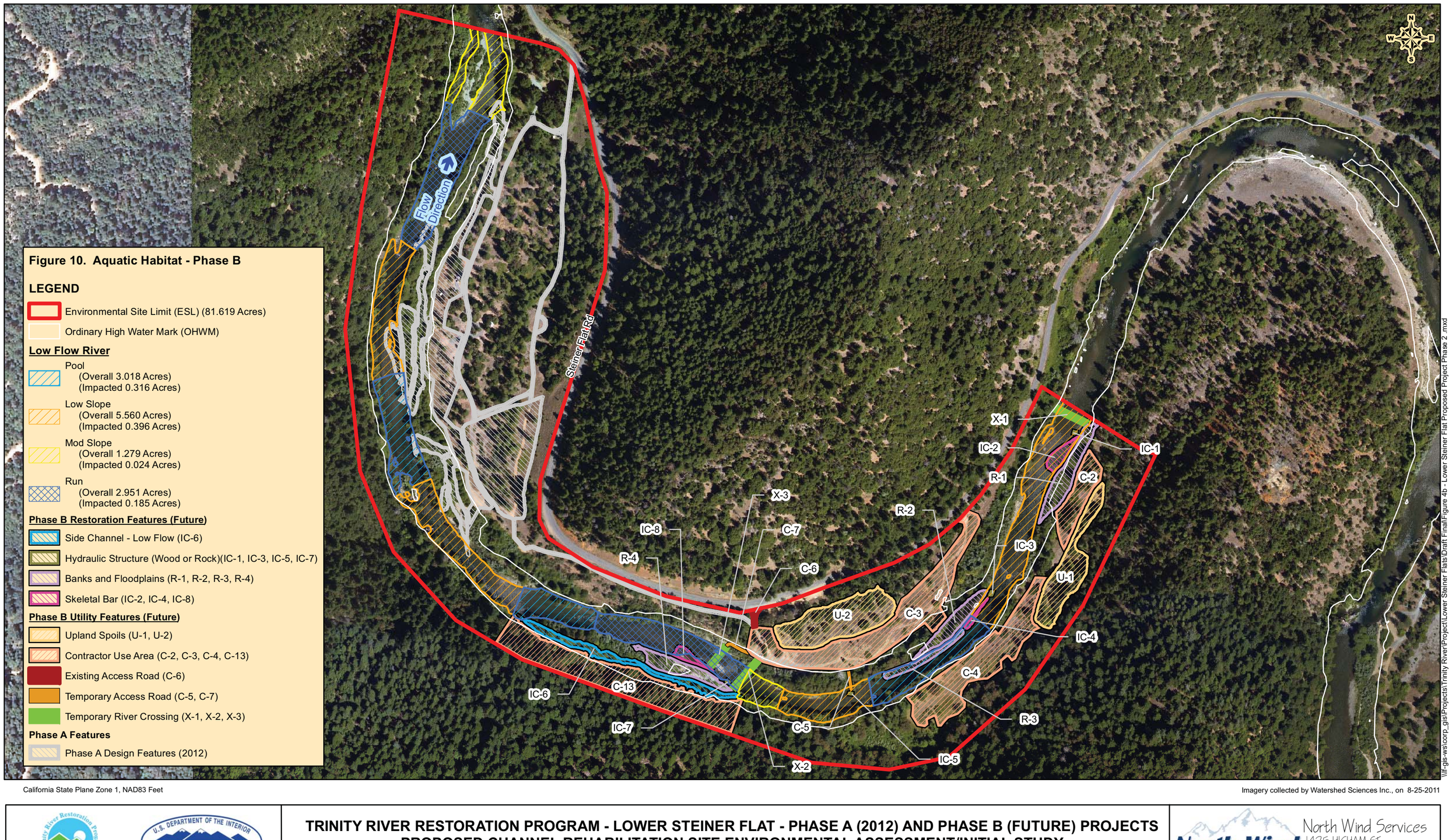

Figure 10. Aquatic Habitat - Phase B

LEGEND

- Environmental Site Limit (ESL) (81.619 Acres)
- Ordinary High Water Mark (OHWM)

Low Flow River

- Pool
  (Overall 3.018 Acres)
  (Impacted 0.316 Acres)
- Low Slope
  (Overall 5.560 Acres)
  (Impacted 0.396 Acres)
- Mod Slope
  (Overall 1.279 Acres)
  (Impacted 0.024 Acres)
- Run
  (Overall 2.951 Acres)
  (Impacted 0.185 Acres)

Phase B Restoration Features (Future)

- Side Channel - Low Flow (IC-6)
- Hydraulic Structure (Wood or Rock)(IC-1, IC-3, IC-5, IC-7)
- Banks and Floodplains (R-1, R-2, R-3, R-4)
- Skeletal Bar (IC-2, IC-4, IC-8)

Phase B Utility Features (Future)

- Upland Spoils (U-1, U-2)
- Contractor Use Area (C-2, C-3, C-4, C-13)
- Existing Access Road (C-6)
- Temporary Access Road (C-5, C-7)
- Temporary River Crossing (X-1, X-2, X-3)

Phase A Features

- Phase A Design Features (2012)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

\\fl-gis-ws\corp_gis\Projects\Trinity River\Project\Lower Steiner Flats\Draft Final\Figure 4b - Lower Steiner Flat Proposed Project Phase 2.mxd

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - LOWER STEINER FLAT - PHASE A (2012) AND PHASE B (FUTURE) PROJECTS
PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 1-03-2012

0 500 1,000 1,500 2,000 Feet

SCALE: 1:4,200

North Wind Services
1425 HIGHAM ST.
IDAHO FALLS, ID 83402
WEB: www.northwindarp.com
Phone: (208)528-8718 FAX: (208)528-8714

Figure 11. UJC Aquatic Habitat LEGEND

- Environmental Site Limit (58.10 acres)
- Ordinary High Water Mark (OHWM)

Low Flow River

- Pool (Overall 3.905 Acres) (Impacted 0.287 Acres)
- Low Slope (Overall 4.190 Acres) (Impacted 0.231 Acres)
- Mod Slope (Overall 0.452 Acres) (Impacted 0.00 Acres)

Restoration Features

- Forced Meander (IC-5)
- Surface Water Inlet (R-12)
- Skeletal Bar Complex (IC-4)
- Water Infiltration Area (R-16)
- Constructed Island Complex (IC-1)
- Revegetation Area (R-13, R-15)
- Split Flow (R-4)
- Side Channel - Low Flow (R-5, R-11)
- Alcove (R-6)
- Hydraulic Structure (Wood or Rock) (IC-3, R-14)
- Banks and Floodplains (R-7, R-8, R-9, R-10)
- Rearing Pond (W-1, W-4, W-5, W-6)

Utility

- Upland Spoils (U-1, U-3)
- Contractor Use Area (C-10, C-11, C-12, U-2)
- Existing Access Road (C-3, C-4, C-5, C-6, C-8, C-14)
- Temporary Access Road (C-1, C-2, C-9, C-16)
- New Permanent Access Road (C-7, C-17)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

\\lf-gis-wsicorp_gis\Projects\Trinity River\Project\Upper Junction City\Final\Figure 5b - Upper Junction City Proposed Project .mxd

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - UPPER JUNCTION CITY
2012 PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 1-03-2012

0 300 600 900 1,200 Feet

SCALE: 1:3,100

North Wind Services
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Adult summer/fall-run steelhead migrate to, and hold in, the deeper pools, runs, and glides along the river between April and January (Leidy and Leidy 1984; Moyle 2002). These fish are active throughout the salmon spawning season, and migrate to the upper-most river reaches and into tributaries to spawn from February through April. Winter-run steelhead migrate to spawning grounds from November through April and spawn during the same time as the summer/fall run. Suitable steelhead spawning habitat occurs in riffles throughout the river. Suitable juvenile steelhead rearing habitat also occurs in the river. Fry and juvenile steelhead of both runs may be expected in the riffles and run/pool habitats year-round, especially those associated with abundant SRA and large cobble/boulder habitat, including LWD (Hampton 1988; Moyle 2002).

