

Russian River Team *Arundo*

Giant Reed (*Arundo donax*) Removal and Riparian
Habitat Restoration in the
Russian River Watershed

Mitigated Negative Declaration

Sotoyome Resource Conservation District

October 2004

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1. SUMMARY

1.1 Introduction

This Mitigated Negative Declaration (MND) has been prepared to evaluate the potential physical environmental consequences of the proposal by the Russian River Team *Arundo* (RRTA). RRTA is comprised of Circuit Rider Productions, Inc. (CRP) in collaboration with the Sotoyome Resource Conservation District (SRCD) and the Mendocino Resource Conservation District (MRCD). The mission of RRTA is to remove giant reed (*Arundo donax*) from the Russian River watershed and restore riparian habitat in invaded sites. The invasion by giant reed is contributing to the decline of Russian River riparian habitat – a critical habitat type upon which salmonids and many other wildlife species depend. The project proposes to cut the giant reed at the rootstock using hand tools and remove it from the stream zone. Mechanized equipment may be used in locations where hand removal is not possible. The remaining biomass will be removed by hand or covered with tarps or a thick pond liner for approximately 6 months in order to kill the invasive species. Biomass that cannot be tarped because of location will be painted on the stumps with glyphosate herbicide. Removal of giant reed by this method will take place in the summer and fall months when the cut and paint method has the highest *Arundo* mortality rate and the bird nesting season is over. Wherever possible, methods other than herbicide shall be used to eliminate giant reed. After the giant reed has been determined to be dead in an area, native plant restoration will take place. For the purpose of the project's review under the California Environmental Quality Act (CEQA), the Sotoyome Resource Conservation District (SRCD) is acting as the Lead Agency.

This MND has been prepared in accordance with the California Environmental Quality Act (CEQA) (Pub. Res. Code Section 21000 et seq.) and the updated State CEQA Guidelines (Title 14, Chapter 3, Section 15000, et seq., California Code of Regulations) to meet the requirements for an MND.

Potential environmental impacts have been identified for each environmental issue area based on the project activities for giant reed removal and native plant restoration within the Russian River watershed. RRTA has included work plans, maps, and other relevant information as identified in Section 4.

Mitigation measures that address impacts are identified in this document. This MND concludes that, given the construction approach, design elements, and the mitigation measures included in this document, no significant effect on the environment would occur.

1.2 Project Description

As described in Section 3 of this document, RRTA shall remove giant reed (*Arundo donax*) from the Russian River watershed via above-ground biomass removal, using hand tools and a limited use of mechanized equipment. Follow-up treatments will include root removal, tarping, and/or the application of glyphosate to cut stems in order to kill the giant reed. RRTA plans to revegetate areas where giant reed is removed with locally collected native plants.

1.3 Project Components

The Russian River basin is an approximately 1,500 square mile watershed located in Mendocino and Sonoma counties in northern California (Figure 1. Russian River Watershed Reference Map). The main stem of the river is approximately 110 miles long, flowing from its source in Potter and Redwood Valleys north of Ukiah to its mouth at the Pacific Ocean near the town of Jenner. The watershed is characterized by a Mediterranean climate, with cool wet winters and hot dry summers. Much of the watershed is underlain by Franciscan formation, making it especially prone to erosion and land movement. The watershed is characterized by a diversity of plant communities, including mixed evergreen forest, oak woodland, redwood forest, Douglas fir forest, grasslands, freshwater wetlands, salt marsh, vernal pools, chaparral, riparian forests, and coastal scrub. The Russian River basin is home to three federally listed species of salmonids, including steelhead, chinook salmon and coho salmon. Historically, the Russian River watershed supported one of the largest steelhead runs in the world. All three species of salmonids have experienced significant declines in the last fifty years.

RRTA proposes to sequence the removal of giant reed and follow-up restoration program from the top of the watershed downstream, since the nature of the giant reed invasion is unidirectional. RRTA would therefore prioritize the removal program in the upper reaches of the mainstem in Mendocino and northern Sonoma counties, and in the tributaries.

Tributaries shall be prioritized based on the level of giant reed infestation and the ability to gain comprehensive landowner support.

1.4 Summary of Impacts and Mitigation Measures

RRTA's primary approach to implementation of the proposed project shall be avoidance of impacts. RRTA shall incorporate mitigations into the proposed project's design and construction plan to avoid or reduce possible environmental impacts to less than significant levels. RRTA's commitments include avoiding sensitive habitats (via timing of treatment or establishing a buffer zone around nest areas), removing giant reed by hand, training crews how to apply herbicide properly, checking weather reports for precipitation, installing erosion controls where needed, and revegetating areas of giant reed removal.

Cumulative Impacts

The environmental impacts of the proposed project would be negligible or less than significant after implementation of recommended mitigation measures.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
AESTHETICS				
Impacts related to Scenic Resources	<p>AES-1: RRTA shall limit work areas to patches of giant reed and avoid all native riparian plant species. RRTA shall maintain neat and orderly work sites.</p> <p>See Mitigation Measure BIO-7</p>	RRTA to implement measure as defined	SRCD site visit to verify compliance	During project activities
Light or glare associated with construction activities	<p>AES-2: Vehicle and equipment lights shall be directed away from the visual field of motorists and pedestrians along any streets or right-of-ways. No nighttime construction shall occur.</p>	RRTA to implement measure as defined	SRCD site visit to verify compliance	During project activities
Same as above	<p>AES-3: Only black or brown tarps or pond liners shall be used in the tarping activities of giant reed to reduce and/or eliminate possible glare to less than significant impact levels.</p>	RRTA to implement measure as defined	SRCD site visit to verify compliance	During project activities
AIR QUALITY				
Equipment exhaust associated with project construction activities	<p>AQ-1 RRTA shall ensure that the following measures are implemented to reduce short-term construction-related emissions:</p> <ul style="list-style-type: none"> • Minimize equipment idling time • Maintain equipment engines in good condition and in proper tune as per manufacturers' specifications • Use alternatively fueled equipment, such as compressed natural gas, or electric, as appropriate. 	RRTA to implement measure as defined	SRCD site visit to verify compliance	During project activities
Net increase in criteria pollutants	See Mitigation Measures AQ-1	RRTA to implement measure as defined	SRCD site visit to verify compliance	During project activities

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
BIOLOGY				
<p>Direct or indirect adverse effects on sensitive or special status species or their habitats</p>	<p>BIO-1 RRTA shall avoid impacts to special status plant species by:</p> <ul style="list-style-type: none"> • Conducting pre-construction surveys for special status plant species where ground disturbing activities with mechanized equipment would take place • Flagging and mapping to protect any special status plant species within or adjacent to the proposed project area during ground disturbing activities • Implementing a worker environmental awareness program (WEAP) with regard to special status species • Supervision and verification of the implementation of these measures by an agency-approved Environmental Monitor. <p>Prior to ground disturbing activities with mechanized equipment, the location of special status plant species will be determined through surveys according to California Native Plant Society (CNPS) protocol. Determination of potential habitat for rare species, and surveys conducted for presence of rare plant species will be performed by a qualified biologist. These surveys will be appropriately timed to cover the blooming periods of the special status plant species with the potential to occur in the area.</p> <p>Any rare plant species within the proposed project area where ground disturbing activities with mechanized equipment will take place (including a 50-foot wide buffer zone on each side of the project's work areas) shall be flagged, accurately mapped on plans, and fenced to protect the area occupied by the species during the removal of giant reed. Installation of ESA fencing shall be supervised by an Environmental Monitor, and appropriate buffer distances from the rare plant population shall be determined by the monitor. The monitor shall have the authority to require installation of silt fencing or other erosion control measures in highly sensitive areas or under certain conditions where potential erosion may impact a special status plant species or its habitat.</p>	<p>RRTA to retain designated biologist / monitor to perform pre-construction surveys and delimit sensitive resources. Submit survey reports to SRCD and appropriate Resource Agencies for review and approval. RRTA to submit WEAP to SRCD for review.</p>	<p>SRCD to review monitoring reports (as appropriate), periodically audit monitoring program to insure compliance with requirements, permits and clearances.</p>	<p>Prior to and during project activities.</p>

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Same as above	<p>BIO-2 For ground disturbing activities with mechanized equipment, RRTA shall ensure pre-construction biological resource surveys to identify the location of sensitive biological resources. Pre-construction surveys will be consistent with all survey protocols and requirements stipulated by resource agencies as a condition of project approval. Sensitive resources shall be clearly mapped and marked on construction drawings or project maps before construction in these areas occurs. Monitors shall also inspect all areas with sensitive resources prior to construction to ensure that stakes, flagging, and required setback buffers are maintained. Avoidance measures and buffer distances vary for each species. The specific buffer zone distance will be determined by the appropriate resource agencies (CDFG and USFWS).</p>	<p>RRTA to retain designated biologist / monitor to perform pre-construction surveys and delimit sensitive resources. Submit survey reports to SRCD and appropriate Resource Agencies for review and approval.</p>	<p>SRCD to review pre-construction survey reports and sensitive resource mapping and delimitation to ensure compliance with mitigation measures for compliance with CEQA and permit stipulations.</p>	<p>Prior to and during project activities.</p>
Same as above	<p>BIO-3 RRTA shall conduct a Worker Environmental Awareness Program (WEAP) training for field crews. All field crews and sub-contractors shall participate in WEAP training prior to starting work on the project and within two days of any new worker arrival. The program will consist of a briefing on environmental issues relative to the proposed project. Training of crews will be conducted by the designated Biologist or Environmental Monitor. The training program will include an overview of the legal status, biology, distribution, habitat needs, and permits and compliance requirements for each special status species that may occur in the project area. The presentation will also include a discussion of the legal protection for endangered species under the U.S. and State Endangered Species Acts (FESA and CESA). A fact sheet conveying this information will be distributed to all personnel who enter the project site. Upon completion of the orientation, employees will sign a form stating that they attended the program and understand all mitigation measures. The forms will be filed at CRP and SRCD and will be accessible to the appropriate agencies.</p> <p>RRTA shall be responsible for ensuring that all project personnel and sub-contractors adhere to the WEAP. Additional training will take place for any new crew members.</p>	<p>RRTA's designated biologist / monitor to conduct WEAP training, maintain records of workers receiving training and provide reports to SRCD</p>	<p>SRCD to review WEAP training reports and periodically monitor project activities to verify compliance of construction personnel with WEAP</p>	<p>Prior to and during project activities.</p>
Same as above	<p>BIO-4 RRTA shall acquire all permits and authorizations required by federal, State, regional and local jurisdictions to proceed with the proposed project. Throughout the life of the project, additional species may be listed or designated as special status, and RRTA shall comply with any new requirements of the USFWS, NMFS, or CDFG for such species.</p>	<p>RRTA to provide all permits and authorizations to the SRCD for review.</p>	<p>SRCD to review all permits and authorizations</p>	<p>Prior to start of project activities.</p>

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Same as above	<p>BIO-5 All activities requiring herbicide treatment would:</p> <ul style="list-style-type: none"> • Appropriately time work so that herbicides are not applied during the wet season to avoid potential impacts to downstream vegetation, and to avoid impacts to fish and wildlife species. • Before the application of herbicide, RRTA shall consult the National Weather Service and allow at least four days of dry weather before application of herbicide. • Treatments shall use a glyphosate-based herbicide including Rodeo® and/or Round-up®. • Ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area. • Ensure that herbicides are mixed with a non-toxic water soluble dye that highlights treated areas. • Minimize trampling of native vegetation by establishing marked trails. • Avoid native riparian plant species. • Have a licensed pesticide applicator conduct or oversee herbicide applications. • Supervision and verification of the implementation of these measures by the Environmental Monitor. 	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
Effects to riparian habitat or other sensitive natural community	<p>BIO-6 RRTA shall avoid damage and/or loss of wetland and native riparian vegetation types due to giant reed removal during ground disturbing activities by completing the following:</p> <ul style="list-style-type: none"> • Maximum avoidance of native wetland and riparian plant and tree species. • Soil replacement where ground disturbing activities with mechanized equipment take place • Implementation of a proposed project's Revegetation Plan • Supervision and verification of the implementation of these measures by an Environmental Monitor. <p>Also see Mitigation Measures BIO 1 – BIO 5</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Direct or indirect effect on wetlands	<p>BIO-7 The purpose of this measure is to prevent temporary hydrologic alteration to wetlands and associated sensitive vegetation from soil disturbance activities associated with the project by requiring:</p> <ul style="list-style-type: none"> • Appropriately timed work so that soil disturbance does not occur during the wet season (when surface water is present) • Soil stabilization measures, including: tamping/compacting soil with hand tools, planting vegetation on 2 – 10 foot centers, seeding, mulching, and installation of erosion control fabrics where necessary to reduce the risk of sediment discharge to wetlands • Soil and grade restoration measures where ground disturbing activities with mechanized equipment have taken place, including backfill of native material to original grade and composition • Supervision and verification of the implementation of these measures by the Environmental Monitor. <p>Also see Mitigation Measures BIO 1 – BIO 6</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
Effect on movement of native resident or migratory fish or wildlife species	<p>BIO-8 If ground disturbing activities are proposed for a project area, RRTA shall avoid mechanical removal of giant reed from the active channel during the migration period of special status anadromous species in streams that potentially support these species. On-site Environmental Monitors will be provided at these locations to address construction activities that may interfere with the migration of anadromous special status fish and wildlife species. No instream construction activities will be allowed during migrational periods within streams that support special status anadromous species, unless otherwise authorized by CDFG and/or NMFS.</p> <p>RRTA shall perform surveys to assess sensitive spawning and rearing areas along the proposed project line where mechanical removal of giant reed will take place. This effort shall be conducted in consultation with CDFG and/or NMFS prior to construction. Spawning and rearing areas shall be identified and avoided during critical periods. These surveys shall be conducted only in areas with the potential for special status fish species.</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance and review documentation of consultation with the resource agencies.	Prior to and during project activities.
All of the above	<p>BIO-9 RRTA shall ensure that all construction personnel comply with the following:</p> <ul style="list-style-type: none"> • Litter or other debris that may attract animals shall be removed from the project area • No pets will be allowed in the project area, including access roads and staging areas 	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
All of the above	<p>BIO-10 Ground disturbing activities with mechanized equipment for giant reed removal shall be limited to periods outside the known breeding period for migratory birds. No pre-construction surveys will be required for activities that occur during the non-breeding season (October 1 through March 1). If ground disturbing activities are required within the breeding season (March 1 – September 30), a qualified biologist shall conduct a survey for nesting birds within three days prior to the start of project activities to ensure no nesting birds shall be impacted by the project. These surveys shall include the areas within 200 feet of the edge of the proposed impact area(s). If active nests are found, a minimum of a 50-foot fence barrier shall be erected around the nest site. No habitat removal or any other work shall occur within the fenced nest zone until the young have fledged, are no longer being fed by the parents, or have left the nest and will no longer be impacted by the project. The Operator shall submit the mapped survey results to the Department for review and approval prior to vegetation removal to ensure full avoidance measures are in place.</p>	<p>RRTA's designated biologist / monitor to report and implement appropriate project activities timing restrictions for nesting/breeding periods of sensitive species, as defined. Work plans will indicate what areas of the project are applicable to measure. Reports and defined exclusion areas to be submitted to SRCD and CDFG for review and approval.</p>	<p>SRCD to review pre-construction survey reports and project activities timing restriction recommendations to verify CEQA and resource permit compliance.</p>	<p>Prior to and during project activities.</p>

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
All of the above	<p>BIO-11 RRTA shall avoid disturbance to active raptor nests within or near the project. For ground disturbing activities with mechanized equipment, no pre-construction surveys for nesting raptors shall be required if work is to occur during the non-breeding season (September 1 through January 31). If, however, ground disturbing activities are scheduled to occur during the breeding season (February 1 through August 31), pre-construction surveys of all potentially active nest sites within 500 feet of the project site shall be conducted in areas that may potentially have nesting raptors, including ground nesting raptor species such as northern harrier and burrowing owls. If surveys indicate that nests are inactive or potential habitat is unoccupied during the life of the project, no further mitigation shall be required.</p> <p>If active nests are found, a minimum 200-foot no-disturbance buffer shall be established around the active nest(s). The size of individual buffers can be adjusted, following a site evaluation by a qualified raptor biologist, which shall depend upon the presence of topographical features that obstruct the line of sight from the project activities to the nest and the observed sensitivity of the birds. Site evaluations and buffer adjustments shall be made in consultation with the local CDFG representatives. The portion of the project that is within the designated buffer shall be identified in the field by staking and flagging.</p>	RRTA's designated biologist / monitor to report and implement appropriate project activities timing restrictions for nesting/breeding periods of sensitive species, as defined. Work plans will indicate what areas of the project are applicable to measure. Reports and defined exclusion areas to be submitted to SRCD and CDFG for review and approval.	SRCD to review pre-construction survey reports and project activities timing restriction recommendations to verify CEQA and resource permit compliance.	Prior to and during project activities.
All of the above	<p>BIO-12 In the unlikely event that active nests of native birds are found within stands of giant reed by RRTA during hand removal of giant reed, all project activities at that location shall cease and a minimum of a 50-foot buffer zone shall be flagged around the nest site. No habitat removal or any other work shall occur within the flagged nest zone until the young have fledged, are no longer being fed by the parents, or have left the nest and will no longer be impacted by the project.</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
CULTURAL RESOURCES				
Construction related activities could damage and/or destroy historical and/or archeological resources	<p>CR-1 RRTA shall appoint a Cultural Resources Specialist (CRS), or specialists, prior to the start of project-related ground disturbance with mechanized equipment, grading, or excavation activities. RRTA shall submit to the SRCD, for review and approval, the name(s) and statement of qualifications for its designated cultural resources specialist, or specialists, who will be responsible for implementation of all cultural resources mitigation measures. The statement of qualifications must be sufficient to substantiate that the CRS meets the Secretary of the Interior’s proposed Historic Preservation Qualification Standards as published in the Federal Register.</p>	RRTA to implement measure as defined.	SRCD to review SOQ of CRS.	Prior to start of project activities.
Same as above	<p>CR-2 Prior to the start of a project, the CRS shall review all proposed ground disturbing activities with mechanized equipment to determine if the proposed action would impact known or potential archaeological resources. If resources are determined to be in the area of the proposed project, the first level of mitigation shall be to change the mode of giant reed eradication to hand removal rather than excavation. This would avoid impacts to the resource.</p>	RRTA to implement measure as defined.	SRCD to review reports by CRS.	Prior to start of project activities.
Same as above	<p>CR-3 If ground disturbing activities with mechanized equipment at those areas identified as potentially archaeologically sensitive cannot be avoided by using another method, full-time archaeological monitoring shall occur during ground-disturbing activities. Monitoring is required within 500 feet of the boundaries of known cultural resources.</p> <p>Monitors must have 2 years of professional experience and be approved by the SRCD. Monitors shall be under the supervision of the CRS.</p> <p>A detailed project specific protocol for monitoring shall be provided and shall include an Unanticipated Discoveries of Cultural Resources Plan. Following is a synopsis of what shall be included in the plan. If cultural resources are located during monitoring, monitors shall immediately halt project activities within 250 feet of the find in non-urban area, and 50 feet of the find in urban areas, and notify the CRS. The CRS shall inspect the find. The CRS shall immediately notify the SRCD Environmental Monitor. If project personnel discover a cultural resource in the absence of a monitor, project activities within 250 feet of the find shall be halted and the environmental compliance monitor contacted. Project activities may begin once the CRS has completed necessary investigations and a written authorization to proceed has been issued by the SRCD.</p>	RRTA to implement measure as defined.	SRCD to review Unanticipated Discoveries of Cultural Resources Plan and Cultural Resource monitoring reports. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Potential discovery or disturbance of unique paleontological resources during construction	<p>CR-4 In the event that fossil remains are encountered, either by the cultural resources monitor or by project personnel, qualified paleontological specialists shall be contacted. Project activities within 100 feet of the find in non-urban areas and 50 feet in urban areas shall be temporarily halted or diverted until a qualified vertebrate paleontologist examines the discovery. The paleontologist shall notify the appropriate agencies and the SRCD Environmental Monitor to determine procedures that would be followed before project activities is allowed to resume at the location of the find.</p> <p>Also see Mitigation Measure CR-3</p>	RRTA to implement measure as defined.	SRCD to review SOQ of paleontological specialists. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
Substantial effects may occur to human burials from ground-disturbing operations	<p>CR-5 The CRS shall develop an Unanticipated Discoveries of Human Remains Plan. Following is a synopsis of what shall be included in the plan. If human remains are found at any time during project-level vegetation clearance; ground disturbance and grading; site or project mobilization; site preparation or excavation activities; implementation of erosion control measures; or the movement or parking of vehicles or other equipment onto or over the project surface, all work shall immediately stop within 250 feet of the find in non-urban areas and 100 feet of the find in urban areas. The CRS shall be notified immediately and shall, in turn, immediately notify the county coroner for the appropriate county, in compliance with Section 7050.5 of the California Health and Safety Code, and notify the SRCD Environmental Monitor. Upon the completion of compliance with all relevant sections of the California Health and Safety Code and the conditions of the Unanticipated Discoveries Plan for Human Remains, the CRS shall implement Mitigation Measure CR-2.</p> <p>Also see Mitigation Measures CR-1 through CR-4</p>	RRTA to implement measure as defined.	SRCD to review Unanticipated Discoveries of Human Remains Plan. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
GEOLOGY AND SOILS				
Substantial soil erosion or loss of topsoil	<p>GEO-1 All exposed/disturbed areas within the project site shall be stabilized to the greatest extent possible. Erosion control measures, such as silt fences, straw hay bales, gravel or rock lined ditches, water check bars, and broadcasted straw shall be used where silt-laden water has the potential to leave the work site and enter State waters. Modifications, repairs and improvements to erosion control measures shall be made whenever needed.</p> <p>Also see Mitigation Measure GEO-2 and BIO-7</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Same as above	<p>GEO-2 No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Seventy-two-hour weather forecasts from the National Weather Service shall be consulted prior to start up of any phase of the project that may result in sediment runoff to the stream.</p> <p>Also see Mitigation Measure GEO-1 and GEO-2</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	Prior to start of project activities.
HAZARDS & HAZARDOUS MATERIALS				
Hazardous materials could result in accidental releases into the environment during construction or transportation	<p>HAZ-1 All herbicide applications would be completed or supervised by a Qualified Licensed Applicator permitted by the Department of Pesticide Regulation to ensure that specific safety measures, including containment and clean-up plans in the event of an accidental spill or leak of the herbicide are followed. All workers involved with herbicide application shall receive training in herbicide application from the Qualified Licensed Applicator.</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
Same as above	<p>HAZ-2 All workers involved with herbicide application shall wear appropriate protective clothing and related safety equipment (masks, gloves, etc.).</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.
Same as above	<p>HAZ-3 Clean water and soap shall be readily available on site for the purposes of emergency washing.</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.
Same as above	<p>HAZ-4 Prior to and during vegetation clearing and herbicide applications on public property, active work areas shall be marked and signs shall be clearly posted along all access points to the site to minimize the public's potential exposure to hazardous materials. These signs would discourage public use or other unauthorized use of the site for a minimum of two weeks after any herbicide application. Prior to any project activities, field crews would survey the site to ensure that no unauthorized persons are present.</p>	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Same as above	HAZ-5 No herbicide application shall take place when wind velocities exceed six (6) mph to minimize potential herbicide drift.	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.
Same as above	HAZ-6 RRTA shall ensure proper labeling, storage, handling, and use of hazardous materials in accordance with best management practices and the Occupational Safety and Health Administration's HAZWOPER requirements. RRTA shall ensure that all employees are properly trained in the use and handling of these materials and that each material is accompanied by a material safety data sheet (MSDS) deemed adequate by the SRCD. Additionally, RRTA shall submit a written plan to the SRCD prior to project activities outlining how to respond if hazardous materials are unexpectedly encountered. The plan shall specify identification, handling, reporting, and disposal of hazardous materials.	RRTA to implement measure as defined.	SRCD to review Hazardous Materials Management/Spill Prevention Plan. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Same as above	<p>HAZ-7 A Hazardous Materials Management/Spill Prevention Plan shall be developed and submitted to the SRCD for review and approval prior to the start of project activities. The purpose of the plan is to provide on-site project managers, environmental compliance monitors, and regulatory agencies with a detailed description of hazardous materials management, spill prevention, and spill response/cleanup measures associated with the project. The primary objective of the plan is to prevent the spill of hazardous materials; the plan shall be given to all project managers and sub-contractors working on the project. At least one copy shall be on-site with the project manager at all times. The plan shall include the following:</p> <ul style="list-style-type: none"> • Definition of staging areas where refueling, storage, and maintenance of equipment will take place. Such areas shall not be located within 100 feet of drainages or any other body of water, or wetlands or riparian areas, to reduce the potential of contamination by spills. • During project activities, equipment shall be maintained and kept in good operating condition to reduce the likelihood of line breaks and leakage. • Fluids drained from machinery during services at staging areas shall be collected in leak-proof containers and disposed of at appropriate disposal or recycling facilities. • No refueling or servicing shall be done without absorbent material (e.g., absorbent pads, mats, socks, pillows, and granules) or drip pans underneath to contain spilled material. • Definition of spill control and countermeasures, including but not limited to employee spill prevention/response training and a description of onsite cleanup equipment (e.g., absorbent pads, mats, socks, granules, etc.) available at staging and project sites. • Resource agency notification and documentation procedures. 	RRTA to implement measure as defined.	SRCD to review Hazardous Materials Management/Spill Prevention Plan. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
Same as above	<p>HAZ-8 RRTA shall prepare a Health and Safety Plan that includes a contingency plan for hazardous materials and waste operations. Before project activities could proceed, RRTA shall submit the plan to the SRCD for review and approval, and once approved shall send the plan to each agency with jurisdiction. The Health and Safety Plan, applicable to all work activities, shall establish policies and procedures to protect workers and the public from potential hazards posed by hazardous wastes. The plan shall be prepared according to federal and California OSHA regulations for hazardous waste sites. This Health and Safety Plan shall also provide for proper storage and/or disposal of any contaminated soils that meet the definition of a hazardous waste.</p>	RRTA to implement measure as defined.	SRCD to review Health and Safety Plan. SRCD to periodically monitor project activities for compliance.	Prior to start of project activities.
Hazardous materials in area of school	See Mitigation Measures HAZ-1 through HAZ-8 .			

