2012 FRGP Proposal Application Form

Section 1: Summary Information

1. Project type:	PD
2. Project title:	The Wildlands Conservancy's Eel River Estuary Preserve Restoration Design
3. Applicant Name:	California Trout
4. Person Authorized to Sign Grant Agreement:	Jeff Thompson
5. Contact person:	Darren Mierau
6. Mailing Address: **Check if changed from previous applications** ☐	870 Market Street, Suite 528
7. City, State, Zip:	San Francisco, CA 94102
8. Telephone #: **Check if changed from previous applications** ☐	(415) 392-8887
9. Fax #:	
10. Email address:	dmierau@caltrout.org
11. Organization Type:	NonProfit Agency
12. Certified Nonprofit Organization:	Yes Nonprofit Organization Number: 237097680
13. New Grantee:	No
14. Licensed Professional	Yes ☐ No ☒ If Yes provide:
15. Amount Requested:	$700,233
16. Total Project Cost:	$999,743
17. Salmonid Species Benefited:	**Coho** ☒ **Steelhead**☒ (Cutthroat ☐ Chinook☒)
18. Project Objectives:	Describe current hydrologic linkage, estuarine function, and aquatic habitat conditions, then develop an over-arching conceptual and engineering design for the xx acre Estuary Preserve.
19. Recovery/Restoration Plan:	Recovery Strategy for California Coho Salmon (DFG 2004)
20. Task Number or Reference:	ER-HU-11

21. Time Frame:	6/1/2013 - 1/1/2015
22. Stream:	Cutoff Slough, Russ Creek, Salt River
23. Tributary to:	Lower Mainstem Eel River
24. Watershed System:	Salt River-Eel River
25. County(ies):	Humboldt
26. Coastal Zone:	Yes
27. Trinity River Basin:	No

Section 2: Location Information

1. Latitude, Longitude (in decimal degrees, Geographic, NAD83):	40.61699500 : -124.31921500 - Northern property boundary of the Eel River Estuary Preserve at the Cutoff Slough Tidegates
2. Location Description:	The project area is within the Eel River Delta floodplain, on lands both preserved by the Wildlands Conservancy and part of the Russ family dairies, located west of the town of Ferndale, CA. It is 0.5 miles upstream of the confluence with Salt River, and 1.5 miles upstream of the mouth of Eel River estuary. See attached maps.
3. Directions:	From Highway 101, take exit 692 toward Fernbridge/Ferndale. Take the first right onto Singley Road, take the second right on to CA-211 South toward Ferndale. After about 4.8 miles, in Ferndale, turn right onto Bluff Street/Ocean Avenue, continue to follow Ocean Avenue as it becomes Centerville Road. Continue on Centerville Road for about 2.3 miles until Russ Lane.

Section 3: Watershed Information:

All questions in this Section refer to the watershed named in Number 1 below.

1. Watershed name:	Lower Eel River Watershed
2. Watershed area:	square miles = 3684.00
3. Watershed area directly affected by the proposed project:	percent = 0.18
4. Land use statement:	Throughout the lower Eel River basin, agricultural lands now dominate what was historically forested riparian and wetland habitat (NMFS 2010, Williams 1988, Monroe et al. 1974, Roberts 1992). Land use in the entire watershed is a mixture of private and public; the predominant uses are grazing and logging, with patches set aside for

	agriculture, recreation, and other uses. Some of the lands are state parks, national forests, and wilderness areas. The Eel River has received both State (1972) and Federal (1981) Wild and Scenic River designation, a title which is to protect the river from dams and ensure that environmental concerns rank equally with development and industry. The current land uses are expected to remain similar over the next 10 years.
5. Watershed ownership:	% Private:70.00% State:2.00 % Federal:18.00%
6. Length of Anadromous Streams in Watershed:	miles = 171.00
7. Watershed Plan(s):	National Marine Fisheries Service, 2012, Public Draft Recovery Plan for Southern Oregon/Northern California Coast Coho Salmon (Oncorhynchus kisutch), National Marine Fisheries Service, Arcata, CA. California Department of Fish and Game, 2010, Lower Eel River Watershed Assessment. Coastal Watershed Planning and Assessment Program, California Department of Fish and Game, Redding, CA California Department of Fish and Game, 2004, Recovery Strategy for California Coho Salmon, California Department of Fish and Game, Sacramento, CA California Department of Fish and Game, 1997, Eel River Salmon and Steelhead Restoration Action Plan, California Department of Fish and Game, Inland Fisheries Division, Sscramento, CA Downie, S.T. and K.P. Lucey, 2005, Salt River Watershed Assessment. Coastal Watershed Planning and Assessment Program, California Department of Fish and Game, Sacramento, CA Becker, G.S. and Reining, I.J., 2009, Steelhead/rainbow trout (Oncorhynchus mykiss) resources of the Eel River Watershed, California, California State Coastal Conservancy, Sacramento, CA U.S. Environmental Protection Agency, 2007, Lower Eel River Total Maximum Daily Loads for Temperature and Sediment, U.S. Environmental Protection Agency, San Francisco, CA
8. Background Information	The Eel River is the third largest river in California (3,684 sq. miles), and contains approximately 3,488 stream miles (CDFG 1997). The basin once possessed large populations of Chinook and coho salmon, winter and summer steelhead, and coastal cutthroat trout. In addition, there were small populations of chum and pink salmon and possibly spring Chinook. Historical accounts of the recreational fishery in the Eel River estuary describe excellent salmon and steelhead fishing, and large commercial harvests were taken from the estuary from 1860 to 1926 (CDFG 2010). Yoshiyama and Moyle (2010) estimate combined annual salmon and steelhead runs in the Eel River exceeded a million adults in good years.

	The indigenous Weott People derived their name from the Eel River, which in their language meant “plenty - from the immense quantities of Salmon obtained by them every fall in that stream…” (Humboldt Times, September 23, 1854). In 2005, the CDFG Coastal Watershed Program completed the Salt River Watershed Assessment, and in 2010 they completed the Lower Eel River Watershed Assessment. The Eel River Estuary Preserve (Preserve) is located at the southwestern edge of the Eel River Delta, abutting the Pacific Ocean. The Preserve occupies 1,255 acres of the Salt River basin (Figure 1), within one of California’s most valuable and productive coastal estuaries. The Eel River estuary was identified in 1974 as a top acquisition priority for CDFG (Monroe et al. 1974), and today this vision is coming to fruition: the estuary is presently the focus of several land acquisition, assessment, and habitat restoration projects, including the 800 acre Salt River Ecosystem Restoration Project (Figure 1) scheduled for implementation beginning in 2012, and the 900 acre CDFG Ocean Ranch Unit, with planning and design initiated in 2011 (Figure 1). Along with The Wildlands Conservancy’s Preserve, nearly 3,000 acres of high-value tidal marsh, estuarine habitat, freshwater wetlands, and agricultural lands are slated for conservation and enhancement. Historically the Preserve was a network of extensive tidal marshlands and dunes (Figure 2). In the late 1800s both Centerville Beach and Port Kenyon were fully navigable waterways used extensively as shipping ports for export of agricultural, cannery, and timber products. At that time, the Salt River was 200 ft. wide and 15 ft. deep, but reclamation efforts resulted in conversion of an estimated 2,900 acres of tideland to agricultural uses (CDFG 2010). Levees and tidegates were installed along and across waterways. Cutoff Slough and Centerville Slough, the two main estuarine channels within the Preserve, were a major part of this reclamation effort. Several miles of slough channel, and brackish/freshwater stream habitat were blocked behind the Cutoff Slough tidegates located at the north end of the Preserve (Figure 3). Russ Creek was severed from its historic confluence with Centerville Slough.