The Lower Steiner Flat reach is located downstream of several major tributaries, including Weaver, Indian, and Reading creeks. These tributaries provide water and sediment to the mainstem year-round, but especially during winter floods. Flows in this reach are measured by the USGS stream gage at Douglas City (#11525854). According to the channel design guide (HVT et al. 2010), the representative summer baseflow for the Douglas City Reach (based on data from water year 2000 to 2009) is 479 cfs, of which 450 cfs is released from Lewiston Dam and 29 cfs is from tributary inflow. The winter baseflow in the reach varies from 450 cfs (dry year) to 950 cfs (extremely wet year), and averages 520 cfs during a "normal" year. The estimated spring flows at the reach, including ROD releases from Lewiston Dam, range from 4,723 cfs (including 4,500 cfs from Lewiston Dam) in a dry year, to 6,215 cfs (6,000 cfs from the dam) in a "normal" year, to 11,935 cfs (11,000 cfs from the dam) in an "extremely wet year." The reach contains riffles, pools, and some alternating bars typical of meandering rivers, but the river is not freely meandering (CH2MHill 2011).

The bed material within the active channel at the Lower Steiner Flat reach is coarse gravel. No pebble count data are available for this reach itself; however, surface and subsurface particle size distributions have been collected at Steiner Flat (RM 91.95), less than 1 mile upstream of the project reach. The channel design guide (HVT et al. 2010) used these data to estimate the reach-average grain size for the bed surface and the subsurface. The surface D50 and D95 for the Douglas City Reach (RM 95.5 to 88.0), which includes the Lower Steiner Flat reach, are 73 mm and 147 mm, respectively. The bed is armored as would be expected. Sediment mobility analyses of the proposed design show that very coarse gravel (32 to 64 mm) would be close to the threshold of motion throughout the main channel in most of the reach at the annual high flow for a normal water year (6,215 cfs). Some confined portions of the reach would also mobilize small cobbles (64 to 128 mm), close to the coarser grain sizes in the armor layer. There are two deep pools on the outside of the bends, and point bars on the inside of the bends. This characteristic of the reach is partially responsible for creation of some of the best existing habitat areas (CH2MHill 2011).

Suitable spawning habitat for anadromous salmonids occurs in most riffles, particularly in low-slope riffles and tail-outs of pools and deep run/glide habitats. Salmon spawning surveys in the upper Trinity River conducted annually by the CDFG (in cooperation with the YT, USFWS, and USFS) report that the greatest concentration of chinook and coho salmon spawning occurs in the upper survey sections, which range from Lewiston Dam to Old Lewiston Bridge and Old Lewiston Bridge to Bucktail Bridge. Chinook salmon and steelhead trout use the Lower Steiner Flat reach year-round for rearing, spawning, and winter cover. Juvenile fish snorkeling data are not available for the project area boundaries, but the USFWS has collected adult spawning data. Based on redd

counts from 2009, steelhead and chinook spawning is focused in several locations through the reach (CH2MHill 2011).

The Upper Junction City Rehabilitation Site includes two subtle crossing riffles in the upper half of the site, pool habitat along the right bank of the more upstream bend, and a large bar complex in the downstream third of the site. This bar complex is formed from gravel recruited off the eroding tailings pile on river left, and in 2010 created a backwater that, at baseflow, extended as far as the most upstream riffle crossing. The 2011 spring high-flow release from Lewiston Dam, which peaked at over 12,000 cfs at the site, caused considerable additional erosion along the full length of that tailings pile, as well as along the left stream bank for a distance of about 200 feet downstream from the tailings. It is anticipated that the downstream bar complex may have increased in size as a result of this additional gravel recruitment. The extreme upstream end of the site is occupied by a long (> 700 feet) riffle. The overall slope of the site is 0.0024, which is a typical slope over the 40-mile project area. However, the drop is concentrated on the long riffle at the far upstream end of the site and on the slip face of the bar complex at the far downstream end of the site. The slope through the backwatered center of the site is nearly flat (USFWS and USBR 2011).

Current pool-riffle spacing through the upstream 2/3 of the reach is about 1,000 feet, or about 12 channel widths. This is a relatively large value, and suggests that it may be appropriate to promote the development of additional alternate features. By contrast, riffle and pool spacing in the complex bar area in the downstream third of the site is about 500 feet. Preliminary regime analysis indicates that the bankfull channel should average around 150 feet in width. This suggests that the channel is overly confined in the upstream half of the site, but is near an appropriate width in the downstream half (USFWS and USBR 2011).

Substrate conditions are variable through the Upper Junction City reach. Bed surface concentrations of sand (40-100% cover) are located in eddies on the convex banks in curves. Elsewhere, surface sand cover varies from near zero in the upstream quarter of the site to 20-30% in the backwater upstream from the bar complex. Surface gravel sizes tend to be finer (D50 = 40-100 mm) in the upstream half of the site and on the slip face of the bar complex than in the central part of the site (D50 = 75-200 mm). The primary local upstream source of sediment to the site is Oregon Gulch, which appears to deliver large quantities of fine sediment and moderate quantities of gravel (USFWS and USBR 2011).

Some areas of the Upper Junction City Rehabilitation Site provide spawning and rearing habitat for coho, chinook, and steelhead. Mainstem redd construction in this portion of the river is generally dominated by natural origin chinook salmon as hatchery origin chinook and coho salmon spawners generally construct redds much closer to Lewiston Hatchery. Most of the spawning activity within the Upper Junction City Rehabilitation Site boundaries occurs on the downstream bar complex. While the remainder of the site experiences relatively low spawning density, higher densities are observed immediately upstream and for about 1 km upstream to Oregon Gulch. Deep adult salmon holding habitat currently occurs opposite features R-5 to R-7 (USFWS and USBR 2011).

No in-channel work or disturbance along the river bank would occur within the Lower Junction City Rehabilitation Site boundary as a result of contractor use of the U-3 spoil area. Because there would be no potential impacts to aquatic habitat including SRA those resources are not described.

HABITAT CONDITIONS

Construction and operation of the TRD, combined with watershed erosion, large-scale gold dredging, and other human-caused disturbances, have resulted in major changes in habitat conditions in the Trinity River. Factors that have resulted in adverse effects on fish habitat include:

- Obstruction to river reaches upstream of the TRD (Lewiston Dam);
- Changes to quantity and timing of flows;
- Changes in channel geomorphology;
- Changes in substrate composition caused by the addition of fine sediments and restriction of gravel recruitment; and
- Changes in water temperature.

These factors are addressed in other sections of this document, specifically Section 3.3, Geology, Fluvial Geomorphology, and Soils; Section 3.4, Water Resources; and Section 3.5, Water Quality, as well as in the respective sections of the Trinity River Master EIR. The relationship between these factors and fish is summarized in the following paragraphs.