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Hazardous materials site	HAZ-9 A list search of known State and federal hazardous waste sites and leaking underground tanks within 1,000 feet of an excavation site shall be conducted prior to project activities to identify high-risk areas, where a moderate or high potential for encountering contaminated soil or groundwater may exist during shallow (6 feet or less) excavations. If known hazardous waste sites are found near a planned excavation site, the mode of giant reed removal will be changed to hand removal as to not disturb contaminated soils.	RRTA to implement measure as defined.	SRCD to review records search of hazardous waste sites.	Prior to start of project activities.
Wildland fire hazards	HAZ-10 RRTA shall develop and implement a Fire Prevention Plan to minimize the risk of starting a fire to less than significant levels.	RRTA to implement measure as defined.	SRCD to review Fire Prevention Plan. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
HYDROLOGY AND WATER QUALITY				
Potential violation of water quality standards or water discharge requirements during construction	WQ-1 Prior to the commencement of project activities at any particular site, RRTA shall provide the SRCD with an outline of the BMPs that will be used during project activities at that location. The BMPs shall be approved by the SRCD prior to the start of project activities to ensure that the potential for discharge into surface waters during giant reed removal is minimized. Also see Mitigation Measure GEO-1 , GEO-2 , and HAZ-7	RRTA to implement measure as defined.	SRCD to review BMPs. SRCD to periodically monitor project activities for compliance.	Prior to and during project activities.
Alter the existing drainage pattern of the site or area that would result in substantial erosion or siltation on-site or off-site?	See Mitigation Measures GEO-1 and GEO-2 , and BIO-7			

Table 1.4.1 Summary of Impacts and Mitigation Measures with Implementation and Monitoring Plan

Impact	Mitigation Measure	Implementation Actions	Monitoring Requirements	Timing of Action
Potential substantial degradation of water quality during construction	See Mitigation Measures WQ-1			
NOISE				
Construction equipment noise	NOI-1 As directed by any local jurisdiction, RRTA shall implement appropriate noise mitigation measures to comply with the applicable local noise ordinance including, but not limited to, shutting off idling equipment, rescheduling project activities, notifying residents in advance of project work, or installing acoustic barriers around stationary project noise sources.	RRTA to implement measure as defined.	SRCD to periodically monitor project activities for compliance.	During project activities.
Substantial temporary or periodic exceedance of ambient noise levels	See Mitigation Measure NOI-1 .			
RECREATION				
Disruption of recreational activities	REC-1 RRTA shall schedule project activities to avoid peak use periods (e.g., weekends and holidays) for recreational facilities. Onsite notification of recreational access closures shall be provided at least 2 weeks in advance, through the posting of signs and/or notices. Also see Mitigation Measure HAZ-4	RRTA to implement measure as defined.	SRCD to review and approve project schedule.	Prior to start of project activities.

2. BACKGROUND

2.1 Legal Authority

CEQA requires State, regional, and local agencies, including special “Districts,” to prepare an environmental review document for any discretionary action that may have the potential to significantly affect the quality of the environment. Under CEQA, a Lead Agency is the governmental agency that has the principal responsibility for carrying out or approving a proposed project, and therefore, the principal responsibility for preparing, or causing the preparation of, CEQA-related documents. The proposed project area is located within the Russian River Watershed. The Sotoyome Resource Conservation District (SRCD) exists to assist landowners and residents in improving land stewardship through soil and water conservation, habitat restoration, and other actions. The district has jurisdiction in the northern two thirds of Sonoma County including the southern half of the Russian River Watershed. Consequently, for the purposes of CEQA, the SRCD is acting as the Lead Agency.

2.2 Public Review

In accordance with CEQA, a 30-day public review period for the Giant Reed (*Arundo donax*) Removal and Native Plant Restoration in the Russian River Watershed Draft Initial Study and Mitigated Negative Declaration (IS/MND) commenced on September 14, 2004, and concluded October 14, 2004. The Draft IS/MND was specifically distributed to involved or interested public agencies. All comments were reviewed and given due consideration. There were no substantial revisions necessary to address comments received. Copies of all comments received and the final MND are available for general public review at:

- Sotoyome Resource Conservation District
970 Piner Road
Santa Rosa, CA 95406

This MND can also be downloaded off of the internet at <http://www.sotoyomercd.org/arundo.htm#MND>.

2.3 Scope of the MND

As stated above, the SRCD completed an Initial Study that led to adoption of this MND to review the project’s potential for having significant effects on the environment. According to CEQA Guidelines Section 15063 (c), the purposes of an Initial Study include:

- 1) *Provide the Lead Agency with information to use as the basis for deciding whether to prepare an EIR or a Negative Declaration.*
- 2) *Enable an applicant or Lead Agency to modify the project, mitigating adverse impacts before an EIR is prepared, thereby enabling the project to qualify for a Negative Declaration.*
- 3) *Assist in the preparation of an EIR, if one is required.*

- 4) *Facilitate environmental assessment early in the design of a project.*
- 5) *Provide documentation of the factual basis for the finding in a Negative Declaration that a project will not have a significant effect on the environment.*
- 6) *Eliminate unnecessary EIRs.*
- 7) *Determine whether a previously prepared EIR could be used with the project.*

According to CEQA Guidelines Article 6 (Negative Declaration Process) and Section 15070 (Decision to Prepare a Negative Declaration or Mitigated Negative Declaration):

A public agency shall prepare or have prepared a proposed negative declaration or mitigated negative declaration for a project subject to CEQA when:

- a) *The initial study shows that there is no substantial evidence, in light of the whole record before the agency, that the project may have a significant effect on the environment, or*
- b) *The initial study identifies potentially significant effects, but:*
 - 1) *Revisions in the project plans or proposals made by, or agreed to by the applicant before a proposed mitigated negative declaration and initial study are released for public review would avoid the effects or mitigate the effects to a point where clearly no significant effects would occur, and*
 - 2) *There is no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment.*

As directed by the CEQA Guidelines, if an Initial Study concludes that some or all of a proposed project would result in significant effects on the environment that cannot be mitigated to less than significant levels, then an EIR must be prepared to address the effects. However, if an Initial Study shows that a proposed action would not create a significant environmental effect, a Negative Declaration or Mitigated Negative Declaration may be prepared and circulated for public and agency review.

Based on the analysis of the Initial Study, the SRCD has determined that all project-related environmental impacts could be reduced to less than significant levels with the incorporation of mitigation measures; therefore, a Mitigated Negative Declaration meets the requirements of CEQA. The mitigation measures included in this MND are designed to reduce or eliminate the potentially significant environmental impacts described herein. Mitigation measures are structured in accordance with the criteria in Section 15370 of the State CEQA Guidelines.

2.4 Subsequent Review of the MND

Supplemental environmental review of this project would only be required under CEQA if changes occurred that were outside the scope of the original project and were not covered by this MND.

2.5 Document Organization

This document contains the following sections and supporting appendices:

Section 1: Summary. Summarizes the project and the mitigation measures adopted to reduce impacts to less than significant levels. All impacts and mitigation measures are described in an impact summary table.

Section 2: Background. Describes the legal authority of the SRCD to prepare an IS/MND, the public review process, the scope of the IS/MND, and the organization of this document.

Section 3: Project Description. Provides a detailed description of the project objectives, project boundaries, and project design.

Section 4: Environmental Setting, Impacts, and Mitigation Measures. Presents the environmental analysis for each issue area identified on the CEQA Environmental Checklist Form. If the proposed project is not considered to have the potential to significantly impact a given resource, a brief discussion is given of the reasons why no impacts are expected. If the proposed project could have a potentially significant impact on a resource, a discussion provides a description of potential impacts and appropriate mitigation measures that would reduce those impacts to less than significant levels.

Section 5: References. Provides a list of documents that were utilized during the preparation of the IS/MND.

Section 6: Report Preparation and Glossary. Provides a list of persons involved in preparing the IS/MND and their respective roles, and a list of terms used in this MND.

The following appendices contain background and technical data that were used in preparation of this MND.

Appendix A. Completed Initial Study Environmental Checklist Form

Appendix B. Methods of Mapping

Appendix C. Maps

Appendix D. Data Collection Forms

Appendix E. Notice of Determination

3. PROJECT DESCRIPTION

3.1 Introduction

The Russian River watershed is an approximately 1500 square mile watershed located in Mendocino and Sonoma counties in northern California (Figure 1). For the purposes of this project, the watershed has been divided into 10 hydrological sub-areas (see Appendix C - Maps). The Russian River watershed once supported three species of salmon, coho, chinook and pink, and one of world's largest populations of steelhead trout (Steiner 1996, Nehlsen, et al. 1991). Pink salmon are now extirpated from the system, and coho, chinook and steelhead are all listed as threatened under the Federal Endangered Species Act. Streams in the watershed also support federally endangered populations of freshwater shrimp. Since European settlement, the Russian River has experienced significant anthropogenic disturbance (gravel mining, logging, urbanization, flood control, agricultural development), and this has resulted in severe impacts to riparian vegetation. Especially hard hit have been floodplain riparian forests – some of the most structurally and biologically diverse areas within the watershed (CRP 2001).

Giant reed (*Arundo donax*) is recognized by resource managers throughout California as a highly invasive noxious weed species with negative effects on a range of environmental features, including fisheries, wildlife habitat, water quality, and quantity. In several river systems, giant reed has expanded from isolated clumps in the channel to a near monoculture within a ten-year time frame. The critical state of riparian plant communities in California has provided the impetus for several removal programs in the southern part of the state. Southern California agencies are spending millions of dollars to control giant reed due to its influence on water supply, fire danger, and impacts to native riparian habitats (CRP, 2002).

In 1999 and 2000, the Sonoma County Board of Supervisors approved a Sonoma County Water Agency Fisheries Enhancement Program grant to Circuit Rider Productions, Inc. (CRP). The objective of these consecutive grants was to develop a comprehensive mapping and research program designed to address the extent and impacts of giant reed on the fish and wildlife values of the Russian River main stem. Additionally, the grant specified the development of estimated control costs for the eradication of giant reed from the Russian River as well as community and landowner outreach to encourage the control of giant reed on private property in the watershed (CRP, 2002).

With funding from SCWA and CDFG, CRP has performed the following tasks as part of the 1999 and 2000 FEP grants and CDFG funding for tributary mapping:

- 1) Mapped the extent of the giant reed invasion along the main stem of the Russian River
- 2) Mapped the extent of the giant reed invasion along major tributaries to the Russian River
- 3) Evaluated the influence of giant reed on native plant communities
- 4) Evaluated the influence of giant reed on terrestrial insect communities
- 5) Documented the influence of giant reed on various attributes of the aquatic food chain, including macro-invertebrates
- 6) Determined effective eradication methods for giant reed in riparian areas
- 7) Evaluated effective revegetation techniques after removal of giant reed
- 8) Developed costs for eradication of giant reed along the main stem Russian River
- 9) Performed education and outreach and engaged landowners and community groups in voluntary giant reed removal.

CRP's research demonstrates that giant reed is having a very substantial effect on the native plant and animal communities of the Russian River riparian zone. If giant reed continues to spread – as it has in southern California – the impacts to the salmonid fishery and wildlife in general will be severe. CRP's research also demonstrates that giant reed, unlike plants that produce seed (such as yellow star thistle), can be effectively and rapidly controlled (K. Gaffney, personal communication).

The total extent of giant reed in the Russian River main stem in 2000 was two hundred and thirty six acres, with the majority of this acreage (60%) occurring in the Alexander Valley. In 2002, forty-three tributaries were infested with giant reed, comprised of over seven hundred individual stands.

Russian River Team *Arundo* (RRTA) has proposed to perform giant reed (*Arundo donax*) removal and riparian habitat restoration in the Russian River watershed.

3.2 Project Objectives

The giant reed invasion is of immediate concern in the Russian River watershed. Based on information from river systems in southern California and other riparian areas throughout the world, it is clear that giant reed may be one of the most serious impacts to the remaining riparian habitat in the Russian River system, having a direct impact on the salmonid fishery. Given the fact that the Russian River watershed is home to federally listed salmonid species – steelhead trout, Coho and Chinook salmon – as well as the federally listed freshwater shrimp, it is imperative that riparian zone management in these ecosystems take into account the impacts of invasive plants. Preservation of the remaining riparian habitat, as well as restoration of fisheries resources, will be more successful, and far more cost effective, if the giant reed issue is addressed during the early phase of this invasion (CRP, 2002).

Following are the primary objectives of the Russian River Giant Reed (*Arundo donax*) Removal and Native Plant Restoration Program:

1. Educate landowners, agencies and the community about giant reed's negative impacts on riparian ecosystems and biodiversity;
2. Prioritize giant reed removal from the top of the watershed downward, in order to most effectively utilize project funds;
3. Implement non-toxic giant reed removal on a large scale in order to reduce the amount of herbicide being used in sensitive riparian habitats;
4. Restore native riparian habitat in areas where significant amounts of giant reed are being removed;
5. Demonstrate and publicize non-toxic removal techniques so that other agencies and restoration groups may effectively use them;
6. Collaborate with existing efforts (such as EQIP, RCD programs and other public and private programs) in order to leverage funding for giant reed removal.
7. Map and monitor the progress of giant reed removal and native plant restoration.
8. Perform research on the impacts of giant reed on riparian ecosystems, and effective non-toxic control methods.

3.3 Proposed Project Components and Methods

A. Landowner Outreach

Because over 95% of the Russian River watershed is in private ownership, and the majority of the giant reed is on private lands, effective removal of giant reed and restoration of riparian areas will require landowner outreach and education about the importance of giant reed removal. RRTA proposes to contact landowners through a variety of newsletter articles, speaking engagements, informational brochures and bulletins. Cooperating groups and organizations have included in the past, and are expected to include in the future:

Sonoma County Grape Growers
Sonoma County Farm Bureau
Sonoma County Water Agency
Mendocino County Farm Bureau
Sotoyome Resource Conservation District
Mendocino County Resource Conservation District
Community Alliance with Family Farmers
Alexander Valley Winegrowers
UC Cooperative Extension – both counties
Agricultural Commissioners Office – both counties
Miscellaneous landowner and agricultural groups.

Informational brochures about the environmental problems associated with giant reed will be developed, and will include discussions of the extent of the invasion and the effects on biological diversity, salmonids, fire danger and water quality/quantity. These brochures will be focused on the giant reed invasion in the Russian River watershed.

Informational bulletins about appropriate control methods and follow-up riparian restoration techniques will be developed and distributed to landowners engaged in giant reed removal and restoration of invaded areas.

B. Workshops and Community Education

In order to ensure continued support for the removal of giant reed and restoration of invaded habitats, public agencies and the community must be educated about the environmental impacts of giant reed on the Russian River ecosystem. RRTA will develop a series of multi-media presentations about the extent of the giant reed invasion, and its impact on coastal stream systems – specifically the Russian River. These presentations will be given to a variety of public agencies such as California Department of Fish and Game, the Natural Resources Conservation Service, National Marine Fisheries Service, Regional Water Quality Control Board, RCD boards, the board of supervisors for both counties, city councils in both counties, local environmental and community education groups. A website will be developed that is focused on the invasion in the Russian River watershed, and will contain information about giant reed impacts, control methods and follow-up restoration methods. The website will link to other internet resources such as Team *Arundo* and California Exotic Pest Plant Council websites. Informational brochures and the website address will be provided at all public presentations.

C. Site Prioritization and Planning

CRP's comprehensive Giant Reed GIS will be used to prioritize sites for removal, identify and contact landowners, and to develop site-specific designs for removal and follow-up restoration. Sites will be prioritized from the top of the watershed downward – with the upper reaches of the main stem and the tributaries receiving first priority. For each site, a map will be developed that shows the infestation, the landowner name, the proposed treatment and any follow-up restoration specifications. These maps will be provided to the landowner and will provide the basis for any permit applications required. Finally, all data developed for the site-specific plans will be incorporated into the GIS for use in monitoring and maintenance. RRTA will attempt to obtain comprehensive permits for each sub-regional zone.

D. Giant Reed Removal

RRTA will remove giant reed in all riparian areas of the main stem and tributaries to the Russian River.

Table 3.3.1. Significant tributaries of the Russian River that have been surveyed and found to have giant reed (*Arundo donax*) infestations (highlighted). Data were derived from USGS Orthoquadrangles (Mendocino County) and Orthophotography (Sonoma County) and analyzed using ArcView software.

Ackerman Creek	Foss Creek	Oat Valley Creek
Adobe Creek	Franchi Creek, La	Orrs Creek
Alder Creek	Franks Canyon	Osborne Creek
Anchor Creek	Franz Creek	Palmer Creek
Angel Creek	Frasier Creek	Parsons Creek
Anna Belcher Creek	Frazier Gulch	Pechaco Creek
Ash Creek	Freezeout Creek	Pena Creek
Atascadero Creek	Galloway Creek	Peterson Creek
Austin Creek	George Young Creek	Picnic Creek
Bakers Creek	Geyser Canyon	Pieta Creek
Barnes Creek	Gibson Creek	Pole Mountain Creek
Barrelli Creek	Gill Creek	Pool Creek
Bear Canyon	Gilliam Creek	Porter Creek
Bear Creek	Gird Creek	Porterfield Creek
Bearpen Creek	Gossage Creek	Powerhouse Canal
Bevans Creek	Grab Creek	Press Creek
Bidwell Creek	Grape Creek	Purrington Creek
Big Oat Creek	Grapevine Creek	Rail Creek
Big Sulphur Creek	Gravelly Springs Creek	Rancheria Creek
Black Rock Creek	Gray Creek	Red Slide Creek
Black Sulfur Creek	Green Valley Creek	Redwood Canyon
Blucher Creek	Harrison Gulch	Redwood Creek
Blue Jay Creek	Hensley Creek	Redwood Log Creek

Bluegum Creek	Hidden Valley	Rincon Creek
Boggs Creek	Hinebaugh Creek	Robinson Creek
Bond Creek	Hobson Creek	Rocky Creek
Boulder Creek	Hoil Creek	Russian Gulch
Boyer Creek	Hoot Owl Creek	Russian River
Boyes Creek	Hot Springs Creek	Saint Elmo Creek
Briggs Creek	Howard Creek	Salt Creek
Brooks Creek	Howell Creek	Salt Hollow Creek
Browns Gulch	Hulbert Creek	Salt Spring Creek
Brush Creek	Humbug Creek	Santa Rosa Creek
Buckeye Creek	Hummingbird Creek	Sausal Creek
Bull Barn Gulch	Hurley Creek	Sawmill Gulch
Burns Creek	Icaria Creek	Schoolhouse Creek
Burright Creek	Ingalls Creek	Schoolhouse Gulch
Busch Creek	Ingram Creek	Scotts Creek
Cascade Creek	Jack Smith Creek	Seven Oaks Creek
Chapman Branch	Jakes Creek	Seward Creek
Cherry Creek	Jenner Gulch	Sheephouse Creek
Cloverdale Creek	Jewell Gulch	Sheldon Creek
Cobb Creek	John Gordon Creek	Sheridan Gulch
Cold Creek	Johnson Creek	Skunk Creek
Coldwater Canyon	Kelley Creek	Snow Creek
Coldwater Gulch	Kellogg Creek	Soda Creek
Coleman Creek	Kidd Creek	South Branch Porterfield Creek
Colgan Creek Flood Co	Kohute Gulch	South Branch Robinson
Conshea Creek	Laguna de Santa Rosa	South Fork Matanzas C
Consolli Gulch	Lancel Creek	Spring Creek
Coon Creek	Little Briggs Creek	Squaw Creek
Copeland Creek	Little Rancheria Cree	Storey Creek
Corral Creek	Little Strawberry Cre	Strawberry Creek
Crane Creek	Little Sulphur Creek	Sulphur Creek
Crawford Creek	Little Warm Springs C	Sweetwater Creek
Crawford Gulch	Livereau Creek	Thompson Creek
Crocker Creek	Lovers Gulch Creek	Timber Gulch
Cummiskey Creek	Lytton Creek	Tiny Creek
Dead Horse Canyon	Maacama Creek	Tyler Creek
Deadhorse Creek	Mariposa Creek	Tyrone Gulch
Devil Creek	Mark West Creek	Van Buren Creek
Dooley Creek	Martin Creek	Vasser Creek

Doolin Creek	Matanzas Creek	Walker Creek
Dorman Canyon	McChristian Creek	Wallace Creek
Dry Creek	McClure Creek	Ward Creek
Ducket Creek	McDonald Creek	Warm Springs
Duncan Creek	McDonnell Creek	Washoe Creek
Dutch Bill Creek	McDowell Creek	Weeks Creek
Dutcher Creek	McNab Creek	West Branch Fife Cree
Duvoul Creek	Mesa Grande Gulch	West Branch Russian G
East Austin Creek	Mewhinney Creek	West Slough
East Branch Russian G	Middle Branch Russian	White Creek
East Canal	Middle Fork Feliz Creek	Wild Cattle Creek
East Fork Russian Riv	Mill Creek (Sonoma co.)	Wildhorse Creek
Edwards Creek	Mill Creek (Mendocino co.)	Williams Creek
Eldridge Creek	Mill Stream	Willow Creek
Elkhorn Creek	Miller Creek	Willow Springs Creek
Fall Creek	Mission Creek	Windsor Creek
Feliz Creek	Monte Cristo Creek	Wine Creek
Felta Creek	Morrison Creek	Wood Creek
Fife Creek	Neal Creek	Woods Creek
Fisher Creek	North Branch Little S	Wright Creek
Five Creek	North Branch Porterfield	Yellowjacket Creek
Foote Creek	North Fork Feliz Creek	York Creek
Forsythe Creek	North Fork Lancel Creek	Yorty Creek
	North Fork Mill Creek	Young Creek

Tributaries will be prioritized based on the level of infestation and the ability to gain comprehensive landowner support. Other tributaries will be included as data becomes available.