Section 4: Project Objectives

1. List Task Information:

CalTrout will lead a broad group of partners to develop the Eel River Estuary Preserve Restoration Design Project ("project"). In so doing, CalTrout will provide a design that can transform the Preserve from a monotypic landscape of grazing lands to a mosaic of pasture and natural habitats, including estuarine and tidal slough channels, a freshwater stream and riparian corridor along Russ Creek, freshwater waterfowl ponds, and fish passage at tidegate structures. When implemented, the project will ensure that the Preserve once again functions as an important nursery for native fish and Dungeness crab, and support diverse and abundant waterfowl and wildlife species.

The project will identify, protect, and enhance agricultural uses such as livestock grazing consistent with public access improvements and habitat restoration. The project will also enhance recreational uses of the Preserve, to allow visitors and educational programs to experience the biological wealth of the Preserve.

CalTrout and the Wildlands Conservancy will establish and lead a restoration team consisting of numerous project partners. Throughout the design process, the restoration team will actively engage with resource agency personnel and the public to develop design elements that reduce or minimize impacts while amplifying the benefits of restoration. The project team will complete CEQA and the regulatory permitting process in a transparent manner to best facilitate public and scientific input. Once this design and regulatory compliance project is completed, The Wildlands Conservancy and its partners can implement the plan, and proceed with the recovery of the immensely valuable natural resources contained within the Preserve.

2. Need for the project:

Located adjacent to the mouth of the Eel River and bordering the Pacific Ocean, the 1,255 acre Preserve is exceedingly picturesque, and exposed to extremely dynamic physical processes: large annual floods and river runoff; immense and encroaching tidal forces; annual suspended sediment loads ranking among the highest in the world (Brown and Ritter 1971); and episodic land subsidence events associated with the nearby Mendocino Triple Junction and the Cascadia Subduction Zone, one of the most seismically active regions in the world. The Wildlands Conservancy purchased the Preserve in 2008 with the goal of promoting habitat restoration and scientific research while providing opportunities for public access, outdoor education, and recreation.. The property includes tidal wetlands, fresh water marsh, sand dunes, grasslands, 3.4 miles of beach frontage, and 2,900 ft. of Eel River shoreline.

Although picturesque, the habitat on the Preserve is highly degraded and in dire need of restoration. Historically, the Preserve was an extensive network of tidal sloughs and freshwater channels (Figure 4). The area drained from south to north though a major slough channel – Centerville Slough, which extended from near the mouth of the Eel River south nearly all the way to the Wildcat Hills. This large channel was navigable. A second slough channel, Cutoff Slough, connected Centerville Slough between two meander bends. These slough channels fluctuated daily with tidal flow, and supported a mosaic of tidal and brackish marsh habitat that transitioned (going south) to a freshwater stream course and riparian corridor along Russ Creek. Russ Creek flowed into Centerville slough from the south. The Salt River, Cutoff Slough, and Centerville Slough historically provided migration passage for adult salmonids reaching spawning habitat in tributaries within the Wildcat Hills to the south of the Preserve, as well as provided non-natal rearing habitat for millions of juvenile salmonids migrating through the Eel River estuary.

Following passage of the Reclamation Act, the Preserve was transformed from tidally influenced areas to pasture. Levees erected along the northern edge of the Preserve block tidal inundation. Cutoff Slough is blocked by six top-hinged tidegates mounted to a large concrete structure (Figure 3) that prevent all but minor tidal leakage from entering the slough channels to the south. Only a small fraction of the original estuary complex is currently subject to tidal influence. The loss of tidal exchange and associated scouring of channels resulted in significant changes to the land. Centerville Slough, now barely visible, provides little drainage capacity. Russ Creek is frequently subject to channel avulsion due to aggradation. Cutoff Slough now forms the eastern boundary of the Preserve and has maintained a relatively open channel above its confluence with the Salt River. Freshwater runoff from the Wildcat Hills now drains into two channels – Russ Creek running south to north up the center of the Preserve, and the Western Drainage running north along the backside of the beach dunes. Several road crossings with undersized culverts have also constrained flow and promoted sediment aggradation.

Similar to the nearby Salt River (HCRCD 2011), channels traversing the Preserve have become choked with sediment, and have lost nearly all natural hydraulic and habitat function. This loss of hydraulic function causes significant flooding and contributes to poor water quality. These problems increase each winter as the sediment continues to fill drainage channels. During the wet season, even small rain events cause Russ Creek to overflow its banks, resulting in almost perpetual flood conditions. Today it is generally accepted that the natural morphology and function of the Eel River estuary has been altered by the presence of levees,

tidegates, and the associated decrease of tidal prism. The loss of this morphology and function has in turn diminished and degraded estuarine habitat significantly.

Degraded estuarine habitat conditions have played an important role in contributing to the substantial population declines of all species of salmonids that formerly used the Salt River basin and the Eel River. Yoshiyama and Moyle (2010) estimate that contemporary salmonid population abundance in the Eel River watershed is less than 5% of its historical abundance. The commercial fishery has been eliminated and the recreational fishery has been significantly reduced and is now catch and release only. The NMFS has listed northern California runs of coho (1997), Chinook (1999), and steelhead (2000) as threatened under the federal Endangered Species Act. The California Fish and Game Commission also listed coho as threatened in 2005. In addition, there has been a dramatic loss of wetlands and habitat diversity (Downie and Lucey, 2004).

The Eel River estuary is critical habitat for all juvenile salmonid species. Salmonids migrate through or reside in the estuary twice: once as juveniles and again as spawning adults. Research has shown that juvenile salmonids utilize the estuary as nursery areas for extended periods before entering the ocean. Chinook seldom return as adults if they enter the ocean at a size less than 100 millimeters in length (Nicholas and Hankin 1988) and estuaries often provide the habitat where juveniles obtain the size needed to increase the chances of survival (Cannata and Hassler 1995). Cannata and Hassler (1995) demonstrated that Chinook salmon increased in size in the Eel River estuary over spring and summer months (Figure 5).