The TRD blocked access to 59 miles of chinook salmon habitat, 109 miles of steelhead habitat, and an undetermined amount of coho salmon habitat (USFWS 1994). Much of this habitat is thought to have been prime spawning and rearing habitat. In the case of chinook salmon, it represented about 50 percent of the suitable spawning habitat in the upper Trinity River Basin. As early as 1980, the overall decline in spawning habitat was estimated at 80 to 90 percent (USFWS 1980). Furthermore, the blocking of salmon access to upstream reaches greatly reduced the diversity of habitats available to salmon in the Trinity River.

For the first 21 years of TRD operations (1964 to 1985), Lewiston Dam releases to the Trinity River averaged only 21 percent of the natural river inflow. The reduction in flows led to a reduction in habitat and declining quality in the remaining habitat. For example, spawning habitat losses in the mainstem Trinity River below the Grass Valley Creek confluence have been estimated to be 80 percent in the first 2 miles and up to 50 percent overall in the 6 miles downstream of that confluence (USFWS 1994).

The altered patterns of fluvial geomorphic processes in the upper Trinity River have resulted in a reduction in the number of alternate gravel bar sequences with a resultant change in substrate quality and a loss of important salmonid habitats associated with the alternate bars (e.g., pools, riffles, open gravel/cobble bars, and slack-water habitats). Additionally, functional side-channel habitat has also been affected by modifications to alluvial deposits.

Changes in substrate composition occur in conjunction with upland and riverine processes. The construction and operation of the TRD have modified the sediment regime of the mainstem Trinity River, particularly the 40-mile reach below Lewiston Dam. The thermal environment of the Trinity River has also changed as a combined result of the construction and operation of the TRD and the subsequently altered geomorphic patterns of the river downstream. In comparison to pre-TRD conditions, water temperatures below Lewiston Dam today are cooler in the summer and warmer in the winter.

HABITAT RESTORATION PROJECTS

Since the early 1980s, the Trinity River Basin Fish and Wildlife Restoration Program have conducted a variety of restoration activities in the mainstem Trinity River and its tributaries.

Restoration activities in the mainstem Trinity River have included coarse sediment (spawning gravel) supplementation, pool dredging to remove fine sediment and restore valuable holding habitat and construction of several channel rehabilitation projects (side channels and bank rehabilitation of point bars).

From 1990 through 1993, the Trinity River Basin Fish and Wildlife Restoration Program constructed 29 channel rehabilitation projects on the mainstem Trinity River between Lewiston Dam and the North Fork Trinity River, 20 side-channel projects, and nine bank rehabilitation projects (also known as feathered-edge projects). Monitoring of the previous channel rehabilitation projects has documented chinook salmon spawning within the constructed side-channels and along some "feathered-edge" sites (North Coast Regional Water Quality Control Board and U.S. Bureau of Reclamation 2009; USFWS, unpublished data). An evaluation of the monitoring results associated with early restoration efforts concluded that "when properly constructed, bank rehabilitation can effectively increase the amount of salmonid fry rearing habitat in the Trinity River" (USFWS and HVT 1999).

3.6.2 Environmental Consequences/Impacts and Mitigation Measures

3.6.2.1 Methodology

The analytic methods used to assess potential impacts of the Proposed Project on fisheries resources included a comprehensive literature search and focused field surveys. Evaluation of the presence of special-status fish species and sensitive habitats within the boundaries of the site was conducted by performing a database search of the California Natural Diversity Database (CNDDB), informally consulting with resource agencies (e.g., CDFG, NMFS, and USFWS), and reviewing environmental documents and technical studies prepared for projects in the vicinity. Aquatic habitat within the 40-mile reach below Lewiston Dam was identified and characterized based on the USFWS mesohabitat delineations map, reconnaissance-level site visits, consultation with local fishery biologists, and review of pertinent literature and data. These efforts were conducted to provide an overview of the quality and character of potential suitable spawning, holding, and rearing habitat present within these reaches.

3.6.2.2 Significance Criteria

Significance criteria used to assess the potential impacts of the Proposed Project on fisheries resources are based on the current scientific understanding of the biological requirements and ecological status of the species of interest, and the regulatory standards of county, state, and federal agencies, including the CEQA Guidelines. A significant impact on anadromous salmonids and other native fish would occur if the project would result in any of the following:

- Potential to substantially reduce the number or restrict the range of an endangered or threatened native fish species or a native fish species that is a candidate for state listing or proposed for federal listing as endangered or threatened;
- Potential for substantial reductions in the habitat of any native fish species other than those that are listed as endangered or threatened or are candidates or proposed for endangered or threatened status;
- Potential for causing a native fish population to drop below self-sustaining levels;

- Substantial adverse effect, either directly or through habitat modifications, on any native anadromous species identified as a sensitive or special-status fish species in local or regional plans, policies, or regulations;
- Substantial interference with the movement of any native anadromous or resident fish species;
- A conflict with, or violation of, the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan relating to the protection of native anadromous species or resident fish species;
- Mortality of state or federally listed fish species, or species that are candidates for listing or proposed for listing;
- Reductions in the size of the population of a native fish species sufficient to jeopardize its long-term persistence;
- Temporary impacts to habitats such that native fish species suffer increased mortality or lowered reproductive success that jeopardizes the long-term persistence of those local populations;
- Permanent loss of designated critical habitat and/or essential habitat of a listed species or special-status native fish species; or
- Reduction in the quantity or quality of habitats in which native fish species populations occur sufficient to reduce the long-term abundance and productivity of local populations.

3.6.2.3 Impacts and Mitigation Measures

Table 9 summarizes the potential fisheries impacts that would result from the No-Project alternative and the Proposed Project.

Table 9. Summary of Potential Fishery Resource Impacts for the No-Project and Proposed Project Alternatives

No-Project Alternative	Proposed Project	Proposed Project With Mitigation
Impact 3.6-1. Implementation of the project could result in effects on potential spawning and rearing habitat for anadromous fishes, including the federally and state-listed coho salmon.		
No impact	Significant	Less than significant
Impact 3.6-2. Implementation of the project could result in increased erosion and sedimentation that could adversely affect fishes, including the federally and state-listed coho salmon.		
No impact	Significant	Less than significant
Impact 3.6-3. Construction activities associated with the project could potentially result in the accidental spill of hazardous materials that could adversely affect fishes, including the federally and state-listed coho salmon.		
No impact	Significant	Less than significant
Impact 3.6-4. Construction activities associated with the project could result in the mortality of rearing fishes, including the federally and state-listed coho salmon.		
No impact	Significant	Less than significant
Impact 3.6-5. Implementation of the project would result in the permanent and temporary loss of SRA habitat for anadromous salmonids.		
No impact	Significant	Less than significant
Impact 3.6-6. Implementation of the project would result in fish passage being temporarily impaired during the in-stream construction phase.		
No impact	Significant	Less than significant

Impact 3.6-1: Implementation of the proposed project could result in effects on potential spawning and rearing habitat for anadromous fishes, including the federally and state-listed coho salmon.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, there would be no effects on spawning and rearing habitat other than those associated with current ongoing actions because the project would not be constructed. As described in Chapter 1, the TRRP and other entities have been implementing channel rehabilitation projects for several years. These projects continue to affect the Trinity River with regards to flows, sediments, channel morphology, and riparian vegetation. These effects would continue to influence the spawning and rearing habitat for anadromous fishes, irrespective of this alternative. Under this alternative, there would be no impact.

