brome, coastal	30
<i>Elymus</i> X <i>triticum</i>	Regreen (Wheat x Wildrye)	70
<i>Festuca rubra</i> 'Molate' ¹	Red Fescue, Molate	15
<i>Juncus bufonius</i> ¹	Toad Rush	1
<i>Lotus purshianus</i> ¹	Purshing's Lotus	8

¹Seed produced in northwest California only

REVEGETATION AREAS

Revegetation efforts will include mechanized removal (i.e., clearing and grubbing with a bobcat) of invasive plant species and replanting a total of approximately 1.291 acres of riparian habitat (Figures 2a and 2b). The areas to be treated are within Caltrans' right of way. After completion of construction and permanent erosion control, the three temporary staging/work areas and the ISSRA under the bridge will be revegetated with native vegetation types (Table 4; species to be planted are presented in Appendix A). The proposed ISSRA is a 0.790 acre area situated between the two northern hinge areas (Figure 2b and Figure 3). It was chosen because it currently has a large and extensive Himalayan blackberry infestation restricting native riparian vegetation development, and once restored, would help create a swathe of native riparian habitat contiguous with the two restored hinge areas.

Figure 2a. Revegetation Area (South Side of River).

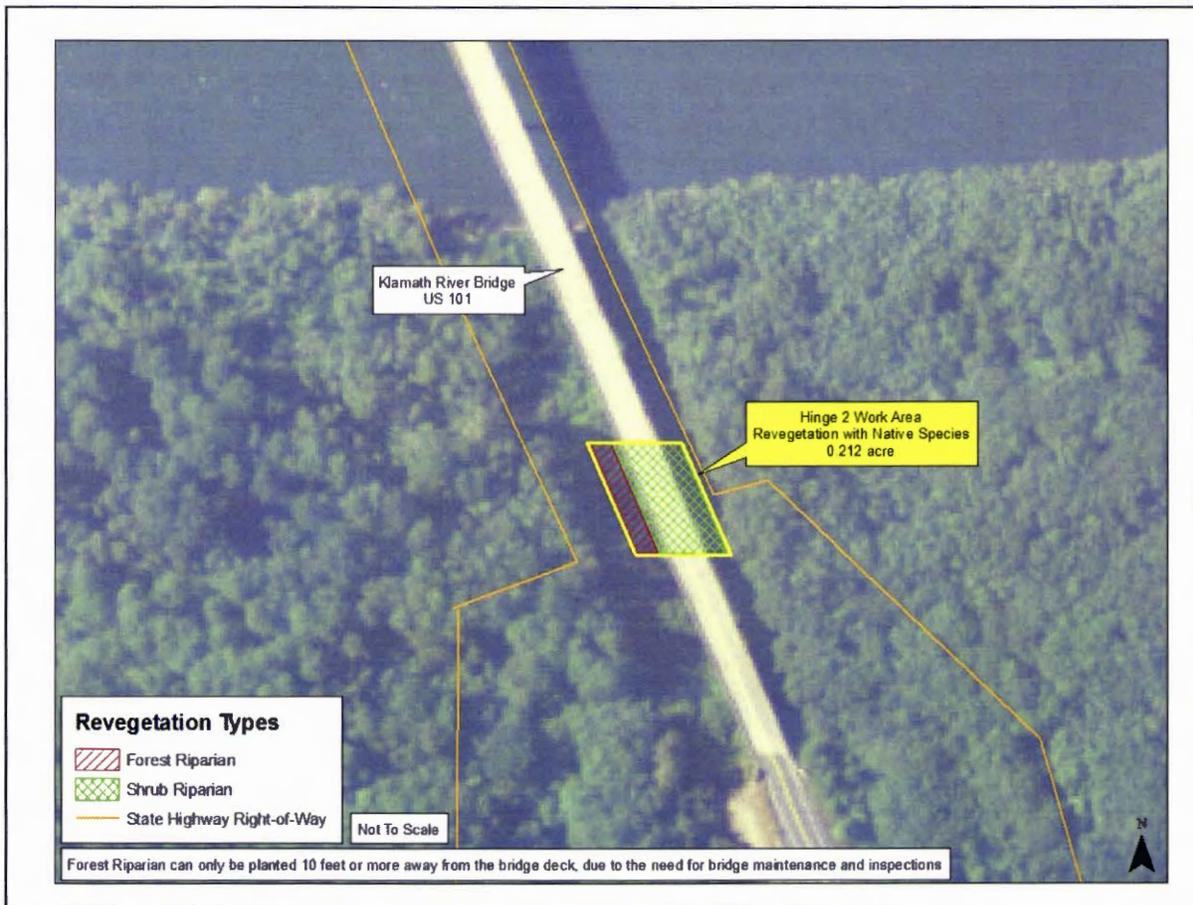


Figure 2b. Revegetation, Invasive Species Removal, and Restoration Areas (North Side of River).