Giant reed removal will be a two-phased process. First, each infestation will be surveyed for wildlife and plant species. Biomass, area and density of the giant reed infestation will be documented and an assessment of surrounding vegetation will be performed (see Appendix D for data collection form). These data will be incorporated into the GIS, and used for the development of site-specific treatment and restoration plans, and for long-term data collection and monitoring. After the survey is complete, giant reed biomass will be removed and transported out of the floodway for composting or other on-site reuse after it has dried and is dead (i.e. staking for agriculture). After biomass has been removed, one of three treatments will be used to eradicate the giant reed – tarping, painting with herbicide, or root removal. Tarping will entail the secure placement of one to two black tarps or pond liners over each clump of giant reed to prevent the plant from photosynthesizing. Tarps will be left in place a maximum of five to six months, starting in May. RRTA will ensure that all giant reed is dead before removing the tarps. Whenever possible, tarps will be re-used. RRTA will ensure that tarps are placed in such a way that they are not subject to flood removal and transport into the stream.

Root removal will entail the complete eradication of the giant reed root and rhizome – either by hand or with mechanized equipment. This approach is only appropriate for relatively new or small infestations, or clumps of giant reed on open gravel bars. All removed biomass will be composted outside of the floodway (see Section 3.3.1 for more information on Proposed Project Activities and Techniques).

E. Riparian Restoration

Riparian restoration will take place only in floodplain areas, as active channel areas tend to regenerate within a few years on their own. In areas where bank erosion due to giant reed removal may be a concern, willow sprigging or willow mattresses may be employed. Revegetation will take place after all giant reed has been eradicated. Revegetation will include installation of appropriate native plants based on the species composition and density of the site. A detailed plan will be developed for each site which outlines the number of species, planting locations, timing of planting, container size and other details relevant to project success. Plants will be propagated from seed and cuttings collected from within five miles of the project site to ensure genetic integrity of the restored habitat.

F. Monitoring and Maintenance

As part of their contribution to the project, the landowners would agree to maintain the project in perpetuity. Maintenance would include checking for re-invasion of giant reed, controlling any new infestations of giant reed, and ensuring that the revegetation project maintains a survival rate of 70%. RRTA will monitor each of the projects after one year and three years to ensure that the sites remain free of giant reed and that the revegetation project has met its success criteria. If the success criteria have not been met, RRTA will work with the landowner to bring the project up to target goals.

3.3.1 Proposed Project Activities and Techniques

The following techniques would be used to remove giant reed from the riparian corridors in the Russian River watershed, and to perform follow-up native plant revegetation in infested areas.

(a) Phase I: Above-ground Biomass Removal (all seasons)

In all cases, the first phase of the project requires the removal of all above-ground giant reed biomass, to within 12 inches of the ground. Timing of above-ground biomass removal is dependent upon the Phase II treatment being applied (see below for detailed descriptions of Phase II treatments). If the tarping method is being used, biomass removal would take place in the spring and summer. If the herbicide method is being used, biomass removal would take place between July and October. If the root removal method is being used, biomass removal could take place at any time of the year, provided it does not create any environmental impact such as increased sedimentation, or harassment of sensitive wildlife species. Giant reed canes would be removed by hand with loppers or other cutting tools. All removed canes would be moved out of the floodway to a staging area, so that no cut canes could be transported into the riparian corridor during flood events, and re-sprout there. Canes placed in the staging area would be prevented from rooting by: a) placing a tarp or other root-impermeable lining under the canes, b) placing the canes

on a substrate that is not conducive to rooting (such as concrete, dry gravel, etc). Canes stored in the staging area would be treated.

(b) Phase II: Tarping (May-October)

The goal of tarping is to prevent all light from reaching any part of the giant reed plant. After removal of above-ground biomass, black tarps would be placed over the cut stems and secured with stakes or large weights (such as rocks, concrete, boards). Tarps would be placed by hand – no equipment or vehicles would be brought into the riparian zone. Tarps would be checked on a regular basis (approximately every two weeks) to determine if there has been any modification to the initial placement as a result of flooding and to correct any problems. In the event that a tarp is removed by vandals, animals, or other environmental factors (such as wind), the tarps would be re-applied or recycled. Tarps would be removed prior to the rainy season, thereby preventing their movement into the stream. When tarps are removed, the treatment would be assessed for percentage of dead stems of giant reed. The site would be evaluate again the following spring and summer for re-growth of giant reed.

(c) Phase II: Root Removal - manual

Hand removal of roots will be accomplished using hand tools such as picks, shovels and digging bars. The giant reed clumps shall be removed, including all roots and rhizomes, and the removal site shall be re-contoured, consistent with the surrounding soil level. No equipment shall be used in the riparian zone during the hand removal process. One dump truck may be used to transport roots/rhizomes and would only be driven on established access roads, and therefore would not impact existing native vegetation or riparian habitat. Roots and rhizomes shall be disposed of outside of the floodway.

(d) Phase II: Root Removal – equipment (June-October)

Equipment removal of roots would be accomplished using tractors, backhoes or graders. Equipment and associated vehicles would be transported only on established access roads, and would not impact existing native vegetation or riparian habitat. Equipment would not be used within 50 feet of surface water. The giant reed clump would be removed, including all roots and rhizomes, and the removal site would be re-contoured, consistent with the surrounding soil level. Roots and rhizomes would be disposed of outside of the floodway.

(e) Phase II: Herbicide application – cut and paint (August-November)

Herbicide (glyphosate) would be applied to the stems of giant reed within 30 seconds of cutting. All label directions and applicable laws would be followed. The minimum amount of herbicide required for treatment would be used. Prior to applying herbicide, an emergency response plan would be developed.

(f) Phase III: Native Plant Revegetation

Those sites that are larger than 100 square feet (or that do not have a source of native plant seeds or propagules) would be revegetated with native plants collected from within ten miles of the revegetation site, or from within the same sub-watershed area. The revegetation species list would be developed based on native plant species that are common within 200 feet of the clump, the size of the removed clump, and

its location (eg, floodplain, bank, gravel bar). Revegetation would take place in the winter, once soils have been saturated by rainfall to a depth of ten inches. Plants would be installed according to the specifications indicated in the specific revegetation plan for the site.

Phase III: disposal/re-use of giant reed biomass (canes, roots, rhizomes)

Giant reed biomass, including above-ground biomass (canes and leaves) and below-ground biomass (roots and rhizomes) would be disposed of via composting or re-used for other applications on the landowner’s property. Composting disposal would consist of piling whole stems or shredded giant reed in a pile outside of the floodway. Giant reed biomass would be used as compost on its own, or mixed with other compost material on the landowner’s property. The giant reed compost mixture would be used on site to enhance soil quality.

Re-use of giant reed stems would require a stockpile of giant reed stems in the staging area outside of the floodway. These stems would be used over time by the landowner for staking vegetables and other crops, supporting irrigation risers, and miscellaneous uses on the property. The giant reed would be monitored for stem node growth during the first season after cutting to ensure that it does not become established in the staging area/stockpiles.

3.3.2 Construction Schedule

Table 3.3.2 Schedule

TASK	TIMEFRAME
A. Landowner Outreach	March 2003 - May 2014
B. Workshops and Community Education	July 2003 - August 2014
C. Site Prioritization and Planning	March 2003 - September 2014
D. Giant Reed Removal	May 2003 - November 2014
E. Riparian Restoration	November 2003 - December 2014
F. Monitoring and Maintenance	February 2004 - December 2014
G. Research	March 1999 - December 2014

3.4 Regulatory Requirements

The proposed project would cross multiple jurisdictions and would potentially require consultation, approval, and/or permits from various federal, State, and local agencies. The following are regulations that would likely apply to the proposed project:

- Consultation with the Regional Water Quality Control Board (RWQCB) - Requires approval and/or permit.
- Section 1602 of the California Department of Fish and Game Code – Requires a Streambed Alteration Agreement from the California Department of Fish and Game (CDFG) before any

action is taken that would obstruct or divert the flow or alter the channel of designated drainages, rivers, streams, and lakes. Potential impacts must be mitigated.

- California Native Plant Protection Act of 1977 – Provides protection for certain native plants.
- California Endangered Species Act of 1984 – Protects California State-listed threatened or endangered species from takings that cause harm to the species or the species' habitat.
- U.S. Migratory Bird Treaty Act of 1918 - The Migratory Bird Treaty Act decrees that all migratory birds and their parts (including eggs, nests, and feathers) are fully protected.

4. Environmental Setting, Impacts, and Mitigation Measures

4.1 Introduction

The Initial Study/Mitigated Negative Declaration (IS/MND) included analysis of the 16 environmental issue areas and mandatory findings of significance listed below by section number. These issue areas incorporate the topics presented in CEQA's Environmental Checklist (see Appendix A).

4.2 Aesthetics

4.3 Agricultural Resources

4.4 Air Quality

4.5 Biological Resources

4.6 Cultural Resources

4.7 Geology and Soils

4.8 Hazards and Hazardous Materials

4.9 Hydrology and Water Quality

4.10 Land Use

4.11 Mineral Resources

4.12 Noise

4.13 Population and Housing

4.14 Public Services

4.15 Recreation

4.16 Transportation and Traffic

4.17 Utilities and Service Systems

4.18 Mandatory Findings of Significance

4.2 Aesthetics

4.2.1 Setting

Aesthetic, or visual, characteristics of the project areas vary geographically throughout the sub-regions. Mendocino and Sonoma Counties have policies in place to protect the aesthetics of the area by the implementation of: 1) Review of on and off premises signs and other advertising; 2) Review of all discretionary development proposals, re-zonings and use permits; 3) Discouragement of commercial strip development and urban sprawl; 4) Location of transmission lines along established transmission line corridors; 5) Adequate landscaping of all new residential subdivisions, commercial and industrial uses; and 6) Timber preserve and agricultural preserve zoning controls (Mendocino and Sonoma County General Plans).

Scenic Vistas

In Mendocino County, the rural and natural landscape offers many scenic vistas of large expanses of land with valleys, rolling hills, agricultural production, and mountain peaks as the back-drop. Although the Pacific coastline is referred to by the County as the “predominant” scenic resource, the natural landscape of much of Mendocino County is highly valued by visitors and those who live there (Mendocino County General Plan).

In Sonoma County, coastal bluffs, vineyards, watersheds and mountain ranges provide much of the scenic landscape. The county has identified specific scenic landscapes that are of importance for protection and preservation. These landscapes include: the Pacific coastline, Oat Valley, Alexander and Dry Creek Valleys, hills east of Windsor, Eastside Road, River Road, Laguna de Santa Rosa, Bennett Valley, Highway 116, Atascadero Creek, Coleman Valley, Sonoma Mountains, hills south of Petaluma, Sonoma Valley, and south Sonoma Mountains (Sonoma County General Plan). One of the predominant scenic vistas in the county is Mt. St. Helena (Robert Louis Stevenson State Park) reaching 4,343 feet above sea level (California State Parks, 2004).

Scenic Highways

A small portion of the proposed project area contains an officially designated State scenic highway. The highway is 116 in Sonoma County from Highway 1 to the south city limits of Sebastopol (Caltrans, 2003).

4.1.1 Environmental Impacts and Mitigation Measures

a. Would the project have a substantial adverse effect on a scenic vista?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCOPORATED. Activities associated with the proposed project would not have an adverse effect on a scenic vista for the following reasons:

- Project sites would be limited to patches of giant reed as described in Mitigation Measure **AES-1**.

- Project activities would be performed mainly by hand labor, limiting the amount of equipment used for the proposed project.
- The areas where giant reed is to be removed would be revegetated with native plants as described by the Revegetation Plan required in Mitigation Measure **BIO-6**.
- Existing riparian vegetation would partially or completely shield most project activities.
- Project activities would move linearly on a daily basis, therefore ensuring that no particular area or view would be impacted for an extended period of time.
- Similar temporary project activities are common in agricultural areas or along roadways and are compatible with the rural and urban visual landscape.

For sites where project activities would be located in a scenic vista, the potential project impacts would represent a temporary and minor aesthetic impact to the scenic vista. Once native plant revegetation has taken place, the scenic vistas would be enhanced. Therefore, with the implementation of Mitigation Measures **AES-1** and **BIO-6**, potential impacts would be reduced to less than significant levels.

AES-1: RRTA shall limit project areas to patches of giant reed and avoid all native riparian plant species. RRTA shall maintain neat and orderly project sites.

b. Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Although the majority of the proposed project would not be located within or near a State scenic highway, one State scenic highway passes through a portion of the project area. The highway is 116 in Sonoma County from Highway 1 to the south city limits of Sebastopol. The only vegetation disturbed as part of the project activities would be giant reed as described in Mitigation Measure **AES-1**. All trees, rock outcroppings, and historic buildings would be avoided. Areas where giant reed is removed would be revegetated with native plants as described in Mitigation Measure **BIO-6**.

c. Would the project degrade the existing visual character or quality of the site and its surroundings?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. As described in Section 4.2.2(a), project activities would be temporary and areas where giant reed is to be removed would be revegetated with native plants (see Mitigation Measures **AES-1** and **BIO-6**). This would create an enhanced visual character or quality of the proposed site and its surroundings.

d. Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Project activities would not include any long-term changes to light or glare. Since most work would be done by hand

labor, the use of equipment would be limited. However, to reduce the light or glare from equipment to less than significant levels for sensitive uses and motorists along streets bordering project areas, Mitigation Measure **AES-2** shall be implemented. To further reduce any glare from tarping activities, Mitigation Measure **AES-3** shall be implemented.

AES-2: Vehicle and equipment lights shall be directed away from the visual field of motorists and pedestrians along any streets or right-of-ways. No nighttime project activities shall occur.

AES-3: Only black or brown tarps or pond liners shall be used in the tarping activities of giant reed to reduce and/or eliminate possible glare to less than significant impact levels.

4.2 Agricultural Resources

4.2.1 Setting

Much of the project area is characterized by agricultural lands. Mendocino and Sonoma counties are some of the largest producers of wine grapes and premium wines in California. Other natural agricultural products include fruit, nuts, and high quality dairy products. The proposed project would not take away from prime farmland because wildlife habitat and open space are protected under agricultural resources and the proposed project would enhance wildlife habitat. According to the California Land Conservation Act of 1965 (Williamson Act), the law pertains to both agriculture and wildlife habitat (CSCC).

4.2.2 Environmental Impacts and Mitigation Measures

a. Would the project convert prime farmland, unique farmland, or farmland of statewide importance (farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?

NO IMPACT. All project activities, including giant reed removal and native plant restoration, would be in line with the Farmland Mapping and Monitoring Program of the California Resources Agency. RRTA would coordinate with farmers regarding giant reed removal and riparian habitat restoration work.

b. Would the project conflict with existing zoning for agricultural use, or a Williamson Act contract?

NO IMPACT. The project would not conflict with existing zoning for agricultural use, or the Williamson Act contract since wildlife habitat is covered under the Williamson Act. No impacts would occur.

c. Would the project involve other changes in the existing environment, which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?

NO IMPACT. Project activities would be temporary and would not convert farmland to non-agricultural use. No impacts would occur.

4.3 Air Quality

4.3.1 Setting

The proposed project includes construction activity throughout the Russian River watershed in Mendocino and Sonoma Counties, which are within three different Air Quality Management Districts (Mendocino County Air Quality Management District, Northern Sonoma County APCD, and Southern Sonoma County covered by the Bay Area Air Quality Management District). The watershed is characterized by a Mediterranean climate, with cool wet winters and hot dry summers. In Mendocino County, the air quality is generally above average with only a few areas having occasional problems. According to the County, “the Fort Bragg area has particulate concentrations sometimes exceeding federal air quality standards, while the Ukiah valley has infrequent excesses of particulates” (Mendocino County Website). Sonoma County boasts the cleanest air in the Bay Area. However, the County does face periods when there are strong atmospheric inversions and stagnation causing pollutants to become concentrated, particularly in the inland valleys (Sonoma County Website).

Ambient air quality is determined by comparing contaminant levels in ambient air samples to national and state standards. These standards are set by the U.S. Environmental Protection Agency (EPA) and the California Air Resources Board (CARB) at levels determined to be protective of public health and welfare with an adequate margin of safety. National Ambient Air Quality Standards (NAAQS) were first established by the federal Clean Air Act of 1970. California Ambient Air Quality Standards (CAAQS) were established in 1967. An area with air quality continuously below or equal to the standards is designated as an area that attains the standards.

Air quality standards specify the upper limits of concentrations and duration in the ambient air consistent with the management goal of preventing specific harmful effects. There are national and state standards for ozone, carbon monoxide (CO), nitrogen dioxide (NO₂), airborne particulate matter with an aerodynamic diameter of less than ten microns (PM₁₀, and sulfur dioxide (SO₂). These are “criteria pollutants.” Federal and State Ambient Air Quality Standards are shown in Table 4.3.1.

Table 4.3.1 Federal and State Ambient Air Quality Standards

Pollutant	Averaging Time	California Standards	National Standards
Ozone (O ₃)	8-hour	NA	0.08 ppm
	1-hour	0.09ppm	0.12 ppm
Carbon Monoxide (CO)	8-hour	9.0 ppm	9.0 ppm
	1-hour	20 ppm	35 ppm
Nitrogen Dioxide (NO ₂)	Annual Arithmetic Mean	NA	0.053 ppm
	1-hour	0.25 ppm	NA
Respirable Particulate Matter (PM ₁₀)	Annual Arithmetic Mean	20 ug/m ³	50 ug/m ³
	24-hour	50 ug/m ³	150 ug/m ³

Fine Particulate Matter (PM2.5)	Annual Arithmetic Mean	12 ug/m3	15 ug/m3
	24-hour	NA	65 ug/m3
Sulfur Dioxide (SO2)	Annual Arithmetic Mean	NA	0.03 ppm
	24-hour	0.04 ppm	0.14 ppm
	1-hour	0.25 ppm	NA

Notes: ppm = parts per million; ug/m3 = micrograms per cubic meter; NA = no applicable standard
 Source: CARB, 2003

All three air quality districts were contacted for the preparation of this document. Both the Mendocino County Air Quality Management District and the Southern Sonoma County Air Quality Management District stated that they did not foresee any significant impacts from the project, and that no air quality modeling was necessary (Chris Brown, Mendocino County AQMD, personal communication 6-8-04; Susann Bourguignon Southern Sonoma County AQMD, personal communication 6-10-04). Northern Sonoma County APCD did not respond to a request for comment. Because of the project’s small size (in comparison with other construction activities in both counties) and the phased project schedule, the emissions would not be expected to exceed air quality standards.

4.4.2 Environmental Impacts and Mitigation Measures

a. Would the project conflict with or obstruct implementation of the applicable Air Quality Attainment Plan?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATION. Project activities would result in some emissions from commuter work trips, use of limited construction equipment, and travel over unpaved surfaces. Emissions would not be expected to impede attainment or maintenance of any ambient air quality standards in the Air Quality Management Districts.

Once the giant reed is removed, tarped or painted, and the area revegetated, restoration maintenance would continue through 2014. Restoration maintenance would include work trips to the project area to do maintenance and monitoring approximately 3 times a year.

AQ-1 RRTA shall ensure that the following measures are implemented to reduce short-term project-related emissions:

- Minimize equipment idling time
- Maintain equipment engines in good condition and in proper tune as per manufacturers’ specifications
- Use alternatively fueled construction equipment, such as compressed natural gas, or electric, as appropriate.

b. Would the project violate any air quality standard or contribute substantially to an existing or projected air quality violation?

LESS THAN SIGNIFICANT IMPACT. As stated above, emissions would not be expected to impede attainment or maintenance of any ambient air quality standards in the Air Quality Management Districts. The only long-term project activities that could cause emissions would be the few occasional vehicle trips associated with maintenance and monitoring.

c. Would the project result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?

LESS THAN SIGNIFICANT IMPACT. As stated above, emissions would not be expected to impede attainment or maintenance of any ambient air quality standards in the Air Quality Management Districts. The only long-term project activities that could cause emissions would be the few occasional vehicle trips associated with maintenance and monitoring.

d. Would the project expose sensitive receptors to substantial pollutant concentrations?

LESS THAN SIGNIFICANT. As stated above, emissions would not be expected to impede attainment or maintenance of any ambient air quality standards in the Air Quality Management Districts. The only long-term project activities that could cause emissions would be the few occasional vehicle trips associated with maintenance and monitoring.

e. Would the project create objectionable odors affecting a substantial number of people?

NO IMPACT. The project would not include the types of emission sources or activities that are normally associated with odor impacts. No impact would occur.

4.5 Biological Resources

This section describes the biological resources that occur within the project area. It includes a description of common communities of plants and wildlife, wetlands, rare plant communities, and special status plant and wildlife species, followed by an assessment of potential impacts to these resources and mitigation measures designed to offset these impacts.

Information used in preparing this section was derived from data sources such as the California Natural Diversity Data Base (CNDDDB, 2004), Native Plant Society Database (CNPS, 2004), a list of Threatened and Endangered species from Sonoma and Mendocino Counties, and a list of species of special concern listed by the California Department of Fish and Game.

4.5.1 Setting

Natural Communities and Wildlife Habitats

There are potentially several unique natural communities in Mendocino and Sonoma Counties that the Russian River watershed passes through. In Mendocino County, these natural communities include: valley freshwater marsh, fen, north central coast summer and fall-run steelhead streams, northern interior cypress forest, serpentine bunchgrass, sphagnum bog, upland Douglas fir forest, and valley oak woodland. In Sonoma County, these natural communities include: coastal and valley freshwater marsh, northern coastal salt marsh, northern hardpan vernal pool, and valley needlegrass grassland. Because

these are unique natural communities, they have the potential to contain unique special status species. In order to avoid these special status species, some of these habitats will be avoided completely. All coastal and valley freshwater marshes with high botanical value (i.e. Pitkin marsh, Cunningham marsh, Perry marsh – Sonoma County) will be avoided. All northern coastal salt marshes will be avoided. All fens (i.e. Inglenook Fen- Mendocino County), sphagnum bogs, and peat bogs (Pygmy Cypress Forest – Mendocino County) will be avoided. All serpentine soil types will be avoided, which will include the natural communities of northern interior cypress forest, serpentine chaparral, and serpentine bunchgrass. All vernal pools will be avoided.