PROPOSED PROJECT

At the Lower Steiner Flat Rehabilitation Site low-flow side channels, separated from the main channel by either unvegetated medial bars or vegetated islands, would be created. This would enhance the habitat value by directing a larger proportion of the flow into it, and providing more lateral connections. These actions would increase the quality, quantity, and frequency of the available rearing habitat. The project would also retain some existing high flow side channels that currently provide refugia during high flows. These areas would provide lower velocities during high flow. The proposed alcoves would provide high quality habitat rearing habitat at the exits of side channels and high flow side channels. Large wood would be placed strategically in the alcoves to provide cover and shade. Placing wood in alcoves would improve the quality of habitat by providing cover for juvenile fish, enhancing roughness and complexity, and increasing shading.

At the Upper Junction City Rehabilitation Site low flow side channels would be created that would provide immediate fry rearing habitat. In addition, it would serve as a flow conduit to connect new wetland features with the mainstem channel at moderate and high flows. Creation of a split flow channel would provide additional shallow water, eddies, and shoreline with cover at baseflow. More of the vegetated bar surface would become inundated and provide new rearing habitat as discharge increases. An alcove would also be created to provide slow water habitat over a wide range of discharges. Construction of a rearing pond complex would provide off-channel rearing habitat for fishes. Water would flow through this area during the spring release or winter storms, bringing young fish in. When flows drop, the young fish would remain in the ponds and spend the summer and fall there. Greater primary productivity in off-channel ponds would contribute to rapid growth (Limm and Marchetti 2009). Fish would be returned to the mainstem during high flows events in the following winter or spring.

Coho Salmon

Under the Proposed Project, no permanent adverse effects to coho salmon spawning habitat would occur within the rehabilitation sites. Instead, the Proposed Project is expected to result in immediate as well as long-term improvements. Figures 9, 10, and 11 illustrate the extent of the grading, excavating, and coarse sediment addition that would occur below the OHWM in riverine habitat at each of the sites. Long-term design objectives are that implementation of the Proposed Project along with the flow management regime implemented by the TRRP would reactivate channel migration across the floodplain within the boundaries of the sites. This dynamic fluvial channel would result in a net increase in point bar surface area through coarse sediment deposition,

increasing spawning habitat within the boundaries of the sites. The addition of coarse sediment would immediately provide suitable sized spawning gravels to coho and other salmonids.

Adverse effects on spawning habitat are expected to be limited to short-term, localized sedimentation caused by settling of silt disturbed by bank-side excavation activities; and the addition of coarse sediment material, including contouring and grading in the low-flow channel. At the Lower Steiner Flat site, impacts could occur during Phase A implementation in 2012 and during implementation of Phase B. Any salmon redds on or near the in-channel work could be destroyed or disturbed by these construction activities. Silt suspended by these activities may be dispersed and re-settle on downstream suitable spawning areas near the construction area. However, all in-channel work would be conducted only during late-summer (July 15-September 15) low-flow conditions, as authorized by NMFS and CDFG, to avoid impacts to spawning anadromous salmonids.

Some temporary effects on the quality of habitat for juvenile salmonids would occur through removal of riparian vegetation that contributes to SRA habitat in the project reaches. The principal effects of in-channel work on fish include displacement of rearing salmonid fishes from their habitat and increased predation risk or reduced feeding efficiency through the loss of the cover function provided by the SRA habitat (Michney and Hampton 1984; Michney and Deibel 1986). However, it is expected that all displaced juvenile fish, including coho salmon, would find suitable habitat within river reaches upstream or downstream of the sites, because juvenile rearing habitat within the mainstem Trinity River is likely under-saturated during summer and fall months (NMFS 2006). The potential direct and indirect effects to fish resulting from increased suspended sediment and turbidity levels are addressed further under Impact 3.6-2.

The adverse impacts on habitat are expected to be offset in the long term by benefits associated with project implementation at the Proposed Project sites. These benefits would accrue from: 1) the constructed inundation surfaces, 2) overall reconnection of these inundated surfaces to the river at low flows, 3) increased bed mobility and potential channel migration through the alluvial surfaces, and 4) revegetation of these surfaces with native plant species that would contribute shade and large wood to the river channel. Improved connectivity, particularly during high flows is expected to increase areas of slow, shallow-water habitat preferred by salmonid fry. The process of channel migration may also create new point bars, further increasing the availability of this preferred habitat. The constructed main channel branches, potential channel migration processes, engineered side channels and alcove habitats would collectively increase the relative abundance of rearing habitat, compared to the existing condition. Approximately 0.545 acres of low slope (glide) habitat would be impacted by in-channel and riverine work (i.e., main channel split flow) and in-channel fill at the Lower Steiner Flat Rehabilitation Site. Of that total impact, 0.149 acres would occur in Phase A and 0.396 acres would occur in Phase B (as shown in Figures 9 and 10). At the Upper Junction City Rehabilitation Site, approximately 0.231 acres of low slope (glide) habitat would be impacted by in-channel and riverine work (i.e., main channel split flow) and in-channel fill (as shown in Figure 11).

Ultimately, the collective changes in channel morphology as a result of the Proposed Project would improve rearing habitat diversity and abundance, for all anadromous salmonids. LWD would be strategically placed to provide complex physical habitat for juvenile and adult fish in the Trinity River. Large wood hydraulic and habitat structures would create spawning and rearing habitat,

increase nutrient and organic matter retention (which increases food production in the system), and provide refuge from predators and cover during high winter flows (Bustard and Narver 1975; Lestelle 1978; Lestelle and Cederholm 1982; Hicks et al. 1991; Cederholm et al. 1997).

Chinook Salmon

Potential impacts and benefits to chinook would be generally similar to those previously described for coho salmon. Spring- and fall-run salmon potentially spawn and rear within the sites. Juvenile spring-run chinook salmon would be expected to rear year-round within the sites and may be displaced by in-river work activities. Additionally, prior to spawning adult spring-run chinook salmon may utilize holding habitat offered by run, glide, and pool areas within the sites. No permanent adverse impacts to spring-run chinook salmon holding habitat would occur. The Proposed Project does not include activities that would directly fill, modify, or otherwise affect the quality or quantity of spring-run holding habitat. Temporary effects on spring-run chinook holding habitat associated with construction of the Proposed Project would be limited to short-term, localized increases in transient turbidity caused by bank-side excavation activities; main channel split flow construction; island construction; and contouring and grading in the low flow channel. The potential effects of increased suspended sediment and turbidity to holding adult spring-run chinook salmon are addressed under Impact 3.6-2.

Steelhead

Potential impacts and benefits to steelhead resulting from implementation of the Proposed Project would be generally similar to those previously described for coho and chinook salmon. Summer, fall, and winter runs of steelhead may migrate and stage within or near the sites and may spawn (as adults) and rear (as juveniles).

Pacific Lamprey

Potential impacts and benefits to Pacific lamprey resulting from implementation of the Proposed Project would be similar to those previously described for coho salmon and other anadromous salmonids. The removal of riparian vegetation that contributes to SRA habitat within the sites could have a temporary impact on adult Pacific lamprey by reducing holding and hiding habitat, which is particularly important for upstream migrant adults. However, the implementation of the Riparian Revegetation and Monitoring Plan, described in Appendix A, would lessen this impact over the longer term.