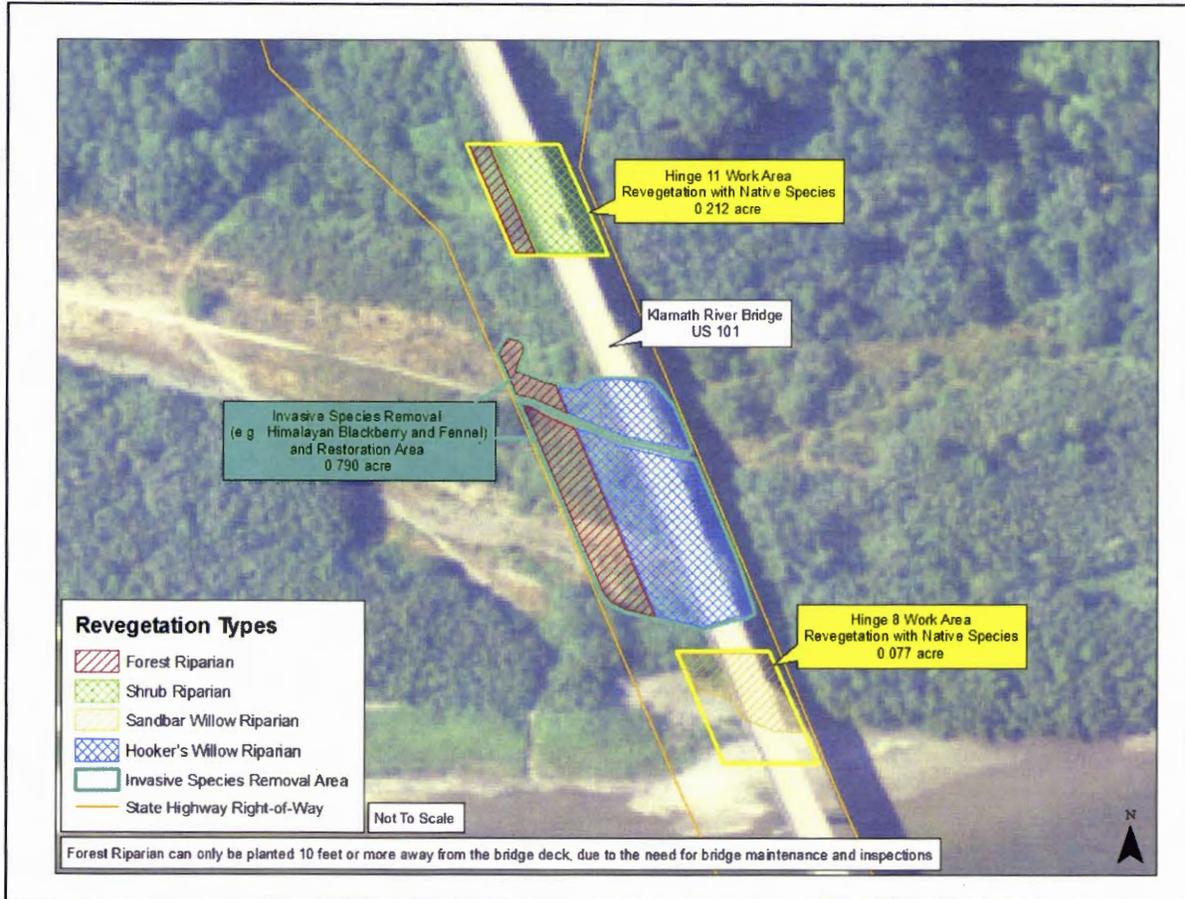


Figure 3. Invasive Species Removal and Restoration Area (North Side of River).



Table 4. Revegetation areas (acres) and types (see Plant Palette, Appendix A).

Revegetation Area	Shrub Riparian	Sandbar Willow Riparian	Hooker's Willow Riparian	Forest Riparian	Total acreage
Hinge Work Area 2	0.159			0.053	0.212
Hinge Work Area 8		0.077			0.077
Hinge Work Area 11	0.159			0.053	0.212
Invasive Species Removal & Restoration Area (ISRRRA)			0.530	0.260	0.790
Total acreage	0.318	0.077	0.530	0.366	1.291

Routine maintenance vegetation trimming occurs underneath the bridge on a periodic basis to ensure bridge safety inspections can take place, and to keep vegetation from growing directly on the piers, to prevent structural damage to the piers.

A clear space of at least 10 feet horizontally out from the edge of the bridge deck and 10 feet vertically under the bridge must be maintained. In some instances, the bases of trees need to be cut further than 10 feet out from the edge of deck, because tall shining willows tend to lean onto the bridge. Thus, the amount of "Forest Riparian" (i.e., tall trees) that can be replanted in the hinge work areas is limited. Revegetation in these zones will utilize small trees and other vegetation that are less than 25-feet in height, such as cascara, scrub willows, shrubs, and herbs. Areas beyond 10 feet from edge of bridge deck will be planted with riparian trees, shrubs and herbs, as is appropriate to adjacent native vegetation types. Areas close to the piers will not be planted.

PLANTING AND INVASIVES REMOVAL