Special Status Plants and Wildlife

There are several special status species in both Mendocino and Sonoma counties that could potentially be near stands of giant reed within riparian areas. Table 4.5.1 summarizes special status species for Mendocino and Sonoma Counties that could occur along the Russian River and its tributaries, the species status, the species habitat type, and the species potential to occur within the project area. Species that occur in the special habitats listed above (Natural Communities and Wildlife Habitats), are not discussed since these areas will be totally avoided.

Table 4.5.1. Special Status Species & Potential in the Proposed Project Sub-regions

Special Status Species Identified in Mendocino and Sonoma County with Potential to Occur in Project Area

Species Name	Status (USFWS/CDFG)	Habitat	Potential for Occurrence
FISH			
Central California coast steelhead <i>Oncorhynchus mykiss irideus</i>	FT/--	Rivers (that flow into the ocean) and tributaries of those rivers.	This species is expected to be in the Russian River and its tributaries.
Chinook salmon <i>Oncorhynchus gorbuscha</i>	FT/--	Rivers (that flow into the ocean) and tributaries of those rivers.	This species is expected to be in the Russian River and its tributaries.
Coho salmon <i>Oncorhynchus kisutch</i>	FT/CE	Rivers (that flow into the ocean) and tributaries of those rivers.	This species is expected to be in the Russian River and its tributaries.
Tidewater goby <i>Eucyclogobius newberryi</i>	FE/CSC	Rivers (that flow into the ocean)	Mouth of the Russian River.
Navarro roach <i>Lavinia symmetricus navarroensis</i>	--/CSC	Rivers and streams.	This species is expected to be in the Russian River and its tributaries.
Gualala roach <i>Lavinia symmetricus parvipinnis</i>	--/CSC	Rivers and streams.	This species is expected to be in the Russian River and its tributaries.

Russian River tulle perch <i>Hysterocarpus traski pomo</i>	--/CSC	Rivers and streams.	This species is expected to be in the Russian River and its tributaries.
Sacramento splittail <i>Pogonichthys macrolepidotus</i>	--/CSC	Rivers and streams.	This species is expected to be in the Russian River and its tributaries.
REPTILES & AMPHIBIANS			
Foothill yellow-legged frog <i>Rana boylei</i>	--/CSC	Gravelly or sandy streams with sunny banks and open woodlands nearby. From sea level to about 6,000 feet.	This species is expected to be in tributaries of the Russian River.
Northwestern pond turtle <i>Emys (=Clemmys) marmorata marmorata</i>	--/CSC	Slow moving streams, ponds, reservoirs.	This species is expected to be in tributaries of the Russian River.
Western tailed frog <i>Ascaphus truei</i>	--/CSC	Clear, cold swift-flowing mountain streams.	This species may occur in the headwaters of the Russian River watershed.
California tiger salamander <i>Ambystoma californiense</i>	FP/CSC	Subterranean retreats near ponds in grasslands and open woodlands.	This species may occur in the Laguna de Santa Rosa.
INVERTEBRATES			
California freshwater shrimp <i>Syncaris pacifica</i>	FE/CE	Streams with undercut banks and blackberry roots overhanging into the water.	This species is expected to be in some tributaries of the Russian River.
BIRDS			
Tri-colored blackbird (nesting colony) <i>Agelaius tricolor</i>	--/CSC	Riparian areas. Nests near or over water in shrubs or reeds.	This species has a low potential to nest in the Russian River watershed.
Purple martin <i>Progne subis</i>	--/CSC	Riparian areas. Nests in tree holes (especially dead tree cavities) near water.	This species is expected to occur in the Russian River watershed.
White-tailed kite (nesting) <i>Elanus leucurus</i>	DFG fully protected	Riparian areas. Nests in treetops.	This species is expected to occur in the Russian River watershed.
Great blue heron (rookery) <i>Ardea herodias</i>	DFG fully Protected	Riparian areas. Nests in trees.	This species is expected to occur in the Russian River watershed.
Osprey (nesting) <i>Pandion haliaetus</i>	--/CSC	Riparian areas. Nests in treetops.	This species is expected to occur in the Russian River watershed.
Double-crested cormorant (rookery)	--/CSC	Riparian areas. Nests in trees or ground.	This species may occur in the Russian River

<i>Phalacrocorax auritus</i>			watershed.
Cooper's hawk <i>Accipiter cooperii</i>	--/CSC	Riparian areas. Nests in trees.	This species is expected to occur in the Russian River watershed.
Yellow warbler <i>Dendroica petechia brewsteri</i>	--/CSC	Riparian thickets. Nests in trees or thickets.	This species is expected to occur in the Russian River watershed.
Yellow-breasted chat <i>Icteria virens</i>	--/CSC	Riparian areas. Nests in dense brush or scrub.	This species is expected to occur in the Russian River watershed.
MAMMALS			
Red tree vole <i>Arborimus pomo</i>	--/CSC	Coastal riparian areas.	This species is expected to occur in the Russian River watershed.
Pacific fisher <i>Martes pennanti pacifica</i>	FC/CSC	Mixed hardwood and coniferous forests.	This species may occur in the Russian River watershed.
PLANTS			
Sonoma alopecurus <i>Alopecurus aequalis</i> var <i>sonomensis</i>	FE/-- CNPS 1B	Riparian scrub areas.	This species is expected to occur in the Russian River watershed.
Big-scale balsamroot <i>Balsamorhiza macrolepis</i> var <i>macrolepis</i>	CNPS 1B	Valley and foothill grasslands.	This species is expected to occur in the Russian River watershed.
Sonoma sunshine <i>Blennosperma bakeri</i>	FE/CE CNPS 1B	Valley and foothill grasslands.	This species is expected to occur in the Russian River watershed.
Thurber's reed grass <i>Calamagrostis crassiglumis</i> (<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>)	CNPS 2	Marshes and swamps.	This species is expected to occur in the Russian River watershed.
White sedge <i>Carex albida</i>	FE/CE CNPS 1B	Marshes and swamps.	This species is expected to occur in the Russian River watershed.
Lock Lomond button-celery <i>Eryngium constancei</i>	FE/CE CNPS 1B	Spring-fed pools.	This species is known to be in only two spring-fed shallow pools in Sonoma County. These pools will be avoided.
North Coast semaphore grass	--/CT CNPS 1B	Upland riparian	This species is expected to occur in the Russian River

<i>Pleuropogon hooverianus</i>			watershed.
Baker's meadowfoam <i>Limnanthes bakeri</i>	--/CR CNPS 1B	Meadows and seeps, marshes and swamps, valley and foothill grasslands.	This species is expected to occur in the Russian River watershed.
Great burnet <i>Sanguisorba officinalis</i>	CNPS 2	Riparian areas, meadows and seeps, marshes and swamps, broad-leafed upland forests.	This species is expected to occur in the Russian River watershed.

Source: CNDDDB, May 2, 2004

STATUS CODES:

FEDERAL: (U.S. Fish and Wildlife Service)

FE = Listed as Endangered (in danger of extinction) by the Federal Government

FT = Listed as Threatened (likely to become Endangered within the foreseeable future) by Federal Government

FP = Proposed for Listing as Endangered or Threatened

FC = Candidate to become a *proposed* species

FSC = Federal Species of Concern. May be Endangered or Threatened, but not enough biological information has been gathered to support listing at this time.

STATE: (California Department of Fish and Game)

CE = Listed as Endangered by the State of California

CT = Listed as Threatened by the State of California

CR = Listed as Rare by the State of California (plants only)

CSC = California Species of Special Concern

3503.5 = Protection for nesting species of Falconiformes (hawks) and Strigiformes (owls)

4.5.2 Environmental Impacts and Mitigation Measures

The mitigation measures presented in this section are intended to reduce potential adverse effects on biological resources (e.g., special-status species, wetlands, riparian habitat) to less than significant levels.

- a. Would the project have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?*

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. No focused botanical surveys for special status plant species have been conducted within the proposed project areas. Ground disturbing activities could result in direct impacts to special status plant species that may occur within and adjacent to the project and would be considered potentially significant. Implementation of Mitigation Measure **BIO-1** (below), requiring pre-construction surveys, demarking of sensitive plant locations, and supervision by a designated environmental monitor would reduce this impact to less than significant.

Temporary loss of habitat within the project area could result from giant reed removal activities. Project activities including mechanical removal and herbicide application could directly or indirectly remove native habitat. This temporarily affected habitat, however, would be restored to a more productive native habitat type, providing a net benefit to wildlife, and is therefore considered a potentially adverse impact that can be mitigated to a level of less than significant.

The primary mitigation measures to reduce potential impacts to wildlife habitat are: preconstruction surveys to determine wildlife presence or absence (Mitigation Measure **BIO-2**, below), implementation of a Workers Environmental Awareness Plan (Mitigation Measure **BIO-3**, see below), compliance with State and federal laws protecting special status species (Mitigation Measure **BIO-4**, see below), and an herbicide treatment plan that would protect wetlands and associated sensitive vegetation (Mitigation Measure **BIO-5**). Implementation of these measures would reduce potentially significant wildlife habitat impacts to less than significant levels.

Direct loss of small mammals, reptiles, other less-mobile species, and ground nests, could result from surface ground disturbance during project activities. Clearing vegetation and excavating soil could also lead to mortality of small mammals, reptiles and nesting birds with eggs or young. Most of the wildlife that may be impacted by construction are common, wide-ranging species. These common species are expected to quickly re-colonize the corridor after construction and subsequent revegetation work is completed. In addition, the use of hand tools rather than heavy equipment minimizes the potential to impact wildlife since most species can escape to adjacent areas. Therefore, the proposed project would have a less than significant impact on wildlife with the incorporation of the following mitigation measures.

- BIO-1:** RRTA shall avoid impacts to special status plant species by:
- Conducting pre-construction surveys for special status plant species where ground disturbing activities with mechanized equipment would take place
 - Flagging and mapping to protect any special status plant species within or adjacent to the proposed project area during ground disturbing activities
 - Implementing a worker environmental awareness program (WEAP) with regard to special status species
 - Supervision and verification of the implementation of these measures by an agency-approved Environmental Monitor.

Prior to ground disturbing activities with mechanized equipment, the location of special status plant species will be determined through surveys according to California Native Plant Society (CNPS) protocol. Determination of potential habitat for rare species, and surveys conducted for presence of rare plant species will be performed by a qualified biologist. These surveys will be appropriately timed to cover the blooming periods of the special status plant species with the potential to occur in the area.

Any rare plant species within the proposed project area where ground disturbing activities with mechanized equipment will take place (including a 50-foot wide buffer zone on each side of the project's work areas) shall be flagged, accurately mapped on plans, and fenced to protect the area occupied by the species during the removal of giant reed. Installation of ESA fencing shall be supervised by an Environmental Monitor, and appropriate buffer distances from the rare plant

population shall be determined by the monitor. The monitor shall have the authority to require installation of silt fencing or other erosion control measures in highly sensitive areas or under certain conditions where potential erosion may impact a special status plant species or its habitat.

BIO-2: For ground disturbing activities with mechanized equipment, RRTA shall ensure pre-construction biological resource surveys to identify the location of sensitive biological resources. Pre-construction surveys will be consistent with all survey protocols and requirements stipulated by resource agencies as a condition of project approval. Sensitive resources shall be clearly mapped and marked on construction drawings or project maps before construction in these areas occurs. Monitors shall also inspect all areas with sensitive resources prior to construction to ensure that stakes, flagging, and required setback buffers are maintained. Avoidance measures and buffer distances vary for each species. The specific buffer zone distance will be determined by the appropriate resource agencies (CDFG and USFWS).

BIO-3: RRTA shall conduct a Worker Environmental Awareness Program (WEAP) training for field crews. All field crews and sub-contractors shall participate in WEAP training prior to starting work on the project and within two days of any new worker arrival. The program will consist of a briefing on environmental issues relative to the proposed project. Training of crews will be conducted by the designated Biologist or Environmental Monitor. The training program will include an overview of the legal status, biology, distribution, habitat needs, and permits and compliance requirements for each special status species that may occur in the project area. The presentation will also include a discussion of the legal protection for endangered species under the U.S. and State Endangered Species Acts (FESA and CESA). A fact sheet conveying this information will be distributed to all personnel who enter the project site. Upon completion of the orientation, employees will sign a form stating that they attended the program and understand all mitigation measures. The forms will be filed at CRP and SRCD and will be accessible to the appropriate agencies.

RRTA shall be responsible for ensuring that all project personnel and sub-contractors adhere to the WEAP. Additional training will take place for any new crew members.

BIO-4: RRTA shall acquire all permits and authorizations required by federal, State, regional and local jurisdictions to proceed with the proposed project. Throughout the life of the project, additional species may be listed or designated as special status, and RRTA shall comply with any new requirements of the USFWS, NMFS, or CDFG for such species.

BIO-5: All activities requiring herbicide treatment would:

- Appropriately time work so that herbicides are not applied during the wet season to avoid potential impacts to downstream vegetation, and to avoid impacts to fish and wildlife species.
- RRTA shall consult the National Weather Service and allow at least four days of dry weather before application of herbicide.
- Treatments shall use a glyphosate-based herbicide including Rodeo® and/or Round-up®.

- Ensure that herbicides are applied at concentrations that are considered safe for biological resources within and adjacent to the project area.
- Ensure that herbicides are mixed with non-toxic water soluble dye that highlights treated areas.
- Minimize trampling of native vegetation by establishing marked trails.
- Avoid native riparian plant species.
- Have a licensed pesticide applicator conduct or oversee herbicide applications.
- Supervision and verification of the implementation of these measures by the Environmental Monitor.

b. Would the project have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, or regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Impacts to riparian habitat and wetlands may occur during giant reed removal resulting in a temporary loss of sensitive vegetation. Implementation of Mitigation Measure **BIO-6** (below), requiring avoidance of wetlands and native riparian vegetation, and restoration/creation, as well as the Mitigation Measures **BIO-1** through **BIO-5**, would reduce the impact to riparian vegetation and wetlands to less than significant.

BIO-6: RRTA shall avoid damage and/or loss of wetland and native riparian vegetation types due to giant reed removal during ground disturbing activities by completing the following:

- Maximum avoidance of native wetland and riparian plant and tree species.
- Soil replacement where ground disturbing activities with mechanized equipment take place
- Implementation of a proposed project’s Revegetation Plan
- Supervision and verification of the implementation of these measures by an Environmental Monitor.

c. Would the project have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but no limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling hydrological interruption, or other means?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Giant reed removal may result in temporary impact to wetland hydrology within and adjacent to the project area. Temporary impacts could be caused by interception and detention of groundwater or surface water within the project area, thus reducing the hydrologic input to the adjacent wetland. This impact is only anticipated in the area of the project that will implement mechanical removal of root/rhizome material. Implementation of Mitigation Measure **BIO-7** (below), requiring native soil/material replacement and proper contour grading, as well as Mitigation Measures **BIO-1** through **BIO-6**, would reduce this impact to less than significant.

BIO-7: The purpose of this measure is to prevent temporary hydrologic alteration to wetlands and associated sensitive vegetation from soil disturbance activities associated with the project by requiring:

- Work shall be timed such that that soil disturbance is minimized during the wet season (when surface water is present)
- Soil stabilization measures, including: tamping/compacting soil with hand tools, planting vegetation on 2 – 10 foot centers, seeding, mulching, and installation of erosion control fabrics where necessary to reduce the risk of sediment discharge to wetlands
- Soil and grade restoration measures where ground disturbing activities with mechanized equipment have taken place, including backfill of native material to original grade and composition
- Supervision and verification of the implementation of these measures by the Environmental Monitor.

d. Would the project interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The proposed project could interfere substantially with the movement of any native resident or migratory fish or wildlife species. Based on the potential for these impacts, implementation of Mitigation Measure **BIO-8** (below) will reduce these potential impacts to less than significant levels.

BIO-8: If ground disturbing activities are proposed for a project area, RRTA shall avoid mechanical removal of giant reed from the active channel during the migration period of special status anadromous species in streams that potentially support these species. On-site Environmental Monitors will be provided at these locations to address construction activities that may interfere with the migration of anadromous special status fish and wildlife species. No instream construction activities will be allowed during migrational periods within streams that support special status anadromous species, unless otherwise authorized by CDFG and/or NMFS.

RRTA shall perform surveys to assess sensitive spawning and rearing areas along the proposed project line where mechanical removal of giant reed will take place. This effort shall be conducted in consultation with CDFG and/or NMFS prior to construction. Spawning and rearing areas shall be identified and avoided during critical periods. These surveys shall be conducted only in areas with the potential for special status fish species.

e. Would the project conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?

LESS THAN SIGNIFICANT IMPACT. RRTA has indicated that no trees are expected to be removed and that, if any variation is required that could adversely affect locally protected trees within the project areas, RRTA would seek approval from the local regulatory office before proceeding. As such, any impacts should be less than significant. No mitigation measures are necessary.

f. Would the project conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Plan, or other approved local, regional, or State habitat conservation plan?

NO IMPACT. The proposed project is in collaboration with the local Resource Conservation Districts and is not in conflict with any adopted Habitat Conservation Plan, Natural Community Plan, or other approved local, regional or State habitat conservation plan.

Additional Biological Resources Mitigation Measures:

- BIO-9:** RRTA shall ensure that all project personnel comply with the following:
- Litter or other debris that may attract animals shall be removed from the project area
 - No pets will be allowed in the project area, including access roads and staging areas.
- BIO-10:** Ground disturbing activities with mechanized equipment for giant reed removal shall be limited to periods outside the known breeding period for migratory birds. No pre-construction surveys will be required for activities that occur during the non-breeding season (October 1 through March 1). If ground disturbing activities are required within the breeding season (March 1 – September 30), a qualified biologist shall conduct a survey for nesting birds within three days prior to the start of project activities to ensure no nesting birds shall be impacted by the project. These surveys shall include the areas within 200 feet of the edge of the proposed impact area(s). If active nests are found, a minimum of a 50-foot fence barrier shall be erected around the nest site. No habitat removal or any other work shall occur within the fenced nest zone until the young have fledged, are no longer being fed by the parents, or have left the nest and will no longer be impacted by the project. RRTA shall submit the mapped survey results to the Department for review and approval prior to vegetation removal to ensure full avoidance measures are in place.
- BIO-11:** RRTA shall avoid disturbance to active raptor nests within or near the project. For ground disturbing activities with mechanized equipment, no pre-construction surveys for nesting raptors shall be required if work is to occur during the non-breeding season (September 1 through January 31). If, however, ground disturbing activities are scheduled to occur during the breeding season (February 1 through August 31), pre-construction surveys of all potentially active nest sites within 500 feet of the project site shall be conducted in areas that may potentially have nesting raptors, including ground nesting raptor species such as northern harrier and burrowing owls. If surveys indicate that nests are inactive or potential habitat is unoccupied during the life of the project, no further mitigation shall be required.

If active nests are found, a minimum 200-foot no-disturbance buffer shall be established around the active nest(s). The size of individual buffers can be adjusted, following a site evaluation by a qualified raptor biologist, which shall depend upon the presence of topographical features that obstruct the line of sight from the project activities to the nest

and the observed sensitivity of the birds. Site evaluations and buffer adjustments shall be made in consultation with the local CDFG representatives. The portion of the project that is within the designated buffer shall be identified in the field by staking and flagging.

BIO-12: In the unlikely event that active nests of native birds are found within stands of giant reed by RRTA during hand removal of giant reed, all project activities at that location shall cease and a minimum of a 50-foot buffer zone shall be flagged around the nest site. No giant reed removal or any other work shall occur within the flagged nest zone until the young have fledged, are no longer being fed by the parents, or have left the nest and will no longer be impacted by the project.

4.6 Cultural and Paleontological Resources

4.6.1 Setting

Information used in preparing this section was derived from a Cultural Resources Existing Conditions Report for the proposed project, which included numerous sources of data and research (Garcia and Associates, 2004).

Records and literature research conducted for the project areas noted that some cultural resource studies/surveys, which vary in scope, have been previously conducted within these areas.

Prehistoric Context

The earliest occupation of the North Coast Ranges, and the study area in particular, may have occurred during the Paleo-Indian period from ca. 10,000 to 6,000 B.C. The Post Pattern (Fredrickson 1973, 1974) is considered indicative of this time period, and was identified from the Borax Lake site in Lake County just northwest of Sonoma County. Fredrickson considers the Post Pattern to be a northern California manifestation of the Western Pluvial Lakes Tradition. The economic focus of the Post Pattern appears to have been on hunting and lacustrine activities (Origer and Fredrickson 1980:47). Attributes of the Post Pattern include darts tipped with fluted projectile points and the inferred use of the atlatl (Origer and Fredrickson 1980:47). Chipped stone crescents, which may have served as tips on darts or as transverse projectile points, also occur during this period (Origer and Fredrickson 1980:47). These artifacts may have been associated with the hunting of waterfowl (Origer and Fredrickson 1980:202). Dowdall and Origer (1997:1) suggest alternative functions of stone crescents, including their use as amulets or animal effigies.

The Lower Archaic Period, from 6000 to 3000 B.C., is represented by the Borax Lake Pattern. The Borax Lake Pattern indicates the importance of both hunting and seed collecting during this period and it is typified by the technologies associated with these activities. The Borax Lake Aspect of the Borax Lake Pattern is marked by wide-stem projectile points as well as the millingstone and mano. The Middle Archaic Period (3,000 to 1,000 B.C.) is marked by the addition of non-fluted concave-base points and the bowl mortar. Fredrickson terms this the Mendocino Aspect of the Borax Lake Pattern.

The Upper Archaic Period (1,000 B.C. to 500 A.D) is represented by the Houx Aspect of the Berkeley Pattern and this period coincides with the replacement of millingstones with mortars and pestles, and the replacement of concave-base projectile points with shouldered lanceolate and contracting stem forms. The Houx Aspect of the Berkeley Pattern is believed to have been influenced by the cultures of the Sacramento Valley and the San Francisco Bay region (Origer and Fredrickson 1980:48). While there was a continued economic focus on hunting, the extensive use of acorns also characterized the Houx Aspect, as inferred from the presence of the bowl mortar and pestle (Origer and Fredrickson 1980:48).

The late prehistoric and early historic periods are represented by the Clear Lake Pattern of the Emergent Period (A.D. 500-1850). Small, corner-notched projectile points are evidence of the use of the bow and arrow during this period, while the slab mortar with basket hopper replaced the bowl mortar. The cultural sequence for the general area is summarized below in Table 1.

Table 4.6.1: Cultural Sequence in the North Coast Ranges (after Fredrickson 1984)

Archaeological Period	Approximate Age	Archaeological Pattern
Paleo-Indian	10,000 to 6,000 B.C.	Post
Lower Archaic	6,000 to 3,000 B.C.	Borax Lake/Borax Lake Aspect
Middle Archaic	3,000 to 1,000 B.C.	Borax Lake/Mendocino Aspect
Upper Archaic	1,000 B.C. to A.D. 500	Berkeley
Emergent	A.D. 500 to 1850	Clear Lake

Ethnographic Context

The Native Americans controlling the lands of the study area at the time of historic contact included the Pomo and the Wappo Native American groups. McLendon and Oswalt (1978: Figure 2) indicate that the entire Russian River drainage was controlled, from north to south, by the Northern, Central, Southern, and Kashaya Pomo.