Although the impacts to coho salmon and other anadromous fish under the Proposed Project would be temporary and localized, they would be significant.

Mitigation Measures

Implementation of the project could result in effects on potential spawning and rearing habitat for anadromous fishes, including the federally and state-listed coho salmon. Therefore, mitigation measures 4.6-1a and 4.6-1b described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.6-2: Implementation of the proposed project could result in increased erosion and sedimentation levels that could adversely affect fishes, including the federally and state-listed coho salmon.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, there would be no increase in erosion or sedimentation levels that could adversely affect fish species because the project would not be constructed. Similar to previous discussions, this alternative acknowledges that a number of restoration activities that are intended to restore the fishery resources and functional values offered by the mainstem Trinity River have been implemented or are ongoing. While some of these activities may result in changes to erosional processes and sedimentation levels, these changes are taken into account in the evaluation of this alternative. The No-Project alternative would not result in an impact with respect to this issue.

PROPOSED PROJECT

Coho Salmon

Activities related to implementation of the Proposed Project would result in the localized loss of vegetation and general disturbance to the bed and banks of the Trinity River. Removal of vegetation and soil could accelerate erosion processes within the boundaries of the rehabilitation sites and increase the potential for sediment delivery to the Trinity River. The turbidity of a water body is related to the concentration of suspended solids. Suspended solids and turbidity generally do not acutely affect aquatic organisms unless they reach extremely high levels (i.e., levels of suspended solids reaching 25 mg/L). At these high levels, suspended solids can adversely affect the physiology and behavior of aquatic organisms and may suppress photosynthetic activity at the base of food webs, affecting aquatic organisms either directly or indirectly (Alabaster and Lloyd 1980).

In-channel and riverine activities would disturb the alluvial materials that constitute the bed and banks of the Trinity River. At the Lower Steiner Flat site, impacts could occur during Phase A implementation in 2012 and during implementation of Phase B. Exposed soils on the upland and staging areas are susceptible to mobilization from rainfall during early season runoff events. In-river excavation is planned as part of the Proposed Project; therefore, it is expected that excavation and operation of heavy equipment would resuspend silt and sand, and result in localized and temporary increases of suspended sediment and turbidity.

Operation of heavy equipment in the active channel during these activities would likely resuspend streambed sediments. Any juvenile coho salmon rearing in the area during in-channel construction may be temporarily displaced or their social behavior may be temporarily disrupted by turbidity created during this activity.

Erosion and deposition of fine sediments associated with implementation of the Proposed Project are expected to be localized and temporary. Some fine-textured materials may settle near or on spawning habitats located downstream of riverine rehabilitation areas, but these materials are not expected to impair redd excavation or spawning. Excavation, grading, and coarse sediment addition within the channel would occur only during low-flow conditions between July 15 and September 15, minimizing the potential for adverse effects on all life stages of coho salmon. Any juvenile coho salmon rearing in the area during this timeframe could be temporarily displaced or their social behavior could be temporarily disrupted by an increase in turbidity. Behavioral disruption, even temporarily, could result in some increased vulnerability to competitive

interactions or predation for juvenile coho salmon (Berg and Northcote 1985). These temporary impacts were anticipated and addressed in the 2000 Biological Opinion and associated incidental take statement for the ROD and amended Biological Opinion for in-river work.

Chinook Salmon

Potential impacts to chinook salmon populations in the Trinity River resulting from project implementation would be generally similar to those described for coho salmon. Consequently, re-suspension of fine-textured sediment, potential erosion and sediment runoff, and elevated turbidity for short distances downstream could occur during the migration, spawning, and rearing seasons. Spring- and fall-run chinook salmon are known to spawn in suitable habitats within and adjacent to the sites. Construction activities are proposed during the spawning period, and in-river construction may temporarily displace holding adult salmonids. Some fine-textured materials may settle near or on known spawning habitats located downstream of riverine rehabilitation areas, but these materials are not expected to impair redd excavation or spawning. Juvenile spring-run chinook salmon are expected to rear throughout the year within or adjacent to the sites' boundaries, and transient increases in turbidity and re-suspension of sediments would be likely to have similar effects on juvenile chinook salmon as on coho salmon. Adult spring-run chinook salmon using holding habitat during the summer months may be displaced to other holding habitats either upstream or downstream by transient turbidity and sediment plumes created by construction activity.

Steelhead

Potential impacts to steelhead populations in the Trinity River resulting from implementation of the Proposed Project would be similar to those previously described for coho and chinook salmon. Summer and winter runs of KMP ESU steelhead are known to migrate, stage (as adults), and rear (as juveniles) in the Trinity River throughout the proposed construction season. Both runs generally spawn during the winter.

Pacific Lamprey

Potential impacts to Pacific lamprey populations in the Trinity River resulting from implementation of the Proposed Project would be similar to those previously described for coho salmon and other anadromous salmonids. Adult Pacific lampreys migrate upstream from spring through early summer and again in the fall to spawn. Larval lampreys inhabit the river year-round. Siltation of nests that may be built in suitable habitats (i.e., low-slope riffles) could occur. Filter feeding by larval lampreys could be disrupted by an increase in suspended sediments caused by construction-related erosion, although this impact would be very localized and temporary.

While the Proposed Project would increase aquatic habitat within the boundaries of the sites, the proposed construction activities would result in an increase in erosion and sedimentation in the short-term. While the long-term impact would be beneficial, the short-term impacts on fishes within the Trinity River would be significant.

MITIGATION MEASURES

Implementation of the project could result in increased erosion and sedimentation levels that could adversely affect fishes, including the federally and state-listed coho salmon. Therefore, mitigation measures 4.6-2a, 4.6-2b, 4.6-2c, 4.6-2d, and 4.6-2e described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.6-3: Construction activities associated with the Proposed Project could result in the accidental spill of hazardous materials that could adversely affect fishes, including the federally and state-listed coho salmon.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, there would be no risk of accidental spills of hazardous material because the project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

Coho Salmon, Chinook Salmon, Steelhead, and Pacific Lamprey

Construction activities typically include the refueling of construction equipment on location. The Proposed Project also includes activities that would place mechanized equipment (e.g., trucks, excavators) within the active channel for short periods. As a result, minor fuel and oil spills could occur and there would be a risk of larger releases. At the Lower Steiner Flat site, impacts could occur during Phase A implementation in 2012 and during implementation of Phase B. Without rapid containment and clean up, these materials could be toxic, depending on the location of the spill in proximity to surface water features, including the Trinity River. Oils, fuels, and other contaminants could have deleterious effects on all life stages of salmonids and other anadromous fish within close proximity to construction activities. Although short-term, these impacts are considered significant.

MITIGATION MEASURES

Construction activities associated with the Proposed Project could result in the accidental spill of hazardous materials that could adversely affect fishes, including the federally and state-listed coho salmon. Therefore, mitigation measure 4.6-3a described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measure would reduce the impact to less than significant. Section 3.5, Water Quality, and Section 3.13, Hazards and Hazardous Materials, provide additional details on mitigation measures developed for water quality standards, hazards, and hazardous materials.