Considering the significantly reduced size of the coho population and the habitat alterations of the estuary, it is difficult to determine how the estuary historically functioned as coho habitat by studies of present conditions. However, studies of other estuaries have shown coho rearing in estuarine habitats for a range of days to months before migrating to sea or moving back into freshwater habitat to over-winter (Tschaplinski 1982, Miller and Sadro 2003). The loss of salt marsh and freshwater ecotones may deny coho use of critical habitat. Similarly, studies of the estuaries and/or lagoons of the Gualala, Garcia, Navarro, Mattole, and Eel rivers, Redwood Creek and Humboldt Bay tributaries (e.g., Wallace 2007)show that steelhead use these habitats year-round.

Tidewater goby have also been found in limited surveys within the Preserve. Tidewater goby is federally listed as endangered, and species recovery is dependent on expansion of tidal marsh habitat, especially low-velocity

brackish slough channels and perched off-channel brackish wetlands with infrequent tidal connection (Chamberlain 2006) that would be found within a restored Preserve.

In summary, the loss of rearing habitat within the Eel River estuary is an important factor among many contributing to the decline of salmon and steelhead abundance. Tidal marshes also provide critical habitat for numerous fish, plant, and wildlife species. Restoration of the Eel River Estuary Preserve will play a prominent role in the recovery of these native plant and animal resources.

Sea level rise could threaten the Eel River Estuary, but recent analysis supports the importance of estuarine enhancement projects such as this. A recent study by the Pacific Institute predicts that mean sea level along the California coast is projected to rise from 1.0- to 1.4-meters (m) by the year 2100 (Pacific Institute, 2009). The Salt River EIR concluded that "the effects of sea-level rise will not be significantly different from the natural episodic tectonically induced subsidence, but would occur much more gradually. The high sedimentation rates on the Eel River delta have effectively kept pace with historic sea-level rise and tectonic subsidence. High sedimentation rates will continue and, over time, will ameliorate the effects of sea level rise to some degree."

3. Limiting Factors to Salmonids Remediated By Proposed Project:	☐ Water quantity	(lack of flow, diversions, runoff)
	☒ Water quality	(temperature, chemistry, turbidity)
	☒ Riparian dysfunction	(lack of shade, excessive nutrients, roughness, elements)
	☐ Excessive sediment yield	(pool and gravel quality)
	☐ Spawning requirements	(gravel, resting areas-pools)
	☒ Rearing requirements	(velocity, lack of shelter, pools)
	☐ Estuary / lagoon issues	(closure during migration periods)
	☒ Fish passage	(emigration and immigration)

4. Limiting Factor Remediation:

Water quality

The project design will seek to restore tidal prism to the Preserve, allowing daily tidal inundation to a

significant portion of the Preserve. Regular tidal exchange will help keep excessive nutrient loads from accumulating in slough and creek channels, and allow sediment to transport out of the system. Regular tidal exchange should also improve water temperature conditions in slough channels within the Preserve.

Riparian dysfunction

The project design will seek to restore a riparian corridor along Russ Creek at the southern end of the Preserve property, with riparian exclusion fencing installed to prevent cattle grazing from within restored riparian zones. The design will include consideration of riparian planting with native hardwood and conifer species to allow recovery of diverse plant species.

Rearing requirements

The estuary currently has limited access to salmonid rearing habitat within creek and tidal slough channels. A primary goal of the restoration design is to increase salmonid rearing habitat for outmigrating juveniles in the Eel River delta. Fish access to rearing habitat in spring into Cutoff Slough, a restored Centerville Slough, as well as smaller tidal creek channels will be a high priority for the design project.

Fish passage

Fish passage will be remediated by designing a properly sized and style of tidegate to replace the current top-hinged tidegates at the mouth of Cutoff Slough. Leo Kuntz of Nehalem Marine, Inc., has been contacted and has been on-site to evaluate the feasibility, suggest design options, and provide engineering and construction cost estimates for replacing one or more of the existing tidegates to allow fish passage. In addition, undersized culverts will be replaced with either larger culverts or bridges, to facilitate fish passage.

Section 5: Project Description

1. *Detailed Project Description Including All Tasks to Be Performed:*

PROJECT SETTING

The Eel River Preserve is a 1,087-acre property located approximately four miles west of the City of Ferndale and one mile north of Centerville Beach, in Humboldt County, California (Figure 1). The climate in this region of the Pacific Northwest has a mean annual temperature of 53-degree F (with extremes ranging from 21 to 87-degree F), mean annual precipitation of 38 inches, and partial or full cloud cover two-thirds of the year on average. The west side of the parcel encompasses the near shore dunes of Centerville Beach and extends to the Pacific Ocean. East of the dunes, the property supports a system of sloughs and pastures that comprise a portion of the Salt River estuary (Figure 6). The north property line borders the Eel River. Much of the southern half of the property east of the former Centerville Slough has been converted to pasture for cattle. Some of this land represents diked former tidelands that are separated from the estuarine wetlands by a series of levees and the Cutoff Slough tidegates. A partially developed upland area occupies the southeastern corner of the property, where vehicular access is gained from Russ Lane. Few structures occur on site but there are two barns within the upland area near Russ Lane (referred to as the Headquarters Barn and Quonset Hut) and a third barn (North Barn) located between Cutoff Slough and the near shore dunes, approximately midway between the north and south property lines and a forth barn (South Barn) located on the southwest corner of the Preserve. The North and South barns are connected by unimproved roads to the Headquarters Barn at the Preserve entrance. Watering troughs and extensive fencing occur throughout the southern half of the ranch.

The Preserve drains into the Salt River through Cutoff Slough north of the property boundary (Figure 7). Prior to European settlement and land reclamation on the Eel River delta, the Salt River channel appears to have been the main conduit draining flood waters off of the southern delta plain and back into the Eel River. The Preserve's lands historically supported an extensive network of slough channels draining tidal marsh, seasonal marsh, and freshwater runoff from the Russ Creek watershed in the Wildcat Hills south of the Preserve. From historical maps, surveys, and aerial photographs (e.g., 1916 USACE Tactical Military Map) Centerville Slough was a dominant feature, extending south paralleling the beach, and draining into Salt River. Several major slough channels and freshwater creek channels connected into Centerville Slough, and were surrounded by extensive wetlands and open water habitat. Cutoff Slough provided a second, smaller connection between Centerville Slough and Salt River. The landscape was subject to tidal inundation and was highly aggradational, annually receiving sediment loads from the Wildcat Hills to the south, and from seasonal inundation from the Eel River. High aggradation rates may have been partially offset by episodic subsidence events from tectonic activity associated with the Mendocino Triple Junction that lowers the elevation of the Eel River delta.

The Eel River Estuary is recognized as one of the most ecologically important tidal marsh habitats in California. It is the third largest estuary in the State and, along with Humboldt Bay, the only substantial tidal marsh habitat between San Francisco and Coos Bay. The estuary is designated critical habitat for salmon and steelhead under the Endangered Species Act. The project provides abundant opportunity for enhancement of estuarine and tidal marsh habitat and the fish, wildlife, waterfowl and rare plant species that are dependent on these habitats. A list of species that would benefit from restoration and enhancement activities is extensive, and would include river otters, tundra swans, bald eagles, egrets, herons, salmon and steelhead. The grasslands on the property are also a winter refuge for Aleutian Cackling Geese.