Pomo

The Pomo occupied the area from central Mendocino County south to central Sonoma County. The Pomo included seven different dialects and tribal areas (tribelets) (McLendon and Oswalt 1978:276). Their territory included the entire Russian River drainage and areas west into the Clear Lake Basin (McLendon and Oswalt 1978:274). Anthropologist A. L. Kroeber provided the following period description of a Pomo settlement along the Russian River:

Russian River flows through a country of hill ridges, which in many places are dignifiable with the appellation of mountains. Like most of California, it is a half-timbered country. Conifers stand on the higher crests, oaks are scattered over the slopes and levels, manzanita and other brush runs up over most of the country where the grade permits, and yet find few large areas of grass. True meadows are almost lacking; wet, low places run to tule rush instead. Russian River flows through a series of small inclosed [sic] valleys, not a continuous plain. Side streams are numerous, often in deep ravines of some length, yet dry in summer; but springs are abundant to any one familiar with the country. It is typical California land; arid to the eye once the winter rains are over, yellow and gray in tone, but fertile; monotonous in the extreme to the stranger, yet endlessly variegated to those familiar with it and its resources. It is good

Indian habitat from the mildness of the climate and the diversity of its products: fishing in winter, plenty of small game the year round, a moderate supply of deer, acorns everywhere, and brush, grass, weeds, and bulb plants in dozens of abundant species yielding their ready quota. Here was situate [sic] the kernel and bulk of the nation. More than a third of the Pomo communities were on this river, most of them with their winter quarters almost on its very banks (Kroeber 1925:226).

The radiation of ancestral Pomoan peoples from the upper Russian River valley into their ethnographic territories probably occurred during the Middle Archaic period (ca. 3000-1000 B.C.), and may have been marked by the Mendocino Aspect (Fredrickson 1984:510, 522).

The extent and nature of the land claimed by each village-community was determined by the nature of the terrain, its ecology, and the nature of the particular group's adaptation to that ecology (McLendon and Oswalt 1978:275). Differences in the carrying capacity of the environment resulted in several village-communities being located in close proximity to one another, particularly along the Russian River (McLendon and Oswalt 1978:276).

Northern Pomo

The Northern Pomo occupied the area of central Mendocino County with the majority of tribelets living in small valleys in the drainage of the Upper Russian River (McLendon and Oswalt 1978:283). Northern Pomo villages on the Russian River included: *Shoda-Kay* on the lower east fork of the Russian River; *Kacha* on the upper west fork of the Russian River; and *Balo-Kay* on the upper east fork of the Russian River (McLendon and Oswalt 1978:283-284, Figure 5).

Central Pomo

The territory of the Central Pomo included southern Mendocino County and stretched from the coast to a border with the Eastern Pomo at the crest of the range east of the Russian River (McLendon and Oswalt 1978:281). On the Russian River, their northern boundary was at or near Ukiah (Barrett 1908). Central Pomo villages located on the Russian River drainage included: *Qahwalaw*, at the confluence of Pieta Creek and the Russian River; and *Sepda*, at the confluence of Cummiskey Creek and the Russian River; and *Kalohko*, south of the confluence of Cummiskey Creek and the Russian River (McLendon and Oswalt 1978:281-282, Figure 4).

Southern Pomo

The Southern Pomo controlled an area that extended from south of Santa Rosa northward to near the Sonoma County border, and from the eastern drainage of the Russian River westward to Central Pomo territory, with a narrow extension to the coast between these two territories (McLendon and Oswalt 1978:276). A Southern Pomo tribelet territory was likely to contain one or two principal villages, up to a dozen satellite villages, hamlets that were home to only one or two families, and innumerable camps, hunting sites, and food-gathering areas within carefully defined territorial boundaries (Stewart 1985:16).

A number of Southern Pomo villages are known from the Russian River area. Barrett (1908) shows a large number of ethnographic village locations in close proximity to the Russian River. Kroeber (1925:233) states that "...on the Russian River in the vicinity of Healdsburg a great number of villages have been recorded, but their grouping is entirely obscure." According to Stewart (1943:53), the Pomo tribelet of *Kataictemi* was centered about *Kale* (Healdsburg) and this tribelet owned the territory on both

sides of the Russian River north of Mark West Creek and south of the Wappo boundary at Fitch Mountain. At least three Southern Pomo villages were located on the Russian River: *Makahmo*, on Big Sulphur Creek near its confluence with the Russian River; *Amako*, on the east bank of the Russian River across from Asti; and *Ya-ka-ama*, near the confluence of Mark West Creek and the Russian River. (McLendon and Oswalt 1978:278-280, Figure 3).

The Southern Pomo population was reduced or destroyed, especially in the southern part of their territory, by missionization, Mexican slave raids, disease, and denser settlement by immigrants (McLendon and Oswalt 1978:276). As a result, ethnic identity was lost in the region of Santa Rosa and Sebastopol several generations ago.

Kashaya Pomo

The Kashaya Pomo occupied an area of about 30 miles of the Sonoma County coast. Their territory extended inland from five to 13 miles and included the mouth of the Russian River (McLendon and Oswalt 1978:278, Figure 3). One Kashaya Pomo village is known from near the mouth of the Russian River: *Sohqawi* (McLendon and Oswalt 1978:278-279, Figure 3).

Some Kashaya Pomo have lived on a small 40-acre reservation within this territory since the late 1970s, while others still reside elsewhere in the county (McLendon and Oswalt 1978:278).

Wappo

The Wappo controlled the area in the vicinity of the city of Napa northward to the Geysers, and a portion of the Alexander Valley on the west, with a small settlement on Clear Lake (Kroeber 1925:218, plate 27). Their settlements were located in the valleys of major watercourses including the Napa River, Big Sulphur Creek, and the Russian River (Kroeber 1925:218). The Western Wappo, who spoke one of five Wappo dialects, occupied the area from Alexander Valley northeast to Cobb Mountain and south to Mount St. Helena. Wappo settlement patterns consisted of several villages located within tribelet boundaries, with a larger and continuously inhabited town as the primary center of the community (Kroeber 1925:218-219). The major Western Wappo village of *Pipoholma* was located on the Russian River near Geyserville (Kroeber 1925:219).

Native American Settlement Patterns

Regarding prehistoric use and/or settlement of the study area, it should be noted that the Russian River floodplain is subject to occasional flooding. As a result, soils in the study area consist predominantly of alluvial deposits representing past flood events (Miller 1972). While this floodplain may have been used occasionally during the prehistoric period, perhaps for food procurement or ceremonial events such as dances, it seems unlikely that habitations or other long-term utilization would have occurred in an area subject to seasonal flooding and inundation. If short-term prehistoric use of the floodplain area occurred, evidence of this use may be obliterated or scoured away by the river's flooding. During recent times, various types of resource extraction, particularly gravel mining, have occurred in the Russian River floodplain, and these activities may have destroyed evidence of prehistoric use and/or settlement along the banks of the Russian River.

European Context

Early Settlement

In addition to prehistoric and Native peoples in the vicinity of the project area, Europeans have made their mark as well. In 1775, Juan Francisco de Bodega y Cuadro of Spain landed at Bodega Bay to find the river basin a virtual paradise, with all of the desirable elements for strong commerce already in place (Wilson 1990). The arrival of the Spanish, who called the Russian River the San Ygnacio River, forever altered the future of this pristine region.

The Spanish were soon followed by the Russians in 1808, led by Alexander Kuskoff of the Russian-American Company. This company, under the leadership of Alexander Baranov, turned to the south in search of more hospitable lands after Russian fur traders virtually decimated the otter populations in Alaska, taking an estimated 100,000 pelts within the last decade of the past century alone (Wilson 1990). The Russian settlers called the river Slavianka, or “Little Slavic Maiden.” By 1811, they had established colonies at Fort Ross and Bodega Bay and had navigated up the river to the Geysers on Sulphur Creek.

Kyrill Khlebnikov, a Russian traveler reporting on the countryside around Fort Ross in the early 1800s, noted that “among quadrupeds the most important are bears, lynx, ordinary wolves, and small ones which the Spanish called coyotes. They catch sturgeon in the Slavianka River when the channel is open (Wilson 1990).” Russian settlers remained in the Russian River area until about 1840, fur trapping otter along the coast and the river, exploring the river basin and possibly cultivating the river valley for wheat and cattle grazing (Ferguson 1931).

In 1831, a Rancho grant was issued for Rafael Gomez at Santa Rosa in order to limit Russia’s encroachment into the Russian River Valley (Wilson 1990). In an 1843 Spanish petition for the Bodega grant the name of the river appeared as Rio Russo, and it has been called the Russian River since. With the presence of the Spanish increasing, cattle and horse ranching became the dominant land use in the Russian River Valley during the rancho period from 1835 to 1846.

In 1837, a smallpox epidemic decimated the Native Americans living in villagesthroughout the river valley, leaving the area open to colonization by Mexican settlers (Ferguson 1931). The Russians abandoned their efforts to establish a colony in 1841 and sold their settlements to Captain Sutter, bringing more “Americans” into the region. During the Mexican-American war in 1846 (the same year the Bear Flag revolt occurred in Sonoma), California was declared a republic. In the years to follow, hostilities ensued between the Indians, Mexicans and newly-settled Americans in the Russian River Valley, escalating in 1847 when the Russian River saw the arrival of many land-hungry American settlers.

Logging

Logging in Sonoma and Mendocino counties began with the first European arrivals and became an essential part of the economy. Initially, logging served local building projects such as missions, presidios, barracks, residences, and other domestic purposes. The Spanish used redwood to build local missions in the San Francisco Bay Area. In 1812, the Russians used redwood to build Fort Ross (Davis 1983). Oak was harvested for fuelwood, furniture, barrels, and saddles.

California did not experience large-scale timber production until the 1830s when overseas trade increased demand for timber worldwide. A lively export of lumber products developed in the region,

with sawmills operating on Mount Tamalpais in the 1830s (Dillon and Dillon 1993:14). However, the most significant boost to the timber industry in California came in 1848 with the California Gold Rush. Local demand for timber products to line mining tunnels and shafts soared.

Commercial logging in California utilized oxen, horses and mules to yard logs to sawmills before logging railroads became established. Some mills floated logs by creeks within the Russian River Watershed or river channels to the ocean where schooners would pick them up and haul them to San Francisco and elsewhere.

The North Pacific Coast Railroad (pre-cursor to the Northwestern Pacific Railroad (NWP)) reached the Russian River in 1876, and six lumber mills sprang into being. The Duncan, Tyrone, Moscow, and other sawmills used the railroad to transport finished lumber to San Francisco, which ended lumber shipment by schooner (Dillon and Dillon, 1993:40). The NWP played a brief role in Mendocino County by carrying redwood logs to San Francisco Bay Area markets (Dillon and Dillon 1993:32).

Russian River Railroads

The Northwestern Pacific Railroad (NWP) was another important part of the Russian River region's history. While there were already small towns within the Russian River watershed, these towns boomed with the coming of the NWP. Towns like Cloverdale, Santa Rosa, Ukiah, Willits, Healdsburg, and many others flourished. The railroad allowed these towns to access markets for their agricultural goods and other commodities. It also allowed easier transportation to and from San Francisco and surrounding communities.

Two lines ran to the Russian River. After the ferry connection at Sausalito, the narrow gauge line turned west from San Anselmo in Marin County and proceeded through a wooded area to Pt. Reyes, then along Tomales Bay, inland through agricultural country and into the redwood forests just before Occidental. Continuing northward, the narrow gauge encountered the Russian River at Monte Rio, followed the south bank and crossed the river at Duncan Mills. It then followed Austin Creek to Cazadreo. The broad gauge went directly north to Petaluma and Santa Rosa from the ferry terminal. At Fulton, it headed west and ran along the Russian River from Mirabel to Duncan Mills. Before these two separate lines were combined to form the NWP in 1907, they were intense rivals, vying for the coveted transportation of the lumber coming from Mendocino and Sonoma counties (Stindt 1974).

In addition to the NWP, various feeder lines tied into the larger NWP system. These feeder lines were predominantly owned by logging companies that were harvesting redwood trees for lumber and using the railroad to get their goods to market. These feeder lines traversed the Russian River tributaries and watershed and had a substantial environmental and economic impact to the region (Stindt 1974).

Agriculture

Sonoma agriculture initially was characterized by large dairy farms. These farms flourished in the fertile valleys. By 1870, butter was Sonoma County's chief export (Hansen and Miller 1962). The agricultural landscape would soon shift from dairy production to poultry production and fruit growing. Penngrove and Petaluma became the "World's Eggbasket" with poultry farmers raising chickens for meat and eggs. In 1907, Sonoma County produced 8,000,000 dozen eggs, 3,500,000 pounds of butter, had over a million fruit trees, and produced 10,000,000 gallons of wine. The poultry boom required massive amounts of feed for the chickens, and Petaluma quickly became the distribution center of

western and central Sonoma County. Numerous large warehouses and feed mills were built on the NWP mainline and spurs to accommodate the huge demand for feed and other agricultural materials supplied by trains. In 1938, the tallest structure in Sonoma County was the Poultry Producers of Central California Coop Feed Mill (Withington 2000). Train service ensured that poultry products and fruit could be shipped quickly to market. Continued train service further helped the fruit growing business develop once the poultry boom subsided.

Mendocino County agriculture also began with early European settlement. Settlers generally grew crops to support themselves and raised livestock. The biggest boost in agriculture in the county came with the Gold Rush. Immigrant farmers, failing as prospectors, turned to agriculture as a way of life in their new home. Having saved the flatter lands on the river and stream plains for farming food crops, these pioneers planted vineyards on the more rugged hillsides and sun-exposed ridgetops.

Wine Production

Grape and wine production has been an integral part of the history and economy of the Russian River Watershed. As early as 1812, Russian colonists planted and cultivated grapes at Fort Ross on the Sonoma coast. Spanish Franciscan fathers established a more permanent legacy in 1824 when Padre Jose Altimira planted several thousand grape vines at Mission San Francisco Solano in Sonoma (Wilson 1990).

In 1834, political upheaval brought an appropriation of all missions by the Mexican government. During this period of disarray, Sonoma mission vineyard cuttings traveled throughout northern California and established new production centers. By 1847, Mexican governor General Mariano Vallejo's vineyards were producing \$20,000 annually. Hungarian immigrant Agoston Haraszthy purchased the Salvador Vallejo vineyard in Sonoma Valley in 1855, and began commercial wine production from the re-named Buena Vista Vineyard (Wilson 1990).

Trouble surfaced in 1873, when a worldwide outbreak of phylloxera (American root louse) nearly destroyed Sonoma County vineyards. The industry located disease-resistant stock and grafted it to the varietal shoots. The wine industry recovered to the point that an October 22, 1876, *San Francisco Chronicle* article noted, "As a wine growing region, Sonoma stands at the head of the list." By 1920, the county boasted 256 wineries, surpassing Los Angeles in total wine acreage with more than 22,000 acres in production. In 1998, there were 194 wineries and 44,700 acres of grapes (SCGGA Website 2003).

The year 1919 marked the onset of Prohibition, as the United States Government shut down the commercial wine industry with the 18th Amendment and passage of the Volstead Act. Ambiguity characterized application of the Volstead Act to the wine industry. San Francisco Judge Van Fleet declined to rule on exempting wineries. The Sonoma County Grape Growers organization voted to make wine despite the new law. Eventually wineries not making "sacramental" or "medicinal" wine closed, but some grape growers like the Olivette Winery actually flourished. A legal loophole allowed 200 gallons of wine yearly for home production, and over 150 million gallons were produced in hundreds of thousands of households in 1930. The grape production reported for Sonoma County totaled 21,300 acres in 1930 (Wilson 1990).

1933 brought the election of President Franklin D. Roosevelt and the repeal of Prohibition, but not in time for many local wineries. Only 160 of California's 700 wineries remained in business. These

wineries endured by producing sacramental wine and grape juice or by planting other crops. Some had pulled out their vines and others planted fruit crops between the wine rows. The wine industry in Sonoma County underwent a slow revival in the late 1930s. Many of the wineries that began producing wine immediately issued bulk wines to bottlers outside the county. Small to medium sized wineries sprang up in Alexander Valley, Dry Creek Valley and the Russian River area, places that had experienced limited growth in the earlier years (SCGGA Website 2003).

The 1940s were tumultuous years for the California wine industry. Post-war years were characterized by severe overproduction of grapes and wine, which resulted in government-mandated programs of pro-rations and set-asides. Adversity brought a new group of winegrowers from business, commerce and industry to work beside second-generation Sonoma County wine industry pioneers. They were still in the rebuilding process when the nationwide wine boom hit in the 1960s. Orchards were pulled out and grazing land plowed under for vineyards and, for the first time, white grapes were predominant (SCGGA Website 2003).

In 2000, Sonoma County ranked first in California for total grape sales with nearly \$390 million in revenue from 42,200 acres of grapes. With secondary spending to suppliers and profits from wine-related tourism, the Sonoma County wine industry contributes an estimated \$3 billion to the local economy, about 18% of the county's contribution to the gross domestic product (SCGGA Website 2003).

Paleontologic Setting

A comparison of the California Department of Fish and Game July 2002 Review Draft Map boundaries of the Russian River Watershed and published geologic maps of the area (Jennings 1977; Helley *et al.* 1979; and Huffman 1980) indicate that the project area will encompass two generalized rock types: Mesozoic marine sedimentary and metasedimentary rocks; and Cenozoic marine and non-marine sedimentary rocks. Mesozoic rocks include Tertiary-Cretaceous sandstone, shale and minor conglomerate in the coastal belt of Northern California, and the Jurassic-Cretaceous Franciscan Complex. Cenozoic rocks in the watershed include Pliocene sandstone, siltstone and shale, Pliocene and/or Pleistocene sandstone, shale, and gravel deposits and relict Pleistocene stream terraces. Generally, areas of high relief (hills and mountains) are composed of Mesozoic rocks, while areas of low relief (valleys and flatlands) are composed of Cenozoic rocks. The geology and paleontologic sensitivity of each rock type is presented in the next section

Mesozoic Rocks

Mesozoic marine sedimentary and metasedimentary rocks underlie the majority of the Russian River watershed. From the headwaters in the region of Redwood and Potter valleys to the north, to the beginning of the Santa Rosa Valley to the south, Mesozoic rocks bound the watershed to the north and west. The Mesozoic sedimentary rocks consist of sandstone, shale and conglomerate. The metasedimentary rocks of the Franciscan Complex consist of sandstone, shale, chert and limestone in a tectonically sheared and fractured *mélange* (mixture) of rock types. Ultramafic rocks, chiefly serpentine, are also present in this mixture.

Vertebrate fossils have not been recovered in the immediate vicinity of the Mesozoic rocks in the project area. Because the Mesozoic rocks have been sheared and deformed through tectonic action, the chance

of fossil preservation is low. Therefore, operations within the slopes underlain by Mesozoic rocks have a low sensitivity to contain fossil remains.

Cenozoic Rocks

Alluvial plains and valleys account for approximately 15% of the Russian River watershed. Alluvial plains and valleys crossed by the Russian River are composed primarily of Cenozoic marine and non-marine rocks. Locations closely follow the mainstem of the Russian River and range from Potter Valley and Ukiah, south through Cloverdale and Windsor. Cenozoic rocks become the dominant rock type throughout the Santa Rosa Plain.

The alluvial valleys are primarily Pleistocene to Holocene alluvial, lake, and stream terrace deposits that infill and overlie older, dissected Pliocene and Pleistocene alluvial deposits. Marine Pliocene rocks consist of marine sandstone, siltstone and shale and are located primarily west of Sebastopol, and south of the mainstem of the Russian River.

Pliocene to Pleistocene deposits are primarily sandstone, shale and loosely consolidated gravel deposits. These deposits are located west of Highway 101 between Santa Rosa and Healdsburg, with outcrops south of Cotati. The Plio-pleistocene non-marine deposits are cross-cut by the current tributaries of the Russian River. These tributaries include Mark West and Santa Rosa creeks as well as numerous unnamed smaller creeks. The younger, recent tributaries to the Russian River lie in channels of Quaternary alluvium. Helley *et al.* (1979) identified relict stream terraces perched adjacent to the current course of the Russian River and its tributaries. The stream terraces consist of moderately consolidated, deeply weathered, poorly sorted clay, silt, sand, and gravel. This Pleistocene alluvium is widely scattered throughout the southern portion of the watershed, and is geomorphically expressed as a flattened bench or terrace adjacent to the current stream course.

The non-marine sediments and Pleistocene relict stream terraces have yielded vertebrate fossils. The lithology and depositional environment of the Cenozoic marine and non-marine rocks is consistent with an area that has the potential to produce more fossil finds. The Pliocene and Pleistocene marine and non-marine deposits, along with the Pleistocene relict stream terraces, are assigned a moderate sensitivity because these areas are known to contain paleontologic localities with moderately preserved, common elsewhere fossil deposits, and they have a strong, proven potential for producing fossil remains.

Paleontologic Sensitivity

The determination of the significance of a fossil can only occur after a fossil has been found and identified by a qualified paleontologist. Until then, the actual significance is unknown. The most useful designation for paleontologic resources is the “sensitivity” of the geologic unit. Sensitivity refers to the likelihood of finding significant fossils in a particular geologic unit. In Northern California, fossils of land-dwelling vertebrates are considered significant. Such fossils are found in fluvial and lake deposits.

The following levels of sensitivity recognize the important relationship between fossils and the geologic formations within which they are preserved.

- **High:** High sensitivity is assigned to geologic formations known to contain paleontologic localities with rare, well preserved, and/or critical fossil materials for stratigraphic or

paleontologic interpretation, and fossils providing important information about the paleobiology and evolutionary history of animal and plant groups.

- **Moderate:** Moderate sensitivity is assigned to geologic formations known to contain paleontologic localities with moderately preserved, common elsewhere, or stratigraphically long-ranging fossil material. The moderate sensitivity category is also applied to geologic formations that are judged to have a strong, but unproven potential for producing fossil remains (e.g. Pre-Holocene sedimentary rock units low to moderate energy, of marine or non-marine depositional environments).
- **Low:** Low sensitivity is assigned to geologic formations that, based on their youthful age and/or depositional environment, are judged unlikely to produce fossil remains. Typically, low sensitivity formations may produce invertebrate fossils in low abundance.
- **Marginal:** Marginal sensitivity is assigned to geologic formations that are composed of either pyroclastic volcanic rocks or metasedimentary rocks, but which nevertheless have the possibility for producing fossil remains from certain lithologies at localized outcrops.
- **Zero:** Zero sensitivity is assigned to geologic formations that are entirely plutonic (igneous rocks formed beneath the earth's surface) in origin and therefore have no potential for producing fossil remains.

4.6.2 Environmental Impacts and Mitigation Measures

a. Would the project cause a substantial adverse change in the significance of a historical resource as defined in 15064.5?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The project could cause substantial adverse changes in the significance of historical resources. Portions of historical resources could be damaged and/or destroyed as a result of ground-disturbing activities due to excavation of some clumps of giant reed. However, with implementation of Mitigation Measures **CR-1** through **CR-3** (see below), these impacts would be reduced to less than significant levels.

CR-1 RRTA shall appoint a Cultural Resources Specialist (CRS), or specialists, prior to the start of project-related ground disturbance with mechanized equipment, grading, or excavation activities. RRTA shall submit to the SRCD, for review and approval, the name(s) and statement of qualifications for its designated cultural resources specialist, or specialists, who will be responsible for implementation of all cultural resources mitigation measures. The statement of qualifications must be sufficient to substantiate that the CRS meets the Secretary of the Interior's proposed Historic Preservation Qualification Standards as published in the Federal Register.

CR-2 Prior to the start of project activities, the CRS shall review all proposed ground-disturbing activities with mechanized equipment to determine if the proposed action would impact known or potential archaeological resources. If resources are determined to be in the area of the

proposed project, the first level of mitigation shall be to change the mode of giant reed eradication to hand removal rather than excavation. This would avoid impacts to the resource.