Post-construction revegetation will utilize a combination of plant material that includes cuttings (sandbar willow), bare root stock, and/or container stock. Plant material will be derived from propagules originating from the North Coast Subregion (Hickman1993) within northern Humboldt and southern Del Norte counties. The species and quantities of plant material to be utilized are presented in the *Plant Palette for Klamath Bridge Hinge Replacement Revegetation Areas*, Appendix A. In addition, natural vegetation recruitment is likely, and will be incorporated into planting considerations and revegetation goals.

The cutting of sandbar willow poles will occur in Caltrans right-of-way along the Klamath River. Collection of cuttings will be well dispersed across the population for genetic and sexual diversity with no more than 20% of stems removed from any individual willow. Transplanting of other plants collected on-site, but outside of the revegetation effort, may be utilized to facilitate native vegetation recovery.

Bare root and container plants will be planted in holes twice as wide as and slightly deeper than root or container size, with organic compost incorporated into the hole and soil. Plants will be deep watered immediately after planting (soils will be saturated beyond the first several inches), and top dressed with 2" to 3" of coarse mulch.

Subsequent watering via a water truck filled from commercial water sources will be conducted as directed by the Caltrans Revegetation Specialist and/or project Biologist. On the south side of the bridge, the watering truck will park at the established pullout; the hose can extend from there to the revegetation area. On the north side, access to the revegetation areas will be via existing dirt roads or from the bridge deck.