In 2003, the Humboldt County Resource Conservation District and its partners began the Salt River Ecosystem Restoration Project planning on property adjacent to the Preserve (Figure 2). The Salt River project will be

implemented in two phases beginning in 2012, and has multiple objectives and benefits including habitat restoration and enhancement, water quality improvement, flood alleviation, and carbon sequestration. The Salt River project will provide immediate and substantial improvements to “boundary conditions” at the north end of the Eel River Estuary Preserve. Eventual implementation of restoration actions on the Eel River Estuary Preserve will both contribute to, and benefit from, the Salt River Project.

The California Department of Fish and Game also acquired at least twenty years ago Ocean Ranch, an approximate mirror image of the Eel River Estuary Preserve to the north of the Eel River mouth. The Ocean Ranch property drains through North Bay and McNulty Slough, and abuts Table Bluff at the northern boundary of the Eel River delta. CDFG is currently initiating the design phase of Ocean Ranch, guided by several project partners including Ducks Unlimited and the Coastal Conservancy.

PHASE I FEASIBILITY STUDIES

The Wildlands Conservancy purchased the Eel River Estuary Preserve in 2008 with the intent to restore and enhance native wildlife and their habitat within the Preserve, to protect agricultural productivity within the Preserve and across neighboring properties, and to provide public access, outdoor education programs, and visitor facilities that are open to the public at no cost.

The State Coastal Conservancy and Five Counties Salmonid Conservation Program initiated feasibility assessment for the project in December 2011. Under that existing funding, Kamman Hydrology and Engineering, Inc. will provide planning and technical feasibility assessments for ecosystem restoration, flood-hazard reduction, and agricultural enhancement at the Eel River Estuary Preserve. This Phase I project will (1) assemble available topographic, bathymetric, hydraulic, and sediment data, and collect additional supplemental field data where needed (2) develop a 2-dimensional hydraulic model to simulate water elevation, water temperature, and salinity conditions across the project area, (3) conduct analyses to evaluate a range of project features and alternatives, including full and muted tidal exchange from the Cutoff Slough tidegates to adjacent lands, protection and enhancement of salmonid and tidewater goby habitat within existing and/or enhanced slough and creek channels, and protection/enhancement of agricultural productivity both within the Preserve and across neighboring properties. Results of the Phase I analyses will be available by December 2012.

PHASE II RESTORATION DESIGN

This Project application to FRGP is for funding to conduct Phase II of the Eel River Estuary Preserve Restoration Design. This Phase II project will evaluate results from the Phase I feasibility analyses, develop a range of project alternatives, then work with project partners, stakeholders, and local landowners to select a best apparent alternative and conduct engineering design, CEQA analysis, and permitting. This project design and regulatory compliance phase will provide an overview and integration of all ecosystem enhancement components. These components will include the following:

*Upgraded tidegates (retrofit) at the Cutoff Slough tidegate structure. There are currently six fully functional top-hinged tidegates attached to a structurally competent concrete headwall structure;

*A muted tidegate (e.g., the Muted Tide Regulator or MTR from Nehalem Marine, Inc.) or full tidal exchange into a 150 acre area in the northern portion of the Preserve referred to as the "high marsh unit" (aka the "closed cell");
*Protection and enhancement of freshwater wetland ponds currently providing waterfowl habitat and recreation (i.e., seasonal hunting);
*Enhancement of Centerville Slough branching off Cutoff Slough, to potentially accommodate an increased tidal prism, improve sediment routing, and improve seasonal drainage;
*Realignment of Russ Creek from the Preserve's southern property line to enhance salmonid habitat and provide the potential for fish passage into the watershed;
*Enhancement of the Western Drainage from the Preserve's southern property line into Cutoff Slough;
*Development of a sediment management unit at the southern end of the Preserve, if sediment routing from Russ Creek through the Preserve through natural processes is determined to be infeasible;
*Dune restoration and Spartina control;

PHASE II WORK PLAN APPROACH AND TASK OUTLINE

The Phase II work plan outlines the anticipated Environmental Studies, CEQA, Permitting and Design Plans at 30-, 65- and 100% design submittals. This work plan is structured around the project components described above and building-off Phase I. The Wildlands Conservancy is currently in the planning and implementation phases of various public access facilities as part of their long-term plan for the Preserve. These facilities include the gravel parking area at the HQ Barn, Vault Toilet Public Restrooms at the HQ Barn and North Barn, interpretive signage, as well as trail surface and crossing improvements. While a majority of these improvements are anticipated to be implemented in 2012 some could be delayed. Public access facilities or other project aspects that are not yet implemented upon preparation of the CEQA document will be included and analyzed as part of this project. The Phase I analyses, will in part, assess potential drainage improvements on the Preserve in an effort to understand the potential conversion and improvements to agricultural lands while maximizing ecological enhancement on the Preserve. This assessment will be utilized and built upon for the design development and for the CEQA documentation and project permits. The Phase II work plan is divided into the primary tasks described below.

TASK 1: Environmental and Supporting Studies

This task includes the environmental studies necessary to support the preferred alternative components and associated project footprint on the Preserve. The environmental studies include a wetland delineation, rare species studies, rare plant surveys, existing habitat/vegetation mapping, tidewater goby habitat assessment/avoidance consultation, cultural resource surveys, geotechnical and soil investigation and supplemental topographic surveys.

Deliverables: One (1) hard copy and (1) electronic copy

• Wetland Delineation Report with GIS Mapping
• Rare Plant/Animal Report with GIS Mapping
• Existing Habitat/Vegetation Report with GIS Mapping

• Tidewater Goby Habitat Assessment/Avoidance Technical Memorandum
• Cultural Resource Report
• Geotechnical/Soils R1 Report
• Supplemental Topographic Surveys in AutoCAD Format

TASK 2: Preliminary (30%) Design Plans

The Project Team will take a multi-disciplinary approach to assess various project components by synthesizing the initial results of the environmental studies to assess environmental limitations, constraints and opportunities, formulate goals/objectives and develop the project description and footprint. To support the CEQA documentation, a description of the project alternatives and preferred alternative will be developed in this task and used for inclusion into the CEQA document. This task will also include the hydraulic modeling of the preferred alternative necessary to support the 30% restoration plans. The plans are intended to convey the design intent and will be used to present the project components necessary for CEQA and stakeholder outreach. An opinion of probable construction cost will be developed based on the 30% design plans and to support project budgeting and grant funding identification.