- CR-3** If ground disturbing activities with mechanized equipment at those areas identified as potentially archaeologically sensitive cannot be avoided by using another method, full-time archaeological monitoring shall occur during ground-disturbing activities. Monitoring is required within 500 feet of the boundaries of known cultural resources.

Monitors must have 2 years of professional experience and be approved by the SRCD. Monitors shall be under the supervision of the CRS.

A detailed project specific protocol for monitoring shall be provided and shall include an Unanticipated Discoveries of Cultural Resources Plan. Following is a synopsis of what shall be included in the plan. If cultural resources are located during monitoring, monitors shall immediately halt construction within 250 feet of the find in non-urban area, and 50 feet of the find in urban areas, and notify the CRS. The CRS shall inspect the find. The CRS shall immediately notify the SRCD Environmental Monitor. If construction personnel discover a cultural resource in the absence of a monitor, construction within 250 feet of the find shall be halted and the environmental compliance monitor contacted. Construction may begin once the CRS has completed necessary investigations and a written authorization to proceed has been issued by the SRCD.

b. Would the project cause a substantial adverse change in the significance of a unique archaeological resource pursuant to 15064.5?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Possible substantial effects could occur to unknown archaeological (prehistoric and historic) deposits from ground-disturbing activities. The project encompasses areas known to have high potential for cultural resources and other features associated with prehistoric occupation and historic settlement. However, with implementation of Mitigation Measures **CR-1** through **CR-2** (see above), these impacts would be reduced to less than significant levels.

c. Would the project directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Potential discovery or disturbance of unique paleontological resources during ground-disturbing activities with mechanized equipment could result in a significant impact. Because significant fossil discoveries can be made in areas designated as low as well as moderate to high potential, ground-disturbing activities could possibly unearth significant paleontological resources. While this is unlikely, should such resources be encountered, this would be a significant impact. However, with implementation of Mitigation Measures **CR-3** (above) and **CR-4** (below), this impact would be reduced to less than significant levels.

- CR-4** In the event that fossil remains are encountered, either by the cultural resources monitor or by project personnel, qualified paleontological specialists shall be contacted. Project activities within 100 feet of the find in non-urban areas and 50 feet in urban areas shall be temporarily

halted or diverted until a qualified vertebrate paleontologist examines the discovery. The paleontologist shall notify the appropriate agencies and the SRCD Environmental Monitor to determine procedures that would be followed before construction is allowed to resume at the location of the find.

d. Would the project disturb any human remains, including those interred outside of formal cemeteries?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Possible substantial effects may occur to human burials from ground-disturbing activities. This could include burials of prehistoric remains or non-Indian pioneers. However, with implementation of Mitigation Measures **CR-1** through **CR-4** (above) as well as Mitigation Measure **CR-5** (below), this impact would be reduced to less than significant levels.

CR-5 The CRS shall develop an Unanticipated Discoveries of Human Remains Plan. Following is a synopsis of what shall be included in the plan. If human remains are found at any time during project-level vegetation clearance; ground disturbance and grading; site or project mobilization; site preparation or excavation activities; implementation of erosion control measures; or the movement or parking of vehicles or other equipment onto or over the project surface, all work shall immediately stop within 250 feet of the find in non-urban areas and 100 feet of the find in urban areas. The CRS shall be notified immediately and shall, in turn, immediately notify the county coroner for the appropriate county in compliance with Section 7050.5 of the California Health and Safety Code and notify the SRCD Environmental Monitor. Upon the completion of compliance with all relevant sections of the California Health and Safety Code and the conditions of the Unanticipated Discoveries Plan for Human Remains, the CRS shall implement Mitigation Measure **CR-2**.

4.7 Geology and Soils

Information used in preparing this section was derived from a Cultural Resources Existing Conditions Report for the proposed project, which included numerous sources of data and research (Garcia and Associates, 2004).

4.7.1 Setting

The Russian River is predominantly underlain by the Franciscan formation, a mélange of Jurassic-Cretaceous age, formed at the bottom of the Pacific Ocean over 100 million years ago. Franciscan sediments consist of a jumbled mass of muddy sandstones and cherts interlayered with basalt lava flows-crumpled sea floor sediments that form the bulk of the Coast Range. The Franciscan lithology is very unstable and landslides are common throughout most mountain regions within the basin (CDFG 2002).

Elevations within the basin range from sea level at the mouth to 4,344 feet at the summit of Mt. Saint Helena in the Mayacamas Mountains to the east. Historic lava flows associated with Sonoma Mountain may have contributed to the isolation of the Russian River from the Petaluma and Sonoma rivers

(Hopkirk 1974). The river passes through a series of broad alluvial valleys and narrow bedrock constrictions along its course. Alluvial regions bordering the mainstem include the Ukiah and Hopland valleys in Mendocino County, and Alexander Valley and the Santa Rosa Plain in Sonoma County. The area within the basin consists of 85% hills and mountains and a mere 15% alluvial valleys (SEC 1996). Present drainage patterns in the Russian River region are similar to drainage patterns for the North Coast Ranges and are the result of Pleistocene down-faulting (Hopkirk 1974). Faulting in the North Coast Ranges generally follows northwest to southeast orientation, and thus many streams (including the upper run of the Russian River) follow this orientation. With the onset of the Wisconsin glacial epoch, sea level changes combined with down-warping along the coast contributed to flow pattern changes as southeasterly flowing rivers of the area were redirected westward (Hopkirk 1974). Eventually the headwaters of the upper Russian River became the headwaters of the Eel, Navarro and Gualala river systems.

Perhaps the most striking character of the Russian River drainage is the mainstem's sharp turn to the west near its confluence with Mark West Creek, where "After following for fifty miles its regular southeasterly course to Santa Rosa Valley, it turns away from this flat and uninterrupted alluvial plain which opens directly to San Francisco Bay, and flows westward to the ocean through twenty miles of rugged canyon, winding through a highland that varies from eight hundred to twelve hundred feet in elevation (Holway 1913)." Holway, in his 1913 paper, hypothesizes that a likely explanation for this is "that the transverse portion of the river from the open valley through the highland was antecedent to, and persisted through, the uplift which made the highland."

Historically, the waters of Clear Lake drained through two outflowing streams. Westward flows passed through Cold Creek into the Russian River, while Cache Creek drained the eastern side of the Clear Lake Basin with flows eventually joining the Sacramento River. Flows from Cache Creek were eventually cut off by lava flows and water from Cache Creek joined with that from Cold Creek to flow into the Russian River (Hopkirk 1974). It is believed that within the past few centuries, however, a large landslide plugged the western Clear Lake outflow, isolating the lake from the Russian River basin (Alt 1975) and reestablished flows into Cache Creek through a sag in the lava flow near the mouth of Cache Creek. Present geology provides for the continued drainage of Clear Lake through its eastern outlet. Historic flows from Clear Lake into both the Russian River and the Sacramento system explain why the fish assemblage in the Russian River today is so similar to that of the Sacramento system.

Both Mendocino and Sonoma Counties have important agricultural soils that make them highly productive agricultural areas. It is very important to protect these soil resources through the implementation of proper excavation practices and erosion controls.

4.7.2 **Environmental Impacts and Mitigation Measures**

This impact assessment uses a qualitative analysis to address geologic hazards, primary and secondary effects of earthquakes, and soil resources. Since no structures would be constructed for this project, worker and public safety in regards to geologic hazards would not occur. Loss of soil resources due to erosion from project construction could occur without implementation of the associated mitigation measures.

- a. *Would the project expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, strong seismic ground shaking, seismic-related ground failure (including liquefaction), or landslides?*

NO IMPACT. The proposed project would not involve the construction of any habitable structures or other features that would be exposed to ground shaking. Therefore, impacts from ground shaking hazards would not be expected to occur.

- b. *Would the project result in substantial soil erosion or the loss of topsoil?*

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. The proposed project would remove large quantities of giant reed throughout the Russian River watershed and could result in some temporary soil instability. However, with the implementation of Mitigation Measure **GEO-1** and **GEO-2** (below), the impact would be reduced to less than significant. Ground disturbing activities for giant reed removal will be minimal since most of the removal will be performed by hand. Also, because the proposed project involves revegetation with native plant species, any temporary effects of soil instability caused by the removal of giant reed are considered to be less than significant because the reestablishment of vegetation would ultimately stabilize the soil (see Mitigation Measure **BIO-7**).

GEO-1: All exposed/disturbed areas within the project site shall be stabilized to the greatest extent possible. Erosion control measures, such as silt fences, straw hay bales, gravel or rock lined ditches, water check bars, and broadcasted straw shall be used where silt-laden water has the potential to leave the work site and enter State waters. Modifications, repairs and improvements to erosion control measures shall be made whenever needed.

GEO-2: No phase of the project may be started if that phase and its associated erosion control measures cannot be completed prior to the onset of a storm event if that construction phase may cause the introduction of sediments into the stream. Seventy-two-hour weather forecasts from the National Weather Service shall be consulted prior to start up of any phase of the project that may result in sediment runoff to the stream.

- c. *Would the project be located on strata or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction, or collapse?*

LESS THAN SIGNIFICANT WITH MITIGATION INCORPORATED. As stated above, the proposed project would remove large quantities of giant reed throughout the Russian River watershed and may result in some soil instability. However, because the proposed project involves revegetation with native plant species, any temporary effects of soil instability caused by the removal of giant reed are considered to be less than significant because the reestablishment of vegetation would ultimately stabilize the soil (see Mitigation Measures **BIO-6** and **BIO-7**). Also, ground- disturbing activities for giant reed removal will be minimal since most of the removal will be performed by hand. With the implementation of Mitigation Measures **GEO-1** and **GEO-2** (above), the associated impacts would be less than significant.

d. Would the project be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code, creating substantial risks to life or property?

NO IMPACT. No structures will be constructed for the proposed project. No impacts would occur.

e. Would the project have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?

NO IMPACT. No septic tanks or alternative wastewater disposal systems will be installed as part of the proposed project. No impacts would occur.

4.8 Hazards and Hazardous Materials

4.8.1 Setting and Introduction

The primary concerns for the proposed project, in regards to hazardous materials, are worker safety and public safety. Exposure to hazardous materials could be possible through handling of hazardous materials or accidental spill during construction activities.

Implementation of the proposed project would involve the use of some herbicide treatments, using a glyphosate-based herbicide. For the risks associated with glyphosate-based herbicides to people, a dose of 2 milligrams per kilogram per day (mg/kg/day) has been determined by the EPA to be the chronic reference dose (RfD) for glyphosate (U.S. Forest Service, 2002). The RfD means that a person could receive a dose of 2 mg/kg/day throughout everyday of his or her life without an adverse health effect. Short-term or acute exposures above the chronic RfD can occur without any known adverse health effect. The estimated lethal dose of glyphosate in humans is 445 mg/kg/day (U.S. Forest Service, 2002). Thus, a 150-pound (73 kilogram) person would need to be exposed to 32,485 mg of glyphosate in a single day to achieve a lethal dose.

4.8.2 Environmental Impacts and Mitigation Measures

a. Would the project create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The proposed project would not require long-term storage, treatment, disposal, or transport of significant quantities of hazardous material; however, small quantities of hazardous materials would be stored, used, and handled during implementation of the project.

HAZ-1 All herbicide applications would be completed or supervised by a Qualified Licensed Applicator permitted by the Department of Pesticide Regulation to ensure that specific safety measures, including containment and clean-up plans in the event of an accidental spill or leak of the herbicide are followed. All workers involved with herbicide

application shall receive training in herbicide application from the Qualified Licensed Applicator.

- HAZ-2** All workers involved with herbicide application shall wear appropriate protective clothing and related safety equipment (masks, gloves, etc.).
- HAZ-3** Clean water and soap shall be readily available on site for the purposes of emergency washing.
- HAZ-4** Prior to and during vegetation clearing and herbicide applications on public property, active work areas shall be marked and signs shall be clearly posted along all access points to the site to minimize the public's potential exposure to hazardous materials. These signs would discourage public use or other unauthorized use of the site for a minimum of two weeks after any herbicide application. Prior to any project activities, work crews would survey the site to ensure that no unauthorized persons are present.
- HAZ-5** No herbicide application shall take place when wind velocities exceed six (6) mph to minimize potential herbicide drift.

b. Would the project create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Procedures of proper handling and disposal of hazardous waste are established by federal, State, and local regulations. RRTA will train project personnel in the handling of such materials prior to the start of project activities. Implementation of Mitigation Measures **HAZ-1** through **HAZ-5** (see above), and Mitigation Measures **HAZ-6** through **HAZ-8** (see below), which are designed to ensure proper labeling, storage, handling, and use of hazardous materials, and to prepare a Hazardous Materials Management/Spill Prevention Plan and prepare a Health and Safety Plan, would reduce potentially significant impacts to less than significant levels.

- HAZ-6** RRTA shall ensure proper labeling, storage, handling, and use of hazardous materials in accordance with best management practices and the Occupational Safety and Health Administration's HAZWOPER requirements. RRTA shall ensure that all employees are properly trained in the use and handling of these materials and that each material is accompanied by a material safety data sheet (MSDS) deemed adequate by the SRCD. Additionally, RRTA shall submit a written plan to the SRCD prior to project activities outlining how to respond if hazardous materials are unexpectedly encountered. The plan shall specify identification, handling, reporting, and disposal of hazardous materials.
- HAZ-7** A Hazardous Materials Management/Spill Prevention Plan shall be developed and submitted to the SRCD for review and approval prior to the start of project activities. The purpose of the plan is to provide on-site project managers, environmental compliance monitors, and regulatory agencies with a detailed description of hazardous materials management, spill prevention, and spill response/cleanup measures associated

with the project. The primary objective of the plan is to prevent the spill of hazardous materials; the plan shall be given to all project managers and sub-contractors working on the project. At least one copy shall be on-site with the project manager at all times. The plan shall include the following:

- Definition of staging areas where refueling, storage, and maintenance of equipment will take place. Such areas shall not be located within 100 feet of drainages or any other body of water, or wetlands or riparian areas, to reduce the potential of contamination by spills.
- During project activities, equipment shall be maintained and kept in good operating conditions to reduce the likelihood of line breaks and leakage.
- Fluids drained from machinery during services at staging areas shall be collected in leak-proof containers and disposed of at appropriate disposal or recycling facilities.
- No refueling or servicing shall be done without absorbent material (e.g., absorbent pads, mats, socks, pillows, and granules) or drip pans underneath to contain spilled material.
- Definition of spill control and countermeasures, including but not limited to employee spill prevention/response training and a description of onsite cleanup equipment (e.g., absorbent pads, mats, socks, granules, etc.) available at staging and project sites.
- Resource agency notification and documentation procedures.

HAZ-8

RRTA shall prepare a Health and Safety Plan that includes a contingency plan for hazardous materials and waste operations. Before project activities could proceed, RRTA shall submit the plan to the SRCD for review and approval, and once approved shall send the plan to each agency with jurisdiction. The Health and Safety Plan, applicable to all work activities, shall establish policies and procedures to protect workers and the public from potential hazards posed by hazardous wastes. The plan shall be prepared according to federal and California OSHA regulations for hazardous waste sites. This Health and Safety Plan shall also provide for proper storage and/or disposal of any contaminated soils that meet the definition of a hazardous waste.

c. Would the project emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. No hazardous long-term emissions would be generated by the proposed project. During the life of the project, project personnel would follow all institutional controls governing the storage, transportation, use, handling, and disposal of hazardous materials. Mitigation Measures **HAZ-1** through **HAZ-8** are recommended to ensure minimal risk of an accidental release of hazardous materials, substances, or wastes, as described in 4.8.2 above. Therefore, potential impacts to existing or proposed schools are less than significant.

d. Would the project be located on a site that is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. As required by Mitigation Measure **HAZ-9** (below), a database list search would be performed for all proposed sites where excavation of giant reed will take place in order to locate areas that may be viewed as potential areas of hazardous materials contamination or locations where it is permitted to perform various hazardous waste activities.

HAZ-9 A list search of known State and federal hazardous waste sites and leaking underground tanks within 1,000 feet of an excavation site shall be conducted prior to project activities to identify high-risk areas, where a moderate or high potential for encountering contaminated soil or groundwater may exist during shallow (6 feet or less) excavations. If known hazardous waste sites are found near a planned excavation site, the mode of giant reed removal will be changed to hand removal as to not disturb contaminated soils.

e. For a project located within an airport land use plan or, where such a plan has not been adopted, within 2 miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?

NO IMPACT. There would be no resultant structures that would impair airport operations or endanger other land uses. No impact would occur.

f. For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area.

NO IMPACT. As discussed above, the proposed project would not result in a safety hazard for people working or residing in the surrounding area. No equipment or construction materials would be left accessible to the public once construction activities cease for the day. No impact would occur.

g. Would the project impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?

NO IMPACT. The proposed project would possibly use some light machinery, however, all work would be done off of public right-of-ways (ROW) and therefore would not impede an emergency response plan. No impact would occur.

h. Would the project expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The project site is within a moderate to high fire hazard area; however, removal of the giant reed would decrease the existing fuel load level in the area. This reduced risk with respect to fire hazard would result in a beneficial impact. During project activities, the RRTA will implement a Fire Prevention Plan described in Mitigation Measure (**HAZ-10**) to reduce impact levels to less than significant.

HAZ-10 RRTA shall develop and implement a Fire Prevention Plan to minimize the risk of starting a fire to less than significant levels.

4.9 Hydrology and Water Quality

4.9.1 Setting

The Russian River watershed is an important water resource for California. It not only provides drinking water for much of the north coast, but also supplies agriculture with necessary water for irrigation, provides fish spawning habitat for three federally listed species, and supports riparian habitats which therefore support many species of plants and animals - some of which are endemic to the area. Therefore, federal, State, and local governments, as well as citizen groups, believe it is important to protect our water resources. The proposed project intends to enhance the riparian zone along the Russian River watershed, which would in turn, benefit hydrology and water quality.

4.9.2 Environmental Impacts and Mitigation Measures

a. Would the project violate any water quality standards or waste discharge requirements?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. There is the potential for sediment-laden or polluted runoff to enter nearby waterways, thus increasing turbidity, increasing channel siltation, reduction of water quality and degradation of aquatic habitat. However, with the implementation of Mitigation Measures **GEO-1** and **GEO-2** (see Section 4.7.2) and Mitigation Measure **WQ-1** presented below, this potential impact would be reduced to a less than significant level.

WQ-1 Prior to the commencement of project activities at any particular site, RRTA shall provide the SRCD with an outline of the BMPs that will be used during project activities at that location. The BMPs shall be approved by the SRCD prior to the start of project activities to ensure that the potential for discharge into surface waters during giant reed removal is minimized.

Accidental Release of Hazardous Materials. Hazardous materials associated with the proposed project construction would include substances such as gasoline and diesel fuels, engine oil, hydraulic fluids, and herbicide. Accidental spills of these substances could contaminate drainages, soils, wetlands, and other environmentally sensitive areas. Although the potential for such a spill and release would be low, it nonetheless would represent a potentially significant impact. However, with the incorporation of Mitigation Measure **HAZ-7** (see Section 4.8), this impact would be reduced to a less than significant level.

b. Would the project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (i.e., the production rate of pre-existing nearby wells would drop to a level that would not support existing land uses or planned uses for which permits have been granted)?

NO IMPACT. The proposed project does not involve the use of groundwater for any project activities, therefore there would be no negative impact on the depletion of groundwater resources. Giant reed has been shown to use excessive amounts of water, therefore, the removal of the *Arundo* will be beneficial to groundwater supplies.

c. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner that would result in substantial erosion or siltation on-site or off-site?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The proposed project could potentially alter the existing drainage pattern of the site that could then result in substantial erosion or siltation. However, the proposed project would be phased over several years starting at the northern tributaries of the Russian River watershed working south. In the case of a large site with large quantities of giant reed, removal and restoration of the site would be phased by dividing the site into sub-sections. This would reduce disturbance at the site, which would reduce erosion and sedimentation as well as flooding. Also, with the implementation of Mitigation Measures **GEO-1** and **GEO-2** (see Section 4.7.2), and the implementation of Mitigation Measure **BIO-7** (see Section 4.5.2), the impact would be less than significant.

d. Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or substantially increase the rate or amount of surface runoff in a manner that would result in flooding on-site or off-site?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. As discussed above, the proposed project would be phased over several years starting at the northern tributaries of the Russian River watershed working south. In the case of a large site with large quantities of giant reed, removal and restoration of the site would be phased by dividing the site into sub-sections. This would reduce disturbance at the site, which would reduce erosion and sedimentation as well as flooding. Also, with the implementation of Mitigation Measures **GEO-1** and **GEO-2** (see Section 4.7.2), and the implementation of Mitigation Measure **BIO-7** (see Section 4.5.2), the impact would be less than significant.

e. Would the project create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems?

NO IMPACT. The proposed project would not utilize existing or planned storm water drainage systems. All disturbed areas would be restored with native plants and runoff would drain as sheet flow and be allowed either to percolate or to flow into temporary storm water management structures. Therefore, no impact would occur.

f. Would the project otherwise substantially degrade water quality?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Mitigation Measure **WQ-1** would protect water quality during project activities.

g. Would the project place housing within a 100-year flood hazard area, as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?

NO IMPACT. The proposed project would not include the construction or placement of housing within a 100-year floodplain. No impact would occur.

h. Would the project place within a 100-year flood hazard area structures that would impede or redirect flood flows?

NO IMPACT. The proposed project would not include structures that would impede or redirect flood flows. No impact would occur.

i. Would the project expose people or structures to a significant risk or loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam?

NO IMPACT. The proposed project would not cause or contribute to the failure of a dam or levee. As the project does not include structures that would house or accommodate people, it would not expose people or structures to a significant risk of loss, injury, or death involving flooding.

j. Would the project contribute to inundation by seiche, tsunami, or mudflow?

NO IMPACT. The proposed project would not contribute to inundation by seiche, tsunami, or mudflow. No impact would occur.

4.10 Land Use

4.10.1 Setting

Both Sonoma and Mendocino Counties have adopted General Plans that specify land use throughout the counties. Land uses throughout the entire proposed project area vary substantially, ranging from agricultural to residential to commercial.

Most of the giant reed removal will be performed by hand. However, in the unlikely event of excavation activities, local grading permits may be necessary for ground disturbing activities. Those permits address soil disturbance and the need to comply with traffic management along the public ROW. Other ordinances govern the time when construction is permitted. Section 3.4 discusses additional regulatory requirements for the proposed project.

4.10.2 Environmental Impacts and Mitigation Measures

a. Would the project physically divide an established community?

NO IMPACT. The proposed project would not physically divide an established community. No impacts would occur.

b. Would the project conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to, the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?

NO IMPACT. The proposed project has been supported by federal, State and local agencies as being necessary to eliminate the invasive of non-native giant reed and restore riparian habitat along the Russian River watershed. The proposed project does not conflict with any land use plans, policies, or regulations of agencies with jurisdiction over the project. Therefore, no impact would occur.

c. Would the project conflict with any applicable habitat conservation plan or natural community conservation plan?

NO IMPACT. Since the proposed project is utilizing the principles of local habitat conservation plans, the project is not expected to conflict with any applicable habitat conservation plans or natural community conservation plans. No impact would occur.

4.11 Mineral Resources

4.11.1 Setting

Sonoma and Mendocino Counties have a history of mineral resources extraction that goes back a century. Some mineral resources continue to be mined, such as aggregate (crushed rock) and limestone for concrete production. Gravel mining also continues on gravel bars in the Russian River.