Currently in and adjacent to the project area, there is the strong potential for invasive plants to re-establish and expand into the proposed revegetation areas, following vegetation removal and ground disturbance. Weeding will be conducted during the plant establishment period (three years) and as necessary during the monitoring period to facilitate native species establishment and control invasive species in the revegetated areas. Invasive species control will focus on specific invasive plant species rated as High or Moderate threats by Cal-IPC (2006). At this site these include weedy pampas grass, fennel, poison hemlock, English ivy, Klamath weed, French broom, and Himalayan blackberry. Physical control methods (hand or mechanized removal) will be utilized and no application of chemicals will be authorized. After the initial site preparation of clearing and grubbing by heavy equipment, the revegetated areas will be weeded by hand.

Revegetation planting, watering and weeding will be contracted out to and performed by California Conservation Corps (CCC) and overseen by a Caltrans Revegetation Specialist and/or project Biologist.

IMPLEMENTATION SCHEDULE

Revegetation

Erosion control will be implemented during or at the completion of project construction (presently scheduled to conclude in late 2012 and late 2013). The riparian revegetation with cuttings (sandbar willow), bare root stock, and/or container stock will commence the first rainy season (November through April) after construction is complete and permanent erosion control is established. It is anticipated that the proposed planting would be completed within several weeks of implementation.

Watering

Watering will occur during the first two dry seasons following planting (mid-May through mid-September, approximately thrice a month), and any extensive dry period during the first month of planting. It is anticipated that after the second year, plants should be established, given the mesic and coastal nature of the site, as well as long-term watering not being recommended for native plants that need to acclimate to natural site conditions.

Weeding

Revegetated areas will be weeded by hand during planting and in the spring of each year when soils are moist, plants are actively growing, and prior to seed set. Weeding will be conducted during the three year plant establishment period, as needed thereafter to maintain the areas free of non-native invasive species infestations (less than 10 percent), and/or until the final revegetation success criteria have been achieved and accepted by the Coastal Commission and other pertinent agencies.

MONITORING AND SUCCESS CRITERIA

Monitoring will be performed to ensure that revegetation goals and management objectives 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.

Plant survival will be monitored by census. This quantitative method involves counting all planted individuals in the revegetated areas. Census monitoring will be conducted annually for five years after the planting is implemented. The first four 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 riparian species has supplemented this shortfall, success criteria may be adjusted in consultation with CCC.

Weed cover will be monitored qualitatively through the use of and comparison with standard vegetation percent cover diagrams to estimate cover in each revegetation area.

At least one reproducible photo point will be established within each revegetation area each year to document vegetation establishment and cover changes. Photos will be provided with the annual monitoring reports.

The success of the revegetation will be determined by specific criteria described below in Table 5.

Table 5. Revegetation Success Criteria

Vegetation Type/Stratum	Target Survival or Cover	Species Richness	Species Composition
Forest Riparian			
Tree	≥60% survival	At least 3 of the 5 species representative of vegetation type & stratum.	3 species present each with at least 10% survival.
Shrub	≥60% survival	At least 3 of the 4 species representative of the vegetation type & stratum.	3 species present each with at least 10% survival
Herb	N/A	N/A	N/A
Invasive Plants	≤ 10% relative cover ¹	N/A	N/A
Shrub Riparian			
Shrub	≥60% survival	At least 3 of the 4 species representative of the vegetation type & stratum.	3 species present each with at least 10% survival
Herb	N/A	N/A	N/A
Invasive Plants	≤ 10% relative cover ¹	N/A	N/A
Willow Riparian			
Shrub (Hooker Willow)	≥60% survival	At least 3 of the 4 species representative of the vegetation type & stratum.	3 species present each with at least 10% coverage.
Shrub (Sandbar Willow)	≥60% survival	At least 1 of the 1 species representative of the vegetation type & stratum.	N/A
Herb	≥60% survival	At least 1 of the 1 species representative of the vegetation type & stratum.	N/A
Invasive Plants	≤ 10% relative cover ¹	N/A	N/A

¹Relative cover is the proportional contribution of one species' cover to total vegetation cover (by comparison, absolute cover is relative to ground surface).