Deliverables: One (1) hard copy and (1) electronic copy

• Constraints and Habitat Impact Assessment with Project Description Technical Memorandum
• Hydraulic Modeling Technical Memorandum
• 30% Restoration Design Plans and Opinion of Probable Construction Cost

TASK 3: CEQA Documentation

This task includes the development of a Notice or Preparation, a Draft Environmental Report and a Final Environmental Impact Report (EIR) for the project. Given the likely temporal impacts to threatened and endangered aquatic species such as coho and tidewater goby as well as potential conversion and enhancement of agricultural lands and hydrology modifications, a focused EIR will be developed for the project. This task will include the notice of preparation, analysis of alternatives, analysis of cumulative effects, preparation of draft and final EIR and standard CEQA notifications.

Deliverables: One (1) hard copy and (1) electronic copy

• CEQA Notice of Preparation, Draft and Final Environmental Impact Reports (EIR)

TASK 4: Intermediate (65%) Design Plans and Basis of Design Report

This task will include the final hydraulic modeling used to design the instream aquatic habitat elements. The results of these analyses will also be used to develop the preliminary restoration design plans to an intermediate (65%) design level. The design plans will include civil, structural and revegetation plan and detail sheets with notes intended for project permitting. Technical specifications will be developed to accompany the plans. An opinion of probable construction cost will be developed based on the 65% design plans. The

design methods and results will be documented in a project basis of design report.

Deliverables: One (1) hard copy and (1) electronic copy

- Finalize Hydraulic Design Technical Memorandum
- Instream Aquatic Habitat Design Technical Memorandum
- 65% Restoration Design Plans, Technical Specifications, Opinion of Probable Construction Cost
- Basis of Design Report

TASK 5: Permit Applications

Concurrent with the development of the intermediate restoration design plans, the Project Team will develop the project permit applications. The permit applications will include the USACE Section 404, NCRWQCB 401 Water Quality Certification, CDFG 2081(b) Incidental Take Permit (ITP), CDFG 1602 Agreement, California Coastal Commission Coastal Development Permit (CDP), Humboldt County Conditional Use Permit (CUP), Humboldt County Grading Permit, State Lands Commission Lease Application, Federal Biological Assessment (BA) and State Historic Preservation Office (SHPO) consultation. The project will involve conversion of habitat types and as part of the regulatory process the following documents will be required and developed as part of this task including Habitat Mitigation & Monitoring Plan (HMMP), Adaptive Management Plan (AMP), and an invasive plant removal and rare plant mitigation and monitoring plan. Due to the number of permits and anticipated conditions, a permit database will be developed and populated with conditions.

Deliverables: One (1) hard copy and (1) electronic copy of completed permits applications

- USACE Section 404
- NCRWQCB 401 Water Quality Certification
- CDFG 2081(b) Incidental Take Permit (ITP)
- CDFG 1602 Agreement
- Consolidated California Coastal Commission Coastal Development Permit (CDP)
- Humboldt County Conditional Use Permit (CUP)
- Humboldt County Grading Permit
- State Lands Commission Lease Application
- Federal Biological Assessment (BA)
- Habitat Mitigation & Monitoring Plan (HMMP)
- Adaptive Management Plan (AMP)
- State Historic Preservation Office (SHPO) Consultation Letter
- Invasive Plant Removal and Rare Plant Mitigation and Monitoring Plan
- Permit Condition Database

TASK 6: Final (100%) Design Plans and Specifications

This task includes the development of the final (100%) restoration design plans. The restoration design aspects benefiting salmonids will be developed from intermediate level to final 100% design plans. Project elements

ancillary to salmonid benefits will not be designed to this final stage. Technical Specification and an opinion of probable construction cost will be finalized and stamped by a California Registered Professional Engineer.

Deliverables: One (1) hard copy and (1) electronic copy

• Draft and Final 100% Restoration Design Plans, Technical Specifications and Opinion of Probable Construction Cost

TASK 7: Stakeholder Outreach and Meetings

This project will involve a multitude of project stakeholders including but not limited to the property owner, adjoining property owners, regulatory agencies, funders, consultants, and other interested groups and participants. The project success will in part be based on the support provided by each of these entities and therefore this task is dedicated to overall stakeholder outreach and project management. This task will start upon initiation of the Phase II work with development of a stakeholder outreach plan. The plan will include identification of key stakeholders, a schedule of outreach meetings with identified key stakeholders at various milestones and desired outcomes. This task includes the preparation and attendance at up to 18 meetings.

Deliverables: One (1) electronic copy

• Meeting Minutes

PROJECT TEAM

The Project Team is comprised of multidisciplinary members necessary to complete this complex project. This team has worked together on multiple local restoration projects such as the Salt River Ecosystem Restoration Project which has similar ecological restoration opportunities and regulatory constraints. The Team understands the complexities associated with striking the balance between maximizing ecologic restoration within a working and regulated landscape. GHD Inc will serve as the prime consultant with teaming partners leading the tasks below. These teaming partners will also provide support on select tasks throughout the duration of the project.

• HT Harvey & Associates: Prepare a tidewater goby technical report, 2081(b) for coho and longfin smelt; assist with biological assessment (BA), habitat mapping, invasive plant removal and rare plant mitigation and monitoring plan, and adaptive management plan (AMP)

• LACO Associates: Complete topographic surveys, geotechnical/soils analysis, Geologic R1 Report

• Kamman Hydrology & Engineering: Complete hydraulic modeling for final design

• Michael Love & Associates: May assist with the design of the instream aquatic habitat elements

The following sub-consultant will contract with CalTrout:

• Roscoe & Associates: Conduct a cultural resources study and report

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Pacific Institute, 2009. The impacts of sea-level rise on the California coast. A paper from: California Climate Change Center, CEC-500-2009-024-F, 101p.

Tschaplinski, P. J. 1982b. Aspects of the population biology of estuary-reared and stream-reared juvenile coho salmon in Carnation Creek: A summary of current research. In Proceedings of the Carnation Creek workshop, A 10-year review. 24 -26 February 1982. Edited by G. F. Hartman. Pacific Biological Station, Nanaimo, B.C. pp. 289 - 307.

Yoshiyama, R.M. and P.B. Moyle. 2010. Historical review of Eel River anadromous salmonids, with emphasis on Chinook salmon, coho salmon and steelhead. UC Davis Center for Watershed Sciences Working Paper. A Report Commissioned by California Trout.

2. *Time Frame:*

TASK 1: Environmental and Supporting Studies -- June 2013 – October 2013

TASK 2: Preliminary (30%) Design Plans -- August 2013 – December 2013

TASK 3: CEQA Documentation -- August 2013 – April 2014

TASK 4: Intermediate (65%) Design Plans and Basis of Design Report -- January 2014 – June 2014
TASK 5: Permit Applications -- March 2014 –July 2014
TASK 6: Final (100%) Design Plans and Specifications -- July 2014 – January 2015
TASK 7: Stakeholder Outreach and Meetings -- June 2013 - January 2015

3. *Deliverables:*

Deliverables have been provided under each task in the work plan. Upon completion of the above tasks, the goal of this project is to have stamped and signed final engineering design plans, technical specifications, an approved CEQA document, and permits ready for bidding and construction.