4.11.2 Environmental Impacts and Mitigation Measures

a. Would the project result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist that would be of value to the region and the residents of the State?

NO IMPACT. The proposed project would not include construction of building structures or hard-scaping any areas. The proposed project would remove giant reed, allowing access to aggregate resources. The proposed project would not result in the loss of availability of a known mineral resource classified MRZ-2 by the State Geologist. No impacts would occur.

b. Would the project result in the loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?

NO IMPACT. As stated above, the proposed project would not include construction of building structures or hard-scaping any areas. Therefore, there would be no loss of availability of a locally important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan. No impact would occur.

4.12 Noise

4.12.1 Introduction

Generally, federal and State agencies regulate mobile noise sources, by establishing and enforcing noise standards on vehicle manufacturers. Local agencies generally regulate stationary noise sources and construction activities in order to protect neighboring land uses and the general public's health and welfare. Noise-related policies are usually adopted in the local government's general plan and usually regulate construction noise levels and time of operations.

4.12.2 Setting

The proposed project would generate very little noise as the only equipment to be used occasionally would be a single backhoe and/or a dump truck. Because removal of giant reed is expected to move quickly, construction noise at any one location would typically be audible for only one day or part of one day.

4.12.3 Environmental Impacts and Mitigation Measures

a. Would the project expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. The project would primarily involve temporary noise sources associated with construction. Implementation of the following Mitigation Measure **NOI-1** would reduce the impact to less than significant.

NOI-1 As directed by any local jurisdiction, RRTA shall implement appropriate noise mitigation measures to comply with the applicable local noise ordinance including, but not limited to, shutting off idling equipment, rescheduling project activities, notifying residents in advance of project work, or installing acoustic barriers around stationary project noise sources.

b. Would the project expose persons to or generate excessive groundborne vibration or groundborne noise levels?

NO IMPACT. The proposed project would not expose persons to or generate excessive groundborne vibration or groundborne noise levels. No impact would occur.

c. Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

NO IMPACT. The project would only require short-term maintenance of the native plants by manual hand-labor which would not result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project. No impact would occur.

d. Would the project result in a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. Project activities would result in a temporary increase in noise. With Mitigation Measure **NOI-1** (above), the temporary impact would be reduced to a less than significant level.

e. For a project located within an airport land use plan or, where such a plan has not been adopted within 2 miles of a public airport or public use airport, would the project expose people residing or working in the project area to excess noise levels?

NO IMPACT. The proposed project is not located within an airport land use area. No impact would occur.

f. For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise?

NO IMPACT. The proposed project is not located within the vicinity of a private airstrip. No impact would occur.

4.13 Population and Housing

4.13.1 Setting

The proposed project passes through many different types of land uses, one of them being residential. RRTA proposes to work with landowners in the effort to remove giant reed from the Russian River watershed.

4.13.2 Environmental Impacts and Mitigation Measures

a. Would the project induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?

NO IMPACT. No houses, roads or other infrastructure will be constructed as a part of the proposed project. No impacts will occur.

b. Would the project displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?

NO IMPACT. Construction staging activities for the proposed project would utilize existing vineyard staging areas or private ROW yards and roads. These areas would not contain any housing units, and would not result in the displacement of any existing housing. Therefore, no project impacts would occur and no mitigation measures are necessary.

c. Would the project displace substantial numbers of people necessitating the construction of replacement housing elsewhere?

NO IMPACT. The proposed project would not result in or include the construction or demolition of structures that could house people. Therefore, people would not be displaced and replacement housing would not be necessary as a result of the proposed project. No impacts would occur.

4.14 Public Services

4.14.1 Setting

As described in Section 3.3 of the Project Description, the proposed project includes the removal of giant reed along the Russian River watershed and restoration with native plants. The project spans two counties and runs through many different local jurisdictions. The proposed project would not create significant additional public service needs.

In general, public services are provided by local agencies. Fire and police protection are provided by either city-wide or county-wide departments. School districts usually define their boundaries by population and age densities of their students. Other public services, such as libraries, are provided by local agencies as needed and as funds allow.

4.14.2 Environmental Impacts and Mitigation Measures

a. Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

(i) Fire protection?

LESS THAN SIGNIFICANT IMPACT. Fire protection services could potentially be required at a project site in the event of an accident. The likelihood of an accident requiring such a response would be low. The service capacities of city and/or county fire departments in which potential accidents could occur would not be affected. Since the potential for a project related accident is low and the respective fire departments are prepared to respond to accidents across their jurisdictions, this would represent a less than significant impact.

(ii) Police Protection?

LESS THAN SIGNIFICANT IMPACT. The proposed project would not have a significant long-term impact on public services. Any potential short-term project impacts to emergency service providers would be less than significant.

(iii) Schools?

NO IMPACT. The proposed project would not create an increase in population or in-migration. Therefore, the proposed project would not cause an increased demand on existing schools and no new schools would be required because of the project. No impact would occur.

(iv) Parks?

NO IMPACT. Portions of the proposed project will be in State and regional parks. However, no population growth or in-migration would occur because of the project. Therefore, no new services would be required in the parks because of the project. No impact would occur.

(v) Other Public Facilities?

NO IMPACT. No population growth or in-migration would occur because of the project. Therefore, no new public services would be required. No impact would occur.

4.15 Recreation

4.15.1 Setting

The project area encompasses several recreational lands. Notable agencies governing recreational facilities in the proposed project area include:

- California State Parks and Recreation
- Regional Parks
- City Parks

4.15.2 Environmental Impacts and Mitigation Measures

a. Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?

NO IMPACT. Population growth in an area is generally the reason for increased use of recreational facilities. As described in Section 4.13 (Population and Housing), the proposed project would not cause a population increase or in-migration. Therefore, no impact would occur.

b. Would the project include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?

NO IMPACT. The proposed project does not include the construction or expansion of recreational facilities. Therefore, no impact would occur.

c. Would the project result in permanent and/or temporary impacts, such as possible disruption of recreational activities, affecting the recreational value of existing facilities?

LESS THAN SIGNIFICANT IMPACT WITH MITIGATION INCORPORATED. As described in Section 4.8, construction activities and the application of herbicide would limit access temporarily to some recreational areas. However, with the implementation of Mitigation Measures **HAZ-4** and **REC-1**, the impact would be less than significant.

REC-1 RRTA shall schedule project activities to avoid peak use periods (e.g., weekends and holidays) for recreational facilities. Onsite notification of recreational access closures shall be provided at least 2 weeks in advance, through the posting of signs and/or notices.

4.16 Transportation and Traffic

4.16.1 Setting

Caltrans is responsible for managing and maintaining State and Interstate highways. Cities and counties are responsible for all other roads within their boundaries.

The proposed project would not encroach into any public right-of-ways (ROW). Project crews would utilize public roads to travel to and from the project sites.

4.16.2 Environmental Impacts and Mitigation Measures

a. Would the project cause an increase in traffic that is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume-to-capacity ratio on the roads, or congestion at intersections)?

LESS THAN SIGNIFICANT IMPACT. The proposed project would require crews to be transported to and from project locations. Crews would carpool to the project locations and would not be utilizing more than four vehicles at a time throughout both counties. Therefore, the impact would be less than significant.

b. Would the project cause, either individually or cumulatively, a level-of-service standard established by the county congestion management agency for designated roads or highways to be exceeded?

LESS THAN SIGNIFICANT IMPACT. As stated above, the proposed project would require crews to be transported to and from project locations. Crews would carpool to the project locations and would not be utilizing more than four vehicles at a time throughout both counties. Therefore, the impact would be less than significant.

c. Would the project result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?

NO IMPACT. The proposed project does not involve aircraft activities and would not result in a change in air traffic patterns. No impact would occur.

d. Would the project substantially increase hazards because of a design feature or incompatible uses?

NO IMPACT. The proposed project would not be located on any public right-of-ways (ROW). No impact would occur.

e. Would the project result in inadequate emergency access?

NO IMPACT. As stated above, the proposed project would not be located on any public right-of-ways (ROW) and would not impede emergency access to a location. No impact would occur.

f. Would the project result in inadequate parking capacity?

NO IMPACT. The proposed project would not interfere with public or private parking areas. No impact would occur.

g. Would the project conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?

NO IMPACT. The proposed project would not be located on any public right-of-ways (ROW). No impact would occur.

4.17 Utilities and Service Systems

4.17.1 Setting

The proposed project would not involve the use of electricity or natural gas. All site work would be conducted using hand labor and fuel-powered equipment. Also, the proposed project would not involve the establishment of, or require communication lines.

4.17.2 Environmental Impacts and Mitigation Measures

a. Would the project exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?

NO IMPACT. The proposed project would not generate wastewater. Therefore, the wastewater treatment requirements of the RWQCBs would not be exceeded. No impacts would occur.

b. Would the project require, or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. The proposed project would not generate wastewater and would require only a minor amount of water for dust suppression during project activities and watering of native plants. Therefore, the proposed project would not require, or result in the construction of, new water or wastewater treatment facilities or expansion of existing facilities. No impact would occur.

c. Would the project require, or result in the construction of, new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?

NO IMPACT. The proposed project would not create new impermeable surfaces that would substantially increase drainage runoff beyond current conditions. Accordingly, the proposed project would not require or result in the construction or expansion of stormwater drainage facilities. No impact would occur.

d. Would the project have sufficient water supplies available to serve the proposed project from existing entitlements and resources, or would new or expanded entitlements be needed?

LESS THAN SIGNIFICANT IMPACT. The proposed project would require temporary maintenance of native plants. The watering of native plants would be provided by landowners, who have existing water resources, or brought onto the site by RRTA. Native plants require very little water and would only be watered temporarily. Therefore, the impact would be less than significant.

e. Would the project result in a determination by the wastewater treatment provider that serves or may serve the proposed project that it has adequate capacity to serve the proposed project's projected demand in addition to the provider's existing commitments?

NO IMPACT. The proposed project would not require wastewater treatment. No impact would occur.

f. Would the project be served by a landfill with sufficient permitted capacity to accommodate the proposed project's solid waste disposal needs?

NO IMPACT. The proposed project would not generate solid waste that could not be recycled. No impact would occur.

g. Would the project comply with federal, State, and local statutes and regulations related to solid waste?

NO IMPACT. As stated above, the proposed project would not generate solid waste that could not be recycled. No impact would occur.

4.18 Mandatory Findings of Significance

The CEQA Environmental Checklist presents the following three issues for which a finding of a significant impact would result in requiring preparation of an Environmental Impact Report:

- (a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?
- (b) Does the project have impacts that are individually limited, but cumulative considerable? (“Cumulative considerable” means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?
- (c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?

As documented in Appendix A (Environmental Checklist), the IS/MND concluded that, with implementation of the mitigation measures included herein, impacts in each of the three categories would be less than significant.

5. Notice of Determination

Notice of Determination

TO: County Clerk
Sonoma County
2300 County Center B-177
Santa Rosa, CA 95403

FROM: Sotoyome Resource
Conservation District
P.O. Box 11526
Santa Rosa, CA 95406

SUBJECT: Filing of Notice of Determination in compliance with Section 21108 or 21152 of the Public Resources Code.

Project Title: Giant Reed (*Arundo donax*) Removal and Riparian Habitat Restoration in the Russian River Watershed.

Contact Person: Kerry Williams: (707) 569-1448

Project Location: The project sites are along the main stem of the Russian River in Mendocino and Sonoma County as well as tributaries to the Russian River.

Project Description: The invasion by giant reed is contributing to the decline of Russian River riparian habitat – a critical habitat type upon which salmonids and many other wildlife species depend. The project proposes to cut the giant reed at the rootstock using hand tools and remove it from the stream zone. Mechanized equipment may be used in locations where hand removal is not possible. The remaining biomass will be removed by hand or covered with tarps or a thick pond liner for approximately 6 months in order to kill the invasive species. Some of the biomass that cannot be tarped because of location will be painted on the stumps with glyphosate herbicide. Removal of giant reed by this method will take place in the summer and fall months when the cut and paint method has the highest *Arundo* mortality rate and the bird nesting season is over. Wherever possible, methods other than herbicide shall be used to eliminate giant reed. After the giant reed has been determined to be dead in an area, native plant restoration will take place.

This is to advise that the Sotoyome Resource Conservation District has approved the above-described project on October 14, 2004 and has made the following determinations regarding the above-described project:

1. The project ___ will, X will not have a significant impact on the environment.
2. ___ An Environmental Impact Report was prepared for this pursuant to the provisions of CEQA.
3. Mitigation measures ___ were, X were not made a condition of the approval of the project.
4. A statement of Overriding Considerations ___ was, ___ was not adopted for this project.
5. Findings ___ were, ___ were not made pursuant to the provisions of CEQA.

This is to certify that the final Negative Declaration with comments and responses and record of project approval is available to the General Public at: Sotoyome RCD office, 970 Piner Road, Santa Rosa, CA 95403.

Original Signed by Ron Roller *10/15/04* *President*

Article II. Signature (Public Agency) Date
Title

6. REFERENCES

- Alt, David D. and Hyndman, Donald W. 1975 *Roadside Geology of Northern California*. Mountain Press Publishing Company. Missoula, Montana.
- Barrett, S.A. 1908. The Ethno-geography of the Pomo and Neighboring Indians. *University of California Publications in American Archaeology and Ethnology* 6(1):1-332. Berkeley.
- Behler, John L. and F. Wayne King. 1979. *Field Guide to North American Reptiles and Amphibians*. Chanticleer Press, Inc. New York, NY.
- Best, Catherine, et al. 1996. *A Flora of Sonoma County: Manual of Flowering Plants and Ferns of Sonoma County, California*. California Native Plant Society, Sacramento, California.
- California Department of Fish and Game (CDFG) 2002. *Russian River Basin Fisheries Restoration Plan*. Sacramento, California.
- California State Parks. 2004. California State Parks - Find a Park website. <http://www.parks.ca.gov/> Accessed August 2004.
- Caltrans (California Department of Transportation). 2003. Caltrans California Scenic Highway Program website. <http://www.dot.ca.gov/hq/LandArch/scenic/scpr.htm> Accessed August 2004.
- California Native Plant Society. Invasive Exotics. <http://www.cnps.org/conservation/exotics.htm> Accessed July 2004.
- _____. 1997. *CNPS Manual of California Vegetation On-line*. Amended February 2000. <http://davisherb.ucdavis.edu/cnpsActiveServer/index.html> Accessed August 2004.
- Circuit Rider Productions, Inc., et al. June, 2002. *Invasion Status, Impacts and Effective Control of *Arundo donax* in the Russian River Watershed*. Final Report to the Sonoma County Water Agency Fisheries Enhancement Program (FEP Grants 1999 and 2000).
- County of Mendocino. 1981. Mendocino County General Plan website. September 1981. Amended. <http://www.co.mendocino.ca.us/planning/GenPlan/GPCContents.htm> Accessed May 2004.
- County of Sonoma. 1989. Sonoma County General Plan website. March 1989. Amended. <http://www.sonoma-county.org/prmd/gp2020/elements.html> Accessed May 2004.
- Davis, Richard C. ed. 1983. *Encyclopedia of American Forest and Conservation History*. MacMillan Publishing Company, Omaha.
- Dillon, Brian D., and Richard H. Dillon. 1993. *Timberland Historical Archaeology Notes 3: A Brief*

History of Logging in California. Prepared for California Department of Forestry and Fire Protection.

- Dowdall, Katherine M. and Thomas M. Origer. 1997 *A View of Crescents from Sonoma County*. Paper presented at the 31st Annual Meeting of the Society for California Archaeology, Rohnert Park.
- Ehrlich, Paul R., et al. 1988. *The Birder's Handbook: A Field Guide to the Natural History of North American Birds*. Simon and Schuster, Fireside. New York, NY.
- Ferguson, Ruby Alta. 1931. *The Historical Development of the Russian River Valley, 1579-1865*. Dissertation.
- Fredrickson, D.A. 1973. *Early Cultures of the North Coast Ranges, California*. Ph.D. dissertation, Department of Anthropology, University of California, Davis.
- _____. 1974 Cultural Diversity in Early Central California: A view from the North Coast Ranges. *The Journal of California Anthropology* 1(1):41-54.
- _____. 1984 The North Coastal Region. In *California Archaeology*, edited by M.J. Moratto, pp. 471-527. Academic Press, Inc., Orlando.
- Garcia and Associates. 2004. *Cultural Resources Existing Conditions Report for the Russian River Watershed Arundo Removal Project*. Prepared for Circuit Rider Productions, Inc. August. San Anselmo, California.
- Hansen, Harvey J. and Thurlow Miller. 1962. *Wild Oats in Eden: Sonoma County in the 19th Century*. Santa Rosa, CA.
- Helley, E.J., Lajoie, K.R., Spangle, W.E., and Blair, M.L. 1979. *Flatland deposits of the San Francisco Bay Region, California - Their geology and engineering properties, and their importance to comprehensive planning*. U.S. Geological Survey Professional Paper 943, 88 p., map scale 1:125,000.
- Hickman, J., ed. 1993. *The Jepson Manual: Higher Plants of California*. University of California Press, Berkeley, California.
- Holway, Ruliff Stephen. 1913. *The Russian River, A Characteristic Stream of the California Coast Ranges*. University of California Press. Berkeley, California.
- Hopkirk, J.D. 1974. *Endemism in Fishes of the Clear Lake Region of Central California*. University of California Press. Berkeley, California.
- Huffman, M.E., and Armstrong, C.F. 1980. *Geology for Planning in Sonoma County*. California Division of Mines and Geology, Special Report 120, 31p.

- Jennings, C.W., Strand, R.G., Rogers, T.H. 1977. *Geologic Map of California, Map no. 2*. California Geologic Data Map Series, California Department of Conservation, Division of Mines and Geology, map scale 1:750,000.
- Kroeber, A.L. 1925. Handbook of the Indians of California. *Bureau of American Ethnology Bulletin* 78, Smithsonian Institution, Washington.
- McLendon, S. and R.L. Oswalt. 1978. Pomo: Introduction. In *Handbook of North American Indians, Volume 8*, edited by R.F. Heizer, pp. 274-288. Smithsonian Institution, Washington.
- Miller, V.C. 1972. *Soil Survey of Sonoma County, California*. United States Department of Agriculture, Forest Service and Soil Conservation Service, in cooperation with the University of California Agricultural Experiment Station.
- Origer, Thomas M. and David A. Fredrickson. 1980. *The Laguna Archaeological Research Project, Sonoma County*. Report prepared for the Public Works Department, City of Santa Rosa. Report prepared by the Cultural Resources Facility, Anthropological Studies Center, Sonoma State University.
- Sibley, David Allen. 2000. *National Audubon Society: The Sibley Guide to Birds*. Chanticleer Press, Inc. New York, NY.
- Smith, Gladys L., Clare R. Wheeler. 1992. *A Flora of the Vascular Plants of Mendocino County, California*. University of San Francisco, San Francisco, California.
- Sonoma County Grape Growers Association (SCGGA) Website. 2003 (July). Sonoma County's Wine History. <http://www.sonomagrapevine.org/pages/vineyardviews/vvhistory.html>
- Steiner Environmental Consulting (SEC). 1996. *A History of the Salmonid Decline in the Russian River*. Potter Valley, California.
- Stewart, Omer C. 1943. *Notes on Pomo Ethnogeography*. Coyote Press. Salinas, California.
- Stewart, S.B. 1985. *Time Before Time: Prehistoric and Archaeology in the Lake Sonoma Area*. U.S. Army Corps of Engineers, Sacramento.
- Stindt, Fred A. 1974. *Trains to the Russian River*. Private Printing. Kelseyville, California.
- USFS (U.S. Forest Service). 2002. *Environmental Assessment of Eradication of *Arundo donax* in Big Tujunga Canyon*. Prepared for the U.S. Forest Service, Angeles National Service. Prepared by Jones & Stokes. March.
- VCWPD (Ventura County Watershed Protection District). 2003. *Casitas Springs *Arundo donax* Removal Project Administrative Draft Environmental Impact Report*. Prepared for the VCWPD. Prepared by Aspen Environmental Group. May.

Wilson, Simone. 1990. *Sonoma County: River of Time*. American Historical Press. Sun Valley, California.

Withington, Jack. 2000. *Historical Buildings of Sonoma County: A Pictorial Story of Yesterday's Rural Structures*. 3rd Wing Press, Penngrove, CA.

7. REPORT PREPARATION AND GLOSSARY

Table 7-1 List of Preparers

Sotoyome Resource Conservation District Project Manager	Kara Heckert, Project Manager Sotoyome Resource Conservation District
Project Manager	Rose Roberts, Nursery Manager Circuit Rider Productions, Inc.
Project Description	Karen Gaffney, Dir. of Ecological Services Circuit Rider Productions, Inc.
Biological Resources	Rocky Thompson, Restoration Planner Jody Fessler, Environmental Specialist Circuit Rider Productions, Inc.
Cultural Resources, Geology and Soils	Daniel Hart, M.A., R.P.A. Garcia and Associates
Aesthetics, Agricultural Resources, Air Quality, Hazards and Hazardous Materials, Hydrology and Water Quality, Land Use, Mineral Resources, Noise, Population and Housing, Public Services, Recreation, Transportation and Traffic, Utilities and Service Systems	Jody Fessler, Environmental Specialist Circuit Rider Productions, Inc. Kara Heckert, Project Manager Sotoyome Resource Conservation District
Document Production	Kara Heckert, Project Manager
Graphics	Katherine Gledhill, Watershed Planning Mgr. Circuit Rider Productions, Inc.