REMEDIAL ACTIONS AND ADAPTIVE MANAGEMENT

Dead or low vigor (less than 25% green material) plant material will be replaced as needed in the fall following the start of the seasonal rains to fill planting gaps, and to meet the revegetation goals and monitoring success criteria. If any particular plant species within the revegetation areas demonstrates failure-to-thrive, then other regionally appropriate riparian 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 done in consultation with the Coastal Commission, DFG and the Yurok Tribe, and will be documented in the annual monitoring reports.

REPORTING

Annual revegetation monitoring reports will begin one year after the initial revegetation of the site is completed. The monitoring results will be summarized in a brief report with photo points, and sent as an update to the appropriate reviewing agencies, including the Coastal Commission.

A final monitoring report will be drafted in year five and submitted for approval to the Coastal Commission, DFG, and the Yurok Tribe. The report will evaluate how successful the restoration was with regard to the revegetation plan's goals, objectives, and success criteria. The report will include a compilation of all monitoring data and photo point documentation. Final compliance will not be achieved without concurrence with the Coastal Commission, DFG, and Yurok Tribe.

REFERENCES

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APPENDIX A. Plant Palette for Klamath Bridge Hinge Project Revegetation Areas

Vegetation Types	Scientific Name	Common Name	Planting Area (acres)	Percent of Planting Mix	Plant Spacing (feet on-center)	Quantity	Container Size
Shrub Riparian	<i>Rubus parviflorus</i>	thimbleberry	0.318	40	6	154	1-Gallon
	<i>Rubus spectabilis</i>	salmonberry		20	6	77	1-Gallon
	<i>Lonicera involucrata</i> var. <i>ledebourii</i>	black twinberry		20	6	77	1-Gallon
	<i>Sambucus racemosa</i> var. <i>racemosa</i>	red elderberry		15	6	58	1-Gallon
	<i>Marah oreganus</i>	coast man-root		5	4	44	1-Gallon
	Totals			100		409	
Sandbar Willow Riparian	<i>Salix exigua</i>	narrow-leaved willow	0.077	80	6	75	Cuttings
	<i>Equisetum hyemale</i> ssp. <i>affine</i>	common scouring rush		20	4	42	1-Gallon
	Totals			100		177	
Hooker's Willow Riparian	<i>Salix hookeriana</i>	Hooker's willow	0.53	50	6	321	Treepot
	<i>Salix sitchensis</i>	Sitka willow		30	6	192	Treepot
	<i>Rubus parviflorus</i>	thimbleberry		20	6	128	1-Gallon
	<i>Baccharis pilularis</i>	coyote brush		20	6	128	1-Gallon
	<i>Artemisia douglasiana</i>	mugwort		20	4	289	1-Gallon
	Totals			140		1059	
Forest Riparian	<i>Alnus rubra</i>	red alder	0.366	25	10	40	Treepot
	<i>Populus balsamifera</i> ssp. <i>trichocarpa</i>	black cottonwood		25	10	40	Treepot
	<i>Salix lucida</i> ssp. <i>lasiandra</i>	shining willow		15	8	37	Treepot
	<i>Rhamnus purshiana</i>	cascara		10	8	25	Treepot
	<i>Fraxinus latifolia</i>	Oregon ash		5	8	12	Treepot
	<i>Rubus parviflorus</i>	thimbleberry		20	6	89	1-Gallon
	<i>Rubus spectabilis</i>	salmonberry		15	6	66	1-Gallon
	<i>Lonicera involucrata</i> var. <i>ledebourii</i>	black twinberry		15	6	66	1-Gallon
	<i>Sambucus racemosa</i> var. <i>racemosa</i>	red elderberry		10	6	44	1-Gallon
	<i>Marah oreganus</i>	coast man-root		10	4	100	1-Gallon
	Totals			1.291	150		520