4. *DFG Protocols to Be Used in Project Development and Implementation (check applicable box):*

☒DFG *California Salmonid Stream Habitat Restoration Manual*

Manual part number: Salmon and Steelhead Habitat Restoration in California

☐DFG monitoring protocols for restoration project effectiveness and validation monitoring

5. *Other Protocols:*

6. *Expected Quantitative Results (Project Summary):*

Area encompassed by planning/assessment (acres)	1087
Watershed plans/assessments completed (number)	0

Section 6: Qualifications and Experience of Applicant and Professionals:

1. *Applicant's Qualifications and Experience:*

CALIFORNIA TROUT

For 40 years, CalTrout has been dedicated to protecting and restoring wild trout, steelhead, salmon and their waters throughout California. This mission requires us to address these challenges at the local, regional and statewide level simultaneously. Our core conservation strategy is to establish regional offices with expert conservation staff who are intimately familiar with local issues, work at the grassroots level to identify regional conservation goals and priorities, design long-term plans and implement, monitor and analyze the plans' activities.

Head quartered in San Francisco, CalTrout engages its 7,500 members to advocate for sound, science-based conservation solutions as well as water policy issues. CalTrout has a solid track-record of working to protect and restore water resources on the North Coast: on The Smith; Trinity; Klamath and Eel rivers and Redwood Creek; and to policy initiatives including the Wild and Scenic Rivers Act (1972 and 1981), the Wild Trout (1972) and Heritage Trout (1999) programs, the Recovery Strategy for California Coho Salmon (2004); the steelhead Restoration and Management Plan for California (1996), and Northern California Coho Recovery

Plan (2007).

DARREN MIERAU – Aquatic Ecologist and North Coast Program Manager

EDUCATION

• Master of Arts (1996), Biology, Humboldt State University, Arcata, CA

• Bachelor of Arts (1984), Biology, Claremont McKenna College, Claremont, CA

• Guest Lecturer at Humboldt State University, courses in Fisheries, Natural Resources, and Environmental Engineering Departments, 2004-present.

• Invited Conference Speaker: American Fisheries Society (2002, 2003); Society for Ecological Restoration (2001, 2006); Salmonid Restoration Federation (2005, 2010, 2011); Humboldt Bay Estuaries Conference (2003, 2005).

• Awarded 'Certificate of Appreciation for Outstanding Contributions to the Nation's Fish and Wildlife Resources' by US Fish and Wildlife Service for efforts in Rocky Gulch restoration, 2007.

• Elected to Humboldt Bay Watershed Advisory Committee as Science and Technical Advisor, 2005-06.

• Contributing scientist to the Humboldt Bay Initiative Strategic Planning Process, 2009-10.

• Founding Board Member of the Coastal Ecosystems Institute of Northern California, 2011.

Darren Mierau, the North Coast Program Manager for CalTrout will be the Project Manager and provide supervision and administrative support for the project in cooperation with Alan Roesberry, CalTrout Finance Manager. Before joining CalTrout in 2011, Mierau worked on numerous North Coast projects as a local watershed advocate and consultant with McBain and Trush, Inc., including:

Rocky Gulch Salmonid Access and Habitat Restoration Project (CDFG Agreement No. P0210414).

The Rocky Gulch Salmonid Access and Habitat Restoration Project was the first phase of a multi-phased implantation effort to restore anadromous fish access and habitat to the lower reaches of Rocky Gulch. This project was a joint effort between McBain & Trush, Inc., and numerous project partners, including Roger and Johanna Rodoni (landowners), CDFG staff scientists, Jeff Anderson & Associate (engineering services), Trinity Associates (CEQA analysis and permitting) , PG&E , US Fish and Wildlife Service, and Humboldt Fish Action Council. Implementation projects included innovative designs for a fish-friendly tidegate (the first side-hinged tidegate implemented in Humboldt Bay), and several phases of channel and floodplain design, implementation, riparian revegetation, and monitoring. Mr. Mierau was lead biologist and project manager, and oversaw project design, permitting, contracting, implementation, and monitoring aspects of the project.

Rocky Gulch Old Arcata Road Culvert Project Conceptual Design (Humboldt County Agreement No. 205300).

Darren Mierau of McBain and Trush was lead biologist and project manager, and teamed with project engineer Jeff Anderson & Associates to develop a conceptual design report for the Old Arcata Road Culvert Project. This project was Phase 2 of the Rocky Gulch restoration effort. This work consisted of developing hydraulic models that provided the basis for developing the culvert dimensions, channel dimensions and floodplain elevations necessary for the project. The conceptual design report also provided recommendations for bank stabilization, riparian fencing, and other miscellaneous design details. The project team worked successfully with local landowners to gain their support for implementing the project design.

Rocky Gulch Barrier Culvert Replacement Project.

The Rocky Gulch Barrier Culvert Project was Phase 3 of a multi-year watershed restoration program begun in 2000 by Mr. Mierau. The Project was funded through the State Coastal Conservancy and administered through the Humboldt County Department of Public Works, but originated as a proposal submitted to the FRGP. This project was a joint effort between McBain & Trush, Inc., and Jeff Anderson & Associates, Inc. The watershed program included planning, extensive coordination with private landowners, and public outreach. The Barrier Culvert Project was implemented in 2006, and replaced a barrier culvert with a bridge (located approximately 8,000 feet upstream of the tidegate and confluence with Humboldt Bay). The project restored fish access to approximately 2,000 feet of high quality coho and steelhead habitat in upper Rocky Gulch.

Lower Freshwater Creek Estuary Rehabilitation Project (CDFG Agreement No. P0210418).

The Freshwater Creek Estuary project, initiated in 2002, developed conceptual designs to remove a tidegate, restore tidal hydrology, and enhance salmonid rearing habitat at a 35 acre marsh adjacent to Freshwater Slough. A small tributary, Wood Creek, traversed the marsh. The property was subsequently purchased by the Northcoast Regional Land Trust with funds from the Coastal Conservancy, and the project was implemented in 2006. Mr. Mierau was a project designer, project manager, and prepared the Biological Assessment for the project.

2. *Previous Projects Funded By FRGP:*

CalTrout has demonstrated its ability in many areas related to salmonid restoration and protection. We have administered millions of dollars of donations, grants and awards on an annual basis and conduct vigorous annual audits.

Among them, our prior and current FRGP's include:

• Southern California Steelhead Coalition, FY 02-03, P01500101. Brought non-profits, agencies and community stakeholders together to recover endangered Southern California steelhead.

• Santa Monica Mountains Steelhead Habitat Assessment FY 03 – 05, P0250013. Assessed steelhead habitat and populations across the Santa Monica mountains

• Instream Flow Methodology on the Shasta River, 2007: P0610313. Prepared a Final Report to CDFG recommending a scientific framework and specific methods for determining instream flow needs to promote salmonid recovery and protection in the Shasta River basin.

• Fish Passage Assessment of stream crossings along Northwestern Pacific Railroad (NWP) within the Eel River Watershed FY 08-09. Assessed 60 culverts below crossings on the Eel River for fish passage.