Impact 3.6-4: Construction activities associated with the Proposed Project could result in the mortality of rearing fishes, including the federally and state-listed coho salmon.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, construction-related mortality to rearing salmonids would not occur because the project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

Coho Salmon

Coho salmon are known to occur throughout the Trinity River. Suitable coho salmon rearing habitat exists within the boundaries of the rehabilitation sites, and juvenile coho salmon may rear within these boundaries year-round. Adult coho migrate through the sites and use suitable spawning habitat throughout the 40-mile reach of the Trinity River below Lewiston Dam. Direct injury to, or mortality of, coho salmon could occur during in-river construction activities. At the Lower Steiner Flat site, impacts could occur during Phase A implementation in 2012 and during implementation of Phase B. These activities would be conducted only during late-summer low-flow conditions (e.g., July 15 – September 15), thus, minimizing the potential for direct mortality to rearing coho, because this period corresponds to a time of the year when the fewest number of juvenile coho salmon are known to occur in project reaches.

NMFS expects that all displaced juvenile fish, including coho salmon, would find suitable habitat within river reaches upstream or downstream of the sites, because juvenile rearing habitat within the mainstem Trinity River is likely under-saturated during summer and fall months (NMFS 2006). The construction period identified above would completely avoid the spawning period for coho salmon; therefore, direct impacts to adult coho salmon or their eggs/alevins (yolk-sac fry) would not occur.

A small, temporary, but uncertain level of stranding of coho salmon fry could occur on the newly constructed inundation surfaces and side channels during rapidly receding flood-flow periods in the winter and early spring when fry are emerging. Additionally, construction of side channel features could result in stranding conditions as flows recede, particularly if the downstream end fills with fine sediments, potentially stranding coho salmon fry. Although stranding of fry under such receding flood conditions occurs on naturally shallow floodplains and in flood bypasses (Sommer et al. 2001), the constructed features could increase this process to varying degrees. As fluvial channel migration occurs through these surfaces, the potential for fry stranding is expected to equilibrate to that of a natural stranding risk. While the activities included in the Proposed Project are intended to benefit coho salmon, the short-term construction impacts would be significant.

Chinook Salmon

Potential impacts to chinook salmon populations in the Trinity River resulting from implementation of the Proposed Project would be similar to those described for coho salmon. Physical construction within and directly adjacent to the river channel could disturb holding spring-run chinook salmon. The principal effect to spring-run chinook is that they would be forced to relocate. The Proposed Project would not impair migration, and spring-run chinook salmon would be able to locate and use suitable holding habitat outside of the disturbed areas. Water temperatures are the coolest in the reach of the Trinity River that encompasses the Proposed Project sites, and physiological effects, or ultimately death, are not expected as temperatures in these reaches of the Trinity River (13-15 °C) are below the threshold observed where spring run can accumulate stresses. Based on studies on temperature tolerance, temperatures in other locations within this section of the Trinity River are sufficiently cool that spring-run chinook salmon are able to deal with stressors (e.g., relocation) without adverse effect (North State Resources 2005).

Steelhead and Pacific Lamprey

Potential impacts to steelhead populations in the Trinity River resulting from implementation of the Proposed Project would be similar to those previously described for coho and other anadromous salmonids. While the activities included in the Proposed Project are intended to benefit salmonids and other aquatic organisms, the short-term construction impacts would be significant.

MITIGATION MEASURES

Construction activities associated with the Proposed Project could result in the mortality of rearing fishes, including the federally and state-listed coho salmon. Therefore, mitigation measures 4.6-4a, 4.6-4b, 4.6-4c, 4.6-4d, and 4.6-4f described in Appendix A will be implemented to reduce the potential for impacts associated with the Proposed Project. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

Impact 3.6-5: Implementation of the Proposed Project would result in the permanent and temporary loss of SRA for anadromous salmonids.

NO-PROJECT ALTERNATIVE

Under the No-Project alternative, loss of SRA habitat would not occur because the project would not be constructed. Therefore, there would be no impact.

PROPOSED PROJECT

As described in the Trinity River Master EIR Section 4.6, Fishery Resources, the term *riparian habitat* encompasses the range of riparian vegetation conditions along the river corridor including rehabilitation sites. It does not have a specific legal description or definition. For the purposes of this document, the term riparian habitat encompasses the range of riparian vegetation conditions within the boundaries of the sites and is synonymous with SRA habitat.

Coho Salmon, Chinook Salmon, Steelhead, and Lamprey

Removal of montane riparian wetland vegetation along the banks of the Trinity River could adversely affect the quality of SRA habitats used by rearing salmonids. At the Lower Steiner Flat site, impacts could occur during Phase A implementation in 2012 as well as during implementation of Phase B. Riparian vegetation is important to the maintenance of healthy fish habitat. Riparian areas provide shade and temperature benefits, sediment, nutrient and chemical regulation, stream bank stability, and inputs of LWD and organic matter to the channel. Riparian vegetation that is adjacent to the river, a component of SRA habitat, is an element of designated critical habitat for coho salmon and a component of EFH for chinook and coho salmon. Complexity in the riparian environment, an important component of fish habitat, would be increased over the long-term with construction at the Proposed Project sites.

To maintain overall SRA habitat values in the project reach, the Proposed Project will be designed to minimize losses of riparian vegetation adjacent to the Trinity River channel, except where necessary to re-activate river access to the floodplain. Boundary markers will be installed along all riparian areas outside of delineated rehabilitation activity areas. These markers will prevent construction access so that impacts to riparian vegetation are minimized. Removal of the riparian berms and re-activation of adjacent floodplains within riverine activity areas would allow for natural revegetation of most of the riparian habitat that would be lost as a result of berm removal and floodplain contouring. Additionally, riparian habitat removed under the Proposed Project would be replaced during the revegetation efforts consistent with the requirements of the Riparian Revegetation and Monitoring Plan. While no permanent net loss of SRA features would necessarily occur, the short-term impact of removing riparian vegetation (see Figures 12, 13, and 14) is considered a significant impact.

MITIGATION MEASURES

Proposed Project implementation would result in a permanent and temporary loss of SRA for anadromous salmonids. Therefore, mitigation measures 4.6-5a, 4.6-5b, and 4.6-5c described in Appendix A will be implemented to reduce the potential for impacts. Implementation of the specified mitigation measures would reduce the impacts to less than significant.