Table 7-3 Glossary of Acronyms

ACOE	U.S. Army Corps of Engineers
AQMP	Air Quality Management Plan
BACM	Best Available Control Measures
BAMP	Best Available Management Practices
BMP	Best Management Practice
Cal-OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CNDDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRHR	California Register of Historical Resources
CRS	Cultural Resource Specialist
DFG	California Department of Fish and Game
DNL	Day-Night Average Noise Level
EPA	U.S. Environmental Protection Agency
ESA	Federal Endangered Species Act
IS/MND	Initial Study/Mitigated Negative Declaration
MMRP	Mitigation, Monitoring, and Reporting Plan
MND	Mitigated Negative Declaration
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NO _x	Nitrogen Oxides
NRHP	Natural Register of Historic Places
ROW	Right-of-way
RRTA	Russian River Team <i>Arundo</i>
RWQCB	Regional Water Quality Control Board
SHPO	State Office of Historic Preservation
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WEAP	Worker Environmental Awareness Program

Appendix A

Environmental Checklist Form

1.	Project title: Giant Reed (<i>Arundo donax</i>) Removal and Riparian Habitat Restoration in the Russian River Watershed		
2.	Lead agency name and address: Sotoyome Resource Conservation District 970 Piner Road Santa Rosa, CA 95403		
3.	Contact person and phone number: Kerry Williams, District Manager (707) 569-1448		
4.	Project location: The project sites are along the main stem of the Russian River in Mendocino and Sonoma County as well as tributaries to the Russian River.		
5.	Project sponsor's name and address: Russian River Team <i>Arundo</i> c/o Circuit Rider Productions, Inc. 9619 Old Redwood Hwy. Windsor, CA 95492		
6.	General plan designation: See Section 4.10 (Land Use)	7.	Zoning: See Section 4.10 (Land Use)
8.	Description of project: See Section 3 (Project Description)		
9.	Surrounding land uses and setting: See Section 3 (Project Description) and 4.10 (Land Use)		
10.	Other public agencies whose approval is required: Department of Fish and Game will need to approve a 1602 permit. A representative from the Army Corp of Engineers has been contacted about giant reed removal using both the cut and paint method and tarping. Both of these methods would not require a Army Corp 404 permit. (per conversation with Peter Straub, U.S. Army Corp of Engineers (415) 977-8443, 1/30/2004)		

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

X	Aesthetics		Agriculture Resources	X	Air Quality
X	Biological Resources	X	Cultural Resources	X	Geology /Soils
X	Hazards & Hazardous Materials	X	Hydrology / Water Quality		Land Use / Planning
	Mineral Resources	X	Noise		Population / Housing
	Public Services	X	Recreation		Transportation/Traffic
	Utilities / Service Systems		Mandatory Findings of Significance		

DETERMINATION:

On the basis of this initial evaluation:

	I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.
X	I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.
	I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.
	I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature

Date

Sotoyome Resource
Conservation District

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
I. AESTHETICS -- Would the project:				
a) Have a substantial adverse effect on a scenic vista?		X		
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?		X		
c) Substantially degrade the existing visual character or quality of the site and its surroundings?		X		
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?		X		
II. AGRICULTURE RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?				X
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?				X
c) Involve other changes in the existing				X

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?				
III. AIR QUALITY -- Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
a) Conflict with or obstruct implementation of the applicable air quality plan?		X		
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?			X	
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?			X	
d) Expose sensitive receptors to substantial pollutant concentrations?			X	
e) Create objectionable odors affecting a substantial number of people?				X
IV. BIOLOGICAL RESOURCES -- Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the		X		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
California Department of Fish and Game or U.S. Fish and Wildlife Service?				
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or US Fish and Wildlife Service?		X		
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?		X		
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?			X	
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?				X
V. CULTURAL RESOURCES -- Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in ' 15064.5?		X		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to ' 15064.5?		X		
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?		X		
d) Disturb any human remains, including those interred outside of formal cemeteries?		X		
VI. GEOLOGY AND SOILS -- Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				X
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.				X
ii) Strong seismic ground shaking?				X
iii) Seismic-related ground failure, including liquefaction?				X
iv) Landslides?				X
b) Result in substantial soil erosion or the loss of topsoil?		X		
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence,		X		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
liquefaction or collapse?				
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?				X
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?				X
VII. HAZARDS AND HAZARDOUS MATERIALS B Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?		X		
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?		X		
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?		X		
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?		X		
e) For a project located within an airport land use plan or, where such a plan has				X

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?				
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?				X
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?				X
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?		X		
VIII. HYDROLOGY AND WATER QUALITY -- Would the project:				
a) Violate any water quality standards or waste discharge requirements?		X		
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?				X
c) Substantially alter the existing drainage pattern of the site or area,		X		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?				
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?		X		
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?				X
f) Otherwise substantially degrade water quality?		X		
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?				X
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?				X
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?				X
j) Inundation by seiche, tsunami, or mudflow?				X
IX. LAND USE AND PLANNING - Would the project:				
a) Physically divide an established				

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
community?				X
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?				X
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?				X
X. MINERAL RESOURCES -- Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?				X
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?				X
XI. NOISE B Would the project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?				X
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the				X

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
project?				
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?		X		
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?				X
XII. POPULATION AND HOUSING -- Would the project:				
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?				X
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?				X
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?				X
XIII. PUBLIC SERVICES				
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically				

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?			X	
Police protection?			X	
Schools?				X
Parks?				X
Other public facilities?				X
XIV. RECREATION --				
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?				X
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X
c) Would the project result in permanent and/or temporary impacts, such as possible disruption of recreational activities, affecting the recreational value of existing facilities?				
XV. TRANSPORTATION/TRAFFIC -- Would the project:				
a) Cause an increase in traffic which is			X	

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections)?				
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?			X	
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?				X
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?				X
e) Result in inadequate emergency access?				X
f) Result in inadequate parking capacity?				X
g) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?				X
XVI. UTILITIES AND SERVICE SYSTEMS B Would the project:				
a) Exceed wastewater treatment requirements of the applicable Sotoyome Resource Conservation District?				X
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could				X

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
cause significant environmental effects?				
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?				X
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?			X	
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project=s projected demand in addition to the provider=s existing commitments?				X
f) Be served by a landfill with sufficient permitted capacity to accommodate the project=s solid waste disposal needs?				X
g) Comply with federal, state, and local statutes and regulations related to solid waste?				X
XVII. MANDATORY FINDINGS OF SIGNIFICANCE --				
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?		X		

	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?		X		
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?		X		

APPENDIX B

Methods of Mapping

Main Stem Mapping

The procedures listed below describe methods used to determine the extent of *Arundo donax* invasion occurring within the riparian zone along the mainstem Russian River. As part of this project Circuit Rider Productions, Inc. (CRP) mapped the extent of the giant reed invasion using Geographic Information Systems (GIS) software ArcView GIS version 3.1, donated by Environmental Systems Research Institute, Inc. (ESRI), Environmental Conservation Program.

Main stem river reaches were defined as follows:

1. Lower Reach, Sonoma County: mouth of Russian River to the Wohler Bridge
2. Middle Reach, Sonoma County: Wohler Bridge to Healdsburg Hwy. 101 bridge
3. Fitch Mountain Reach, Sonoma County: Healdsburg, Hwy. 101 bridge to Alexander Valley bridge
4. Alexander Valley Reach, Sonoma County: Alexander Valley bridge to the Sonoma-Mendocino county boundary
5. Mendocino County Reach: Sonoma-Mendocino county boundary to Tomki bridge in Redwood Valley

USGS Digital Orthogonal Quarter Quadrangles (DOQQ) were used as base maps for the project, for the raster-format underlay for display of the final mapped stands of *Arundo*, as well as for the calibration of the unrectified low-level Aggregate Resources Management (ARM) Plan aerial photos. Sonoma and Mendocino County USGS DOQQ were developed from 1993 National Aerial Photography Program imagery (1:40,000 photo scale). The project 3.75-minute DOQQ are in the Universal Transverse Mercator coordinate system on the North American Datum of 1983 and have a ground pixel distance of 1 meter.

The Aggregate Resources Management (ARM) Plan aerial photos provided the most detailed, recent and consistent imagery coverage of the mainstem Russian River for photo-interpretation and digitizing individual stands of *Arundo*. Though these aerial photos were not orthogonally rectified, the terrain within the floodplain study area is relatively level and the mapping results are considered acceptable for purposes of natural resources planning. The set of ARM Plan aerial photographs used in this study were taken by Delta Geomatics, Inc., May 1999, at a scale of 1:4,800. Mylar enlargements of the original photographs, were produced by Delta Geomatics, Inc. for the Middle Reach, Alexander Reach and much of the Fitch Mountain Reach, at a scale of 1:2,400; and reproduced using blueprinting processes. These blue-line prints were used to delineate *Arundo* feature boundaries, augmented by low level aerial photographs taken by CRP. *Arundo* polygons not clearly seen in the photographs were identified on the map for future field editing.

In the fall/winter months of 1998, low-level fixed wing aircraft test flights were conducted to determine the best film type, weather conditions, season, photo angle, and plane flight altitude for photographing *Arundo* in a riparian setting. Both banks of the 115 mile long Russian River mainstem were photographed during several low level flights conducted during the winter months (Jan./Feb. 1999), when riparian plant species were dormant, providing the clearest view of *Arundo* stands. Attempts were taken to photograph during overcast weather to avoid shadow effect. A series of sequential,

overlapping photographs was taken for both banks, at an approximate altitude of 500 feet, at a 45 degree angle, using Kodak Gold color film.

The above mentioned photographs were used to enhance monoscopic photo interpretation of the ARM Plan low-level aerial photo coverage (May 1999) of the Alexander Valley, Fitch Mountain and Middle reaches of the Russian River in Sonoma County. The ARM Plan aerial photo coverage was registered to the digital 1:12,000 USGS DOQQ base maps with a minimum of five control points for each blue-line aerial photo enlargement using the projective transformation routine in AutoCAD Release 12.0. Manual digitizing of *Arundo donax* feature boundaries was performed on a 24" x 36" CalComp Drawing Board II digitizing tablet.

The accuracy of registration between each blue-line enlargement and the base map was measured by the Root Mean Square Error (RMSE), or an accuracy average of all tested points on a map (in statistical terms) and calculated in map units (meters). The USGS National Map Accuracy Standards constrain the maximum acceptable RMSE according to the intended scale of the output maps. Since the output maps for the project were to be plotted at a minimum scale of 1:6,000 (1"=500'), the tolerance value specified by the National Map Accuracy Standards for maps of this scale was used as a guide during the registration operation.

The appropriate RMSE value when registering the blue-line ARM Plan maps to the digital base maps is 3.29180 m (or 0.018 inch in digitizer units). 89% of the individual blue-line sheets for the *Arundo* coverage were able to meet this standard. 100% of the individual blue-line sheets for the *Arundo* coverage were able to meet this standard for the output scale 1:12,000 (1"=1000').

Arundo feature boundaries and location were digitized directly onto the USGS DOQQ base maps using ESRI ArcView 3.1 software, for those areas not covered by the ARM Plan aerial photos, (the Mendocino County Reach and Lower Reach in Sonoma County). The data set for these areas is considered to be less accurate.

Though the extent of *Arundo* growth and general locations of feature polygons were the main focus of this mapping project, the determination of stand growth-patterns in relation to surrounding vegetation was considered important due to the implications for eradication efforts and long term monitoring. *Arundo* stands were classified into the following categories:

1. Overstory: discreet stands of *Arundo* growing as a mono-culture, visible on both the blue-line enlargements and the low-level oblique photographs.
2. Overstory/Intermixed: stands of *Arundo* growing as overstory, but intermixed with other same-sized shrubs and trees.
3. Understory: stands of *Arundo* growing as the understory layer, with an overstory canopy consisting of larger-sized trees.

ArcView 3.1 software was used to convert AutoCAD drawings into a Geographic Information System (GIS) format, allowing data analysis and acreage compilation.

Arundo donax GIS Mapping - file structure and data definitions

Arundo donax shape files are found in */gis_projects/Arundo_donax/Arundo/ directory. Each directory is comprised of subdirectories arcview (for shape files), cad (original cad files from digitizing process, where available) and calibrat (calibration point coordinate files used in digitizing process, where available) Individual directories, arcview subdirectories and shape files for each reach include:

- **AD Alexander Valley/arcview/Adav0_ply.shp, Adav1_ply.shp, Adav2_ply.shp, Adav3_ply.shp**
Each of these files cover a different portion of the Alexander Valley and are made up of layers (see method section for more detail):
AD: Overstory - discreet stands of *Arundo* growing as a mono-culture
AD2: Overstory/Intermixed - stands of *Arundo* growing as overstory, but intermixed with other same-sized shrubs and trees.
AD_under: Understory: stands of *Arundo* growing as the understory layer, with an overstory canopy consisting of larger-sized trees.
- **AD Fitch Mountain/arcview/fm1.shp**
This file covers the portion of the Fitch Mountain area with SCWA ARM photo coverage (see method section) and are made up of layers:
AD: Overstory - discreet stands of *Arundo* growing as a mono-culture
AD2: Overstory/Intermixed - stands of *Arundo* growing as overstory, but intermixed with other same-sized shrubs and trees.
AD_under: Understory: stands of *Arundo* growing as the understory layer, with an overstory canopy consisting of larger-sized trees.
- **AD Fitch Mountain/arcview/fm_over.shp** (corresponds with Overstory definition listed above), **fm_shrub.shp** (corresponds with Overstory/Intermixed definition) and **fm_under.shp** (corresponds with Understory definition)
- **AD lower reach/arcview/ lr_over.shp** (corresponds with Overstory definition listed above), **lr_shrub.shp** (corresponds with Overstory/Intermixed definition) and **lr_under.shp** (corresponds with Understory definition)
- **AD Mendocino/arcview/adxloc.shp, ad00.shp, ad.shp**
(note: these names should be changed or shape files aggregated)
Each of these files cover a different portion of the Mendocino reach with no stand type differentiation.
- **AD middle reach/arcview/admr_ply.shp**
This file covers the entire middle reach area and is made up of layers:
AD: Overstory - discreet stands of *Arundo* growing as a mono-culture
AD2: Overstory/Intermixed - stands of *Arundo* growing as overstory, but intermixed with other same-sized shrubs and trees.

AD_under: Understory: stands of *Arundo* growing as the understory layer, with an overstory canopy consisting of larger-sized trees.

As well as some miscellaneous directories:

- Area Masks (area shape files)
- Base (Excel and database files for acreage analysis, .tif files to be used as location maps or general base maps, and various shape files [rr_ws.shp – Russian River watershed boundary][russianr.shp – Russian River][so_me.shp – Sonoma and Mendocino county boundaries])

In March of 2001, the .shp files for *Arundo* extent in Mendocino County were appended into one .shp file. Using the Map Join functionality within The Engine extension (Geokinetic Systems Inc.), the ad00.shp file was appended to adxloc.shp. The resulting file from this join was appended to ad.shp. The resulting .shp file illustrates the extent of *Arundo Donax* infestations along the Russian River in Mendocino County, CA.

Tributary Mapping

The procedures listed below describe methods used to survey and map the extent of *Arundo donax* invasion occurring within the alluvial zone along significant tributaries of the Russian River. As part of this project Circuit Rider Productions, Inc. (CRP) mapped the extent of the giant reed invasion using Geographic Information Systems (GIS) software ArcView GIS version 3.1, donated by Environmental Systems Research Institute, Inc. (ESRI), Environmental Conservation Program.

CRP has surveyed the majority of the salmonid-bearing streams in the watershed (Table 2) to document the level of *Arundo* invasion. Because *Arundo* tends to be found predominantly in alluvial areas, CRP has focused the aerial reconnaissance and mapping program on the alluvial sections of the tributary streams.

Two sets of imagery data were used as base maps for the project due to differences in available digital aerial photography data for Sonoma and Mendocino counties. For Mendocino county, USGS Digital Orthogonal Quarter Quadrangles (DOQQ) were used for the raster-format underlay for display of the final mapped stands of *Arundo*. . Mendocino County USGS DOQQ were developed from 1993 National Aerial Photography Program imagery (1:40,000 photo scale). The project 3.75-minute DOQQ are in the Universal Transverse Mercator coordinate system on the North American Datum of 1983 and have a ground pixel distance of 1 meter.

For infestations mapped in Sonoma county, newly released orthophotography was used as the base imagery. The county orthophotography utilized in this project was a “Beta Version” of the orthophotography in Mr. SID-Compressed format. The data are stored in California Stateplane Zone II, NAD 83 (survey feet) II coordinates, and have been corrected to the ground using aerial and ground-based global positioning system (GPS) survey coordinates. At the time of use, the image data was being quality checked by County staff and may have contained irregularities. Available photo resolution varies within the orthophoto coverage with one-foot resolution or better in urban or incorporated areas and two-foot resolution in forested, mountainous, or other unincorporated areas of the County. In both

counties, *Arundo* stands were interpreted from photographs taken during a series of low-level fixed wing aircraft flights.

In the fall/winter months of 1998, low-level fixed wing aircraft test flights were conducted to determine the best film type, weather conditions, season, photo angle, and plane flight altitude for photographing *Arundo* in a riparian setting. The significant tributaries were photographed during several low level flights conducted during the winter months (Jan./Feb. 2001), when riparian plant species were dormant, providing the clearest view of *Arundo* stands. A series of sequential, overlapping photographs was taken for both banks, at an approximate altitude of 500 feet, at a 45 degree angle, using Kodak Gold color film. *Arundo* polygons not clearly seen in the photographs were identified in the GIS database as being sites that require further surveying or base imagery with improved resolution.

Subsequent to the development of the hand held camera photographs, the photos were cataloged in a Microsoft Excel datasheet, indicating the roll number, photo number a general locational descriptor and the name of the tributary that the photograph captures. The features determined to be *Arundo* infestations were then digitized directly onto the USGS DOQQ base maps using ESRI ArcView 3.1 and ArcView 3.2 software. When possible, the area boundary of the infestation was digitized, producing a polygon feature to describe the infestation. However, in many cases the resolution of the base imagery was inadequate for mapping the infestations as polygonal data features. Consequentially, a majority of the tributary infestations were mapped as points, representing approximate locations of the centers of infestation stands. The differences in polygonal and point data have been accounted for by creating centroids of the digitized polygons. The resulting points were merged together into one GIS format file (ESRI .shp file) that illustrates and describes the extent of *Arundo* infestations along significant tributaries to the Russian River. Additionally, a GIS format (ESRI .shp file) has been created that describes the Russian River tributaries that have *Arundo donax* infestations along them.

Results

Mapping

Maps generated from the CRP project are included as Figures 2-18, and depict only selected representative locations of *Arundo* invasion for the main stem and the tributaries. The entire data set has been provided via CD to the Sonoma County Water Agency.

Seven hundred and sixty four points were identified as approximate locations (point data) of *Arundo donax* infestations within this study. Of these 764, CRP was able to calculate polygonal data for 663. These polygons ranged in size from a minimum of 0.00012 acres to a maximum of 0.95 acres, with the mean acreage being 0.04. Because it was not possible to gather polygonal data on each point due to the inadequacies of the underlying photography, CRP was unable to supply accurate acreage calculations for the tributaries. However, these data can be used to gain a general understanding of the number of acres in tributary watersheds and provide accurate information about the location of tributary infestations.

A significant number of tributary infestations are located near the confluence of the tributary and the mainstem. After the mapping was completed, this study required a mechanism for determining which infestations within proximity to the confluence were tributary infestations and which infestations were

more closely associated with the mainstem. Using ArcView 3.2, a buffering method was used to facilitate this determination. A buffer of thirty feet was applied to the hydrology of the Russian River. Infestations located within a thirty foot radius of the mainstem and tributary confluence were assigned to the tributary while those that were within proximity to the confluence but did not intersect the thirty foot buffer were attributed as being mainstem infestations. After applying this somewhat arbitrary filter, the data resulted in 227 points being categorized as tributary infestations.

Though the extent of *Arundo* growth and general locations of feature polygons were the main focus of this mapping project, the determination of stand growth-patterns in relation to surrounding vegetation was considered important due to the implications for eradication efforts and long term monitoring. *Arundo* stands were classified into the following categories:

Category

- 1- *Arundo* mixed with bareground
- 2 - *Arundo* mixed with shrubs and trees
- 3 - *Arundo* mixed with bareground and shrubs
- 4 - Reinterpretation of *Arundo* locations from previous mapping
- 5 - *Arundo* that is identified with confidence
- 6 - Identified as *Arundo*, but was not mapped, either due to poor aerial photo quality or inadequate DOQQ resolution
- 7 - *Arundo* is tentatively identified, but needs field checking to be confident

Category	Tributary	Mainstem	Total Points
1	1	5	6
2	13	37	50
3	2	9	11
4	6	24	30
5	196	412	608
6	6	38	44
7	3	12	15

43 tributaries in the Russian River watershed were identified as having *Arundo* infestations. Of these tributaries, 15 were unnamed tributaries according to the 1:24,000 hydrographic GIS dataset (hydro_121.shp) produced by CDF FRAP (<http://frap.cdf.ca.gov/data/frapgisdata/select.asp>). 28 Tributaries are named and included in **Table 4**. Map readers are able to identify these unnamed tributaries using the LLID value which is a unique numeric ID assigned to each hydrographic line feature in the 1:24,000 dataset. Certain tributaries are indicated as having *Arundo* infestations without corresponding information in the GIS point file indicating the approximate location of the infestation. This is a result of tributaries that have been identified as having *Arundo* through field surveying however, the point location information was unable to be mapped due to either inadequate base imagery resolution or complications in recording GPS information at the site. The method through which each

the point data (representing approximate infestation locations) as well as the line data (representing infested tributaries) has been recorded in the “Methods” field of the two GIS databases. The various method values are as follows:

AP- information is from an aerial photograph

LK- information is from local knowledge, such as someone telling us he/she knows *Arundo* is present in a general area

FC- the *Arundo* was seen in the field and either was mapped or a GPS reading was taken

Discussion

Mapping

The 1999 baseline mapping of giant reed provides important benchmark data for ongoing monitoring of this highly invasive species. Future map data can be compared to the 1999 baseline to determine rate of expansion, as well as to evaluate the success of control and restoration efforts. Additionally, it may be possible to obtain quantitative historic information about the level of reed invasion from aerial photos, thereby allowing us to develop a chronological understanding of the expansion of this noxious weed in the Russian River system. Using these data, resource management planners are now able to describe the spatial extent of *Arundo donax* throughout the Russian River watershed. This project has documented the extent of the infestation and confirms that *Arundo* has infested all reaches and habitat types within the Russian River riparian zone. Riparian habitat in both urban and rural settings have been found to be infested with *Arundo* as well as in certain cases, upslope areas with little access to waterways. Additionally, *Arundo* infestations have been located along drainage ditches among agricultural fields as well as being farmed in the Alexander Valley Reach.

This project also has significant implications for future *Arundo* mapping efforts. This project has provided practitioners with substantial experience in mapping *Arundo donax* infestations along tributaries of the Russian River watershed, whereas previous experiences were focused on the mapping of infestations along the alluvial section of the mainstem of the Russian River. It has been determined that locating tributary infestations from a low-level aircraft is substantially difficult due to relatively small infestation sizes. Small infestations are difficult to locate from the air and are therefore challenging to photograph accurately. The size of the infestation affects the locational accuracy of the mapped information. In order to map small infestations, high resolution base imagery is required, regardless of whether or not one is attempting to map the infestation as an area or as a point that represents a larger area.

APPENDIX C

Maps

APPENDIX D

Data Collection Forms

ARUNDO TRANSECT DATA COLLECTION – RUSSIAN RIVER GIANT REED REMOVAL PROGRAM

1) Date: _____	2) Name of Data Collectors: _____	3) Date Cut: _____
4) Clump #: _____	5) Time Spent Collecting Data On Site: _____	
6) Total Clump Area 7) Area L_____ M_____ 8) Total Area _____ (Measure in Meters) 9) GPS Area _____ 10) % of Live to Dead _____	12) Removal Technique: (Tarping, hand removal, small equipment (describe), herbicide (rodeo or roundup) Notes: _____ 13) Tarp/Herbicide and Quantity Used: _____	
11) Distance Between Transects: D _____ *adjust distance for even distribution of stem collection	14) Problems Encountered During Removal/Data Collection: _____	

15) Transect Data

Transect 1 W=		Transect 2 W=		Transect 3 W=		Transect 4 W=		Transect 5 W=	
#	Dia (mm)								
1		1		1		1		1	
2		2		2		2		2	
3		3		3		3		3	
4		4		4		4		4	
5		5		5		5		5	
6		6		6		6		6	
7		7		7		7		7	
8		8		8		8		8	
9		9		9		9		9	
10		10		10		10		10	

Data for Clumps #

1) Date:	2) Property/Project Name
3) Arundo Habitat Data	
4) Soil Type: (sand, gravel, cobble, silt/soil)	5) Clump Arrangement: Consolidated, or Unconsolidated
6) Plant Species WITHIN Clump: _____ % in order of frequency	
7) Wildlife Data (where possible, attach digital photos)	
Birds (species, number, life stage, behavior –e.g. perching, nesting etc.) _____	
Nests – occupied/unoccupied _____	
Amphibians (species, number, life stage, behavior) _____	
Reptiles (species, number, life stage) _____	
Mammals (species, number, life stage, behavior) _____	
Insects (species, number, life stage) _____	