• Zuma Creek County Beach Arizona Crossing Replacement Design and Alternatives Assessment for Steelhead Passage. FY 12-13

• Parks Creek Cardoza Diversion Fish Passage Design FY 12-13

• Santa Clara Watershed Coalition FY 12-13

• San Diego/Orange County Watershed Coalition FY 12-13

3. *Professionals Qualifications and Experience:*

GHD INC.

GHD is one of the world's leading engineering, architecture, and environmental consulting companies. Established in 1928, GHD employs more than 6,500 people across five continents and serves clients in the global markets of water, energy and resources, environment, property and buildings, and transportation. GHD's Eureka office has been serving the North Coast community since 1951. Formerly known as Winzler & Kelly, our multidisciplinary engineering and environmental team has been distinguished with numerous awards of excellence.

Our firm includes individuals experienced in coastal ecosystem management and restoration, hydrology, river hydraulics, hydrogeology, water quality, and landscape ecology. These professionals provide services in restoration and mitigation for habitats such as forested uplands, freshwater riparian, coastal tidal/salt marsh, and working agricultural lands, performing technical studies, project development, project design, environmental compliance, and project construction management services. Additionally, we offer experts in all phases of environmental analysis pursuant to the California Environmental Quality Act (CEQA), including preparation of the initial study/environmental checklist, preparation of environmental impact reports and statements, and the development and implementation of mitigation and environmental monitoring programs. The diversity of our staff, coupled with our broad project experience, means we can support our clients with the efficient collaboration required to execute a successful project at all levels.

GHD PREVIOUS PROJECTS FUNDED BY FRGP

• 2011 to Present – Salt River Ecosystem Restoration Project (Riverside Ranch Tidal Marsh Restoration – Phase 1), Humboldt County, CA
• 2011 to Present – Strawberry Creek Channel and Wetland Restoration Project, Humboldt County, CA
• 2009 to Present-Feliz Creek Fish Passage Improvement Project, Mendocino County, CA
• 2009-Parks Creek Diversion, Topographic Survey, Geotechnical and Geomorphic Assessments, Siskiyou County, CA
• 2008-Young's Dam Fish Passage Improvement Project, Sisikyou County, CA
• 2008-Rail Creek Reservoir Fish Passage Improvement Feasibility Study, Siskiyou County, CA
• 2007-Cedar Creek Fish Passage and Stream Restoration, Jedediah Smith State Park, Del Norte County, CA
• 2007 to Present – Martin Slough Tidal Wetland Enhancement Project, Humboldt County, CA

KEY GHD PERSONNEL

Steven Allen, PE – Project Director (CA PE #62021)

Mr. Allen is a third generation native of Humboldt County. He is a licensed civil engineer with experience in a variety of civil and environmental engineering projects. He joined GHD (then Winzler & Kelly) in

December of 1999 after ten years of heavy equipment construction experience and four years working as an engineer in McKinleyville. Mr. Allen currently serves as the Managing Principal of GHD's Eureka office, as well as on the Board of Directors of the Salmonid Restoration Federation (SRF).

Mr. Allen has extensive training and experience in restoration and fish passage projects; hydrology; hydraulics; fluvial geomorphology; floodplain design and restoration of stream function; fish passage assessment and design of various types of passage facilities; channel and tidal estuary restoration; bio-engineering; stream crossings; stormwater management; grading plans; erosion and sediment control design and plans; culvert and bridge design; site design; roadway design; parking lot design; trail location and design; preparation of construction plans and bid documents; project permitting; project management; construction observation; construction management; and regulatory compliance in sensitive environments in California, Oregon, Nevada, and the Commonwealth of the Northern Mariana Islands. Mr. Allen has been a guest lecturer in various engineering courses at Humboldt State University and College of the Redwoods; he's presented different aspects of successfully completed fish passage projects at multiple annual conferences of the SRF and at For The Sake Of Salmon (FSOS) design workshops; and he has also given trainings concerning construction techniques and erosion and sediment control practices at various locations with the Regional Water Quality Control Board. He has conducted many public meetings for various project types, including project planning meetings and design charrettes. He often helps clients from project inception through completion, assisting with writing grants and obtaining project funding, as well as with design, permitting, construction, post-project monitoring, and long term maintenance.

Jeremy Svehla, PE – Project Manager (CA PE#72169)

Mr. Svehla is a professional engineer with over eleven years' experience in a variety of civil-, environmental-, and agricultural-related engineering projects. Mr. Svehla has extensive training and expertise in hydraulic analyses; hydrologic and storm water runoff analyses; fish passage design and analysis, including bridge and culvert design; bioengineering stream bank restoration design using 1-D and 2-D finite element modeling; fluvial geomorphology; stream function; floodplain management; wetland restoration; scour analysis; and erosion and sediment control design. His professional experience involves preparation of construction plans, specifications, and cost estimates (PS&E); project permitting; CEQA documentation; project management; construction management; and regulatory compliance for stream and tidal marsh restoration projects. As Project Manager for regulatory compliance and final design for the Salt River Ecosystem Restoration Project, Mr. Svehla has substantial local knowledge of tidal marsh and stream restoration. He also served as the constructability review lead for the Giacomini Wetlands Restoration Project. These projects have involved an array of project stakeholders, including municipalities, regulatory resource agencies, non-profit watershed organizations, tribes, resource conservation districts, and special/landowner associations.

Travis James, PE – Project Engineer (CA PE#76663)

Mr. James is a licensed civil engineer with experience in a variety of civil and environmental engineering projects. Since joining GHD in May 2007, Mr. James has worked primarily on water resource engineering projects. His experience includes design and/or analysis of hydrology; open channel hydraulics; stormwater management; fish passage; dam removal; bridge placement; grading; water and wastewater system analysis; wastewater treatment and water reuse; and construction management. Mr. James applies both deterministic and probabilistic approaches to completing

design and/or analysis, using multiple tools, including industry standard models, customized models, civil design software, and GIS software. Mr. James has served as lead project engineer for multiple stream restoration and fish passage habitat/passage improvement projects.

Susan O'Gorman, PE – Structural Engineering (CA PE#71484)

Ms. O'Gorman is a registered civil engineer and has nearly 10 years' experience in civil and structural engineering, performing structural calculations for several fish passage projects, residential and commercial projects using steel, concrete, and wood, as well as working on various civil projects, including bridge designs, water, sewer, and site development. She is well experienced in AutoCAD and has completed the drafting on many of the structural projects for which she has worked. Ms. O'Gorman has also assisted on many construction projects within the last three years, which include the Arcata/Eureka Airport Bluff Stabilization Project and the Willits Railroad Avenue Bridge Replacement Project.