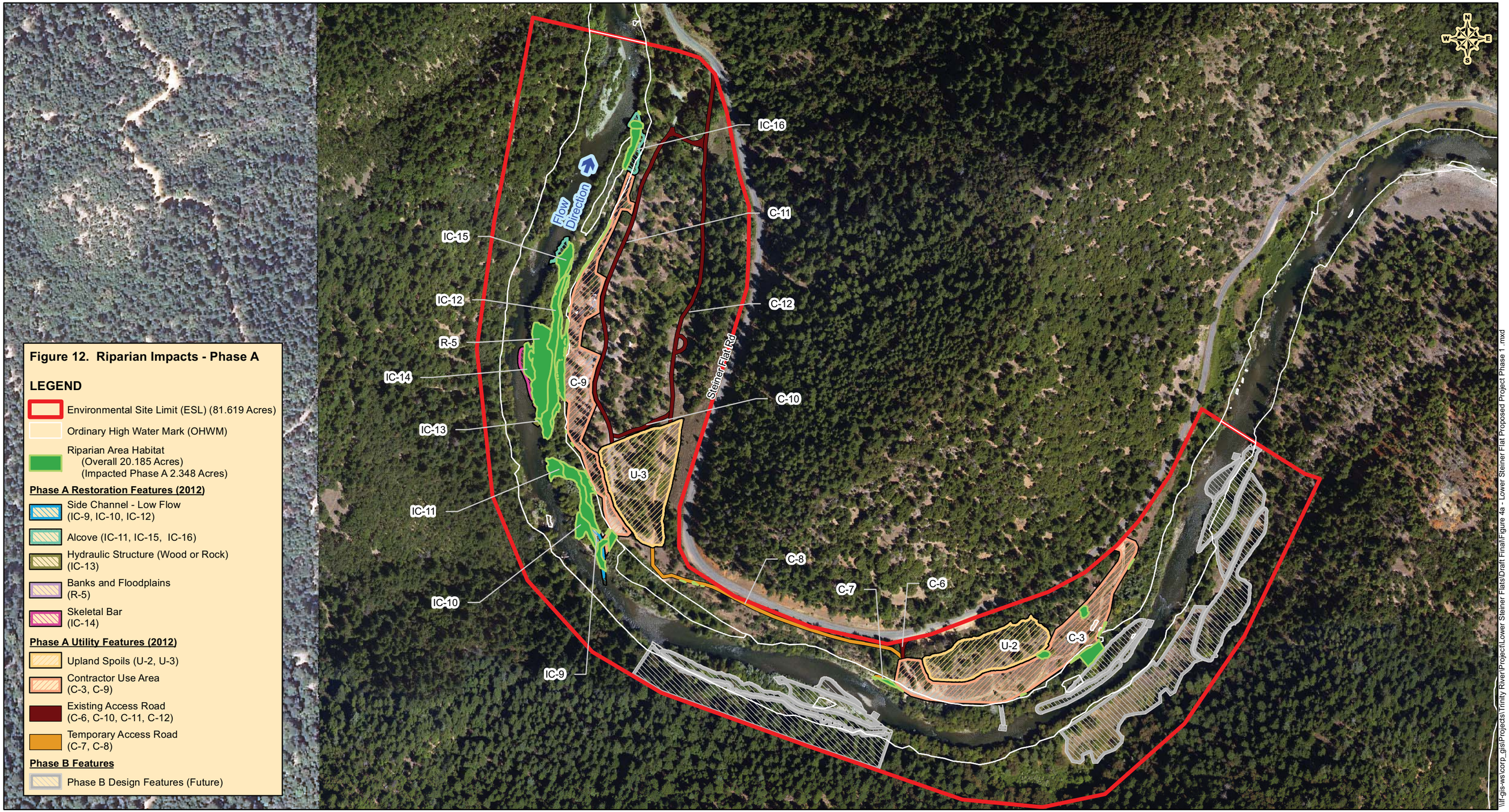

Figure 12. Riparian Impacts - Phase A

LEGEND

- Environmental Site Limit (ESL) (81.619 Acres)
- Ordinary High Water Mark (OHWM)
- Riparian Area Habitat
  (Overall 20.185 Acres)
  (Impacted Phase A 2.348 Acres)

Phase A Restoration Features (2012)

- Side Channel - Low Flow
  (IC-9, IC-10, IC-12)
- Alcove (IC-11, IC-15, IC-16)
- Hydraulic Structure (Wood or Rock)
  (IC-13)
- Banks and Floodplains
  (R-5)
- Skeletal Bar
  (IC-14)

Phase A Utility Features (2012)

- Upland Spoils (U-2, U-3)
- Contractor Use Area
  (C-3, C-9)
- Existing Access Road
  (C-6, C-10, C-11, C-12)
- Temporary Access Road
  (C-7, C-8)

Phase B Features

- Phase B Design Features (Future)

\\lf-gis-ws\corp_gis\Projects\Trinity River\Project\Lower Steiner Flats\Draft Final\Figure 4a - Lower Steiner Flat Proposed Project Phase 1.mxd

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - LOWER STEINER FLAT PHASE A (2012) AND PHASE B (FUTURE) PROJECTS
PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 2-02-2012

0 500 1,000 1,500 2,000 Feet

SCALE: 1:4,200

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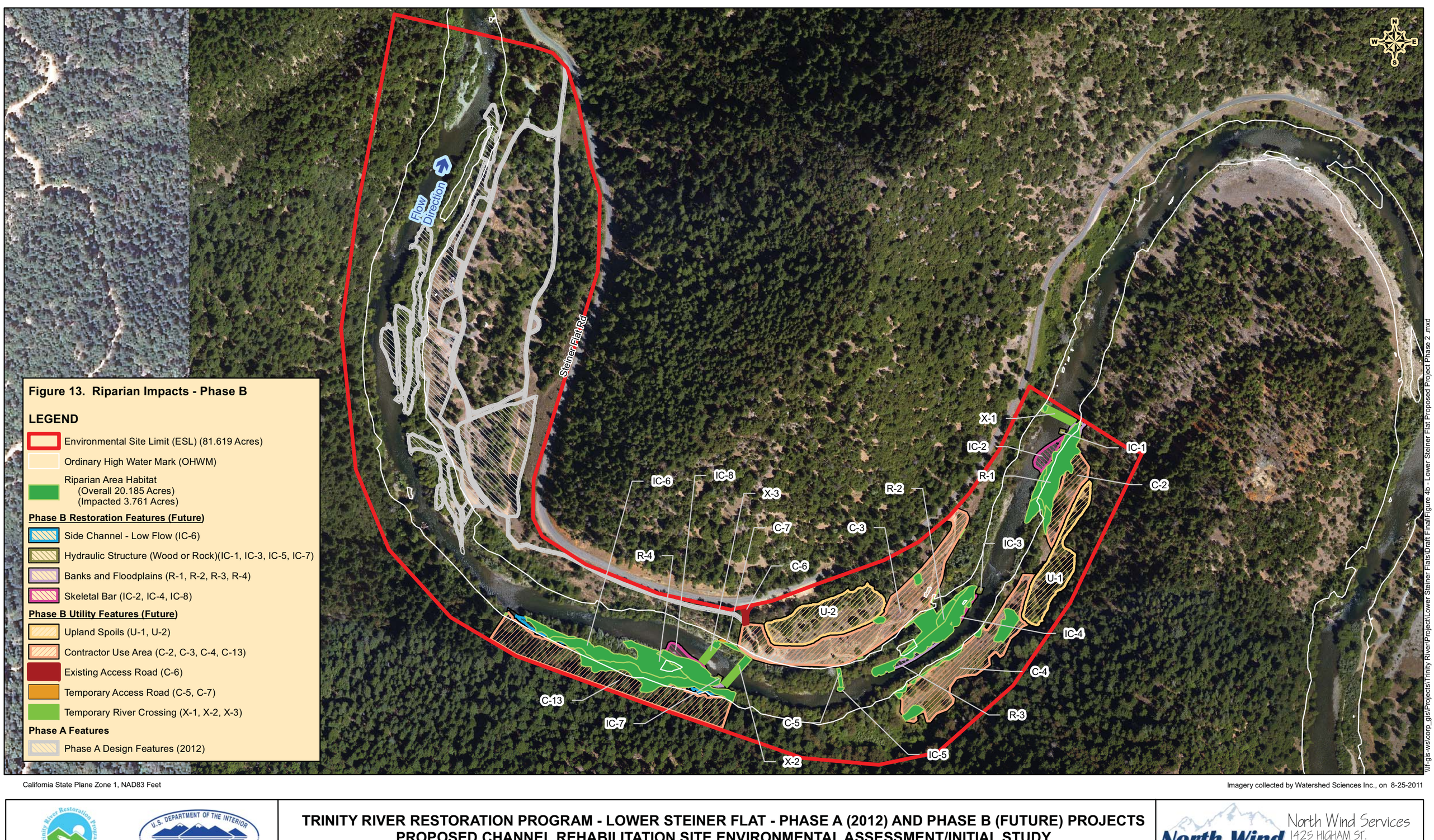

Figure 13. Riparian Impacts - Phase B

LEGEND

- Environmental Site Limit (ESL) (81.619 Acres)
- Ordinary High Water Mark (OHWM)
- Riparian Area Habitat
  (Overall 20.185 Acres)
  (Impacted 3.761 Acres)

Phase B Restoration Features (Future)

- Side Channel - Low Flow (IC-6)
- Hydraulic Structure (Wood or Rock)(IC-1, IC-3, IC-5, IC-7)
- Banks and Floodplains (R-1, R-2, R-3, R-4)
- Skeletal Bar (IC-2, IC-4, IC-8)

Phase B Utility Features (Future)

- Upland Spoils (U-1, U-2)
- Contractor Use Area (C-2, C-3, C-4, C-13)
- Existing Access Road (C-6)
- Temporary Access Road (C-5, C-7)
- Temporary River Crossing (X-1, X-2, X-3)

Phase A Features

- Phase A Design Features (2012)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

\\fs-wsicorp_gis\Projects\Trinity River\Project\Lower Steiner Flats\Draft Final\Figure 4b - Lower Steiner Flat Proposed Project Phase 2.mxd

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - LOWER STEINER FLAT - PHASE A (2012) AND PHASE B (FUTURE) PROJECTS
PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 2-02-2012

0 500 1,000 1,500 2,000 Feet

SCALE: 1:4,200

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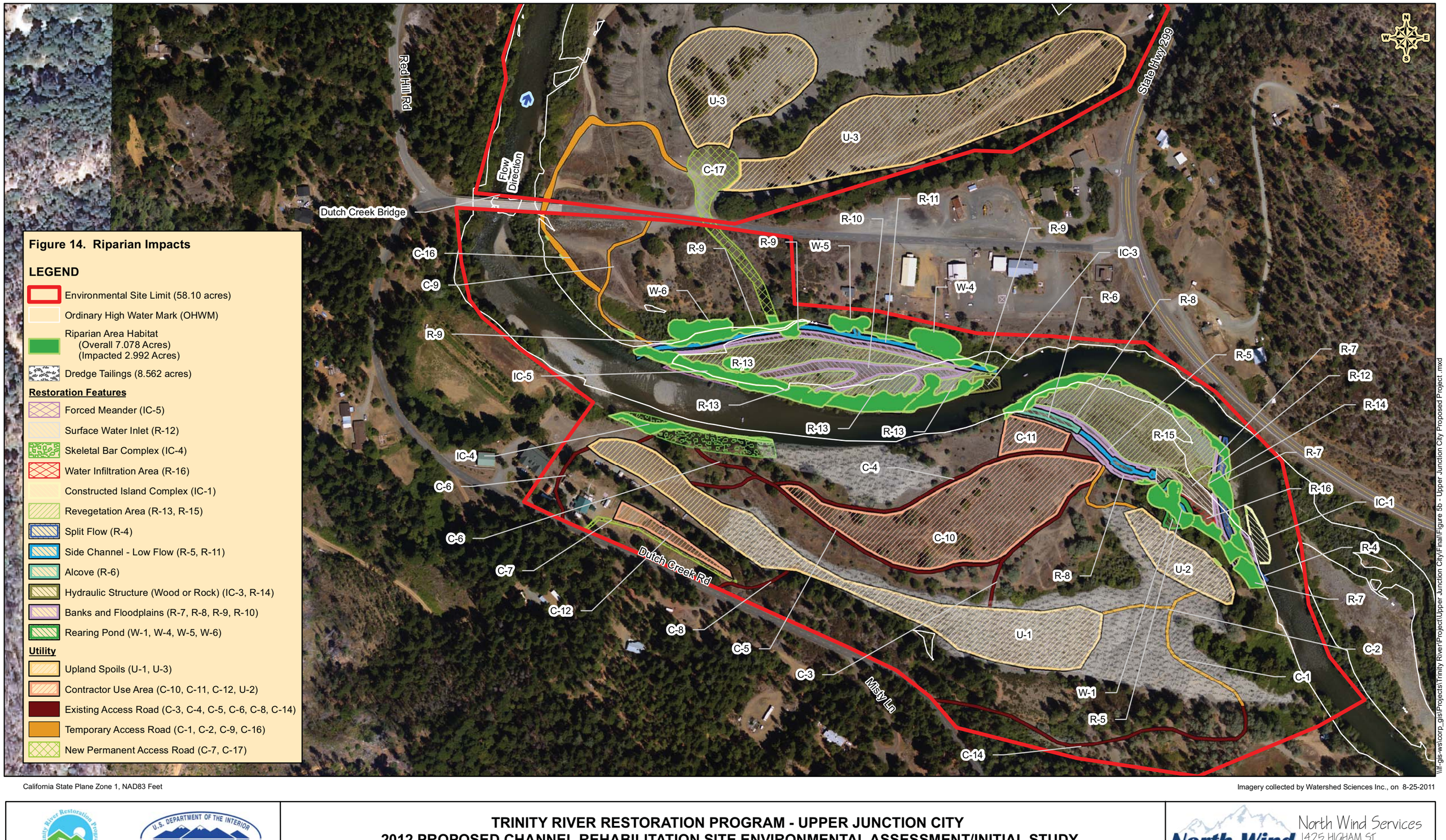

Figure 14. Riparian Impacts

LEGEND

- Environmental Site Limit (58.10 acres)
- Ordinary High Water Mark (OHWM)
- Riparian Area Habitat (Overall 7.078 Acres) (Impacted 2.992 Acres)
- Dredge Tailings (8.562 acres)

Restoration Features

- Forced Meander (IC-5)
- Surface Water Inlet (R-12)
- Skeletal Bar Complex (IC-4)
- Water Infiltration Area (R-16)
- Constructed Island Complex (IC-1)
- Revegetation Area (R-13, R-15)
- Split Flow (R-4)
- Side Channel - Low Flow (R-5, R-11)
- Alcove (R-6)
- Hydraulic Structure (Wood or Rock) (IC-3, R-14)
- Banks and Floodplains (R-7, R-8, R-9, R-10)
- Rearing Pond (W-1, W-4, W-5, W-6)

Utility

- Upland Spoils (U-1, U-3)
- Contractor Use Area (C-10, C-11, C-12, U-2)
- Existing Access Road (C-3, C-4, C-5, C-6, C-8, C-14)
- Temporary Access Road (C-1, C-2, C-9, C-16)
- New Permanent Access Road (C-7, C-17)

California State Plane Zone 1, NAD83 Feet

Imagery collected by Watershed Sciences Inc., on 8-25-2011

W:\gis-ws\corp_gis\Projects\Trinity River\Project\Upper Junction City\Final\Figure 5b - Upper Junction City Proposed Project.mxd

Prepared for the Bureau of Reclamation
Trinity River Restoration Program

TRINITY RIVER RESTORATION PROGRAM - UPPER JUNCTION CITY
2012 PROPOSED CHANNEL REHABILITATION SITE ENVIRONMENTAL ASSESSMENT/INITIAL STUDY

DATE: 1-03-2012

0 300 600 900 1,200 Feet

SCALE: 1:3,100

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