Merritt Perry, PE – Construction Manager/Constructability Review (CA PE#69126)

Mr. Perry brings over twelve years of experience in engineering design for a broad range of infrastructure and environmental projects. He joined GHD in March 2003 after working for five years as an engineer in Northern California and for five years as a field biologist in the Pacific Northwest while completing his degree. Mr. Perry has extensive training and experience in project permitting, programming, and design of State and federally funded trails and environmental projects, hydrology and hydraulics, fish passage, construction management, and preparation of plans and construction documents.

Misha Schwarz, PWS, CPSS, CAC, CDPH I/A/M – Senior Project Scientist and Permit Specialist

Mr. Schwarz is the leader of GHD's Eureka Environmental Service Line. Mr. Schwarz possesses a wide range of specialties and over 26 years of experience. His thorough knowledge of soil science, hydrology, hydrogeology, plant ecology, biology, geology, botany, and climatology have helped him successfully design and implement mitigation, restoration, and habitat creation projects. He has designed habitat creation and restoration projects involving numerous endangered species, including the federally listed California red–legged frog, San Francisco garter snake, Giant Garter Snake, Bay Checkerspot butterfly, and the Fountain thistle. He has also been involved in numerous project dealings with listed anadromous fish species and other marine-listed species. Additionally, his dozens of restoration, mitigation, and habitat creation projects have included wetlands (fresh and salt water), riparian, coastal dune habitat, serpentine habitat, oak forest, native grassland, redwood forest, and Mendocino pygmy forest. Mr. Schwarz also has over 24 years' experience in CEQA/ NEPA documentation, as well as in federal and State coastal permitting, and possesses a vast knowledge of a wide array of regulations that help ensure project designs are permittable and will allow for efficient CEQA/NEPA clearance.

Ken Mierzwa – Senior Ecologist

Mr. Mierzwa has over 21 years' experience as a senior ecologist and a project manager. His specialties include conceptual design, permitting, and monitoring of habitat restoration, particularly in an endangered species context. He has assisted in the restoring of grasslands, oak woodlands, riparian woodlands, seasonal wetlands, and salt and brackish marsh in the Bay Area, as well as elsewhere in Northern California. He has also helped design and implement habitat restoration efforts in Illinois (wet prairie, graminoid fen, marsh, and a 200-acre bottomland hardwood forest with associated river re-meandering), Indiana (lakeshore ridge and swale), Missouri (marsh, high-gradient stream,

oak/pine woodland), Wisconsin (oak savanna and wet prairie), and New York (oak/pine barrens and associated wetlands, high-gradient stream). He chaired a public/private working group, which successfully implemented 75-acres of habitat restoration for the federally endangered Hine's emerald dragonfly, and has also been involved in habitat restoration efforts for species as diverse as the tidewater goby, San Francisco garter snake, California red-legged frog, giant garter snake, Eastern tiger salamander, blue-spotted salamander, steelhead, mission blue butterfly, Karner blue butterfly, Bay Checkerspot butterfly, and Fountain thistle. Mr. Mierzwa often leads or works as part of multidisciplinary project teams and has been involved at all stages of restoration, including concept development, site selection, mitigation plan development, permitting, final design, coordination with construction management, and monitoring. Additionally, Mr. Mierzwa has authored chapters in several major publications.

Lia Webb, PWS, CPSS – Environmental Scientist

Ms. Webb has ten years' experience as a professional environmental scientist with a focus in wetland science, plant and animal habitats/ecology, and soil science. She has specialties in coastal, riparian, and sensitive habitat assessments and management plans and has worked closely with the California Coastal Commission to gain project permits in the Coastal Zone while ensuring protection of coastal resources. She has performed rare plant surveys and wetland delineations in Humboldt, Del Norte, Mendocino, Siskiyou, and Sonoma counties, including mapping, orienteering, photo interpretation, buffer assessments, and habitat mitigation and monitoring design and implementation. She has extensive local experience in the Humboldt Bay region and Eel River estuary, including conducting Biological Assessments (BA) of potential fisheries effects for water and land based projects; sampling and analysis of bay sediments for assessment of potential contamination effects on fisheries; habitat and wetland mapping; eel grass mapping/monitoring/avoidance measures; and CEQA/NEPA and biological resource studies for numerous coastal trail projects that cross sensitive habitats, including bay margin, saltmarsh, intertidal zone, scrub/shrub, forested wetlands, riparian, and coastal streams and estuaries. Ms. Webb has worked closely with agencies such as U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Game, U.S. Fish and Wildlife Service, and the California Coastal Commission to analyze, monitor, and prepare plans and permit applications for numerous California-based projects.

Stephanie Klein – Environmental Scientist/Restoration Ecologist

Ms. Klein has been involved with environmental science and policy for over six years, including invasive species management, stream assessment, wetland delineation, mitigation, restoration planning, permitting, written policy compendiums, field experience and construction oversight. Ms. Klein's Master's course work involved ecological management, landscape ecology, water quality assessment, wetlands management, and fish and benthic macroinvertebrate identification, as well as watershed and environmental master planning. Ms. Klein has developed revegetation plans and specifications for a range of habitats, such as oak woodlands, tidal marsh, freshwater riparian and coastal dunes.

Seth Lancaster – Environmental Scientist

Mr. Lancaster is an environmental scientist and a Humboldt County native with a background in environmental planning. In addition to multiple years of private sector environmental consulting work, including project management of CEQA and NEPA efforts, Mr. Lancaster served as the lead environmental planner and project manager for a large-scale programmatic permitting effort for the Natural Resources Conservation Service (NRCS) and RCD related to habitat restoration projects throughout Humboldt County.

KEY H.T. HARVEY & ASSOCIATES PERSONNEL

Ronald R. Duke, M.A. – Wildlife Ecologist

Mr. Duke is the president of H. T. Harvey & Associates (HTH), as well as a principal in their wildlife division, and responsible for the overall technical direction of the company. He is a wildlife ecologist whose training and research emphasized population and community ecology, particularly the relationships of wildlife to their habitats. As a consulting ecologist for over 25 years, Mr. Duke has supervised over 2,500 projects covering a variety of ecological issues and geographic areas. He maintains an active role in projects, particularly those dealing with wetlands and endangered species. Mr. Duke has also supervised approximately 1,000 environmental impact reports and statements for a variety of projects, including general plans, housing developments, commercial developments, flood control projects, highway construction, golf courses, and transmission lines. Additionally, he's directed over 300 endangered species investigations, consultations, and habitat conservation plans dealing with the salt marsh harvest mouse, California clapper rail, San Joaquin kit fox, California least tern, Bay Checkerspot butterfly, and other species. HTH's efforts in salt marsh restoration projects have been of particular interest to Mr. Duke. For both the Bair Island Restoration in Redwood City and the acclaimed South Bay Salt Pond Restoration Project, Mr. Duke has led the restoration planning, permitting, and environmental impact reports on both of these important projects. He has also had a major role in high-profile habitat conservation plans (HCPs), including the Yolo County and Santa Nella HCPs, for which he provided project oversight as the Principal-in-Charge and helped guide the conservation planning from the development of the existing conditions and environmental baseline report to implementation strategies.

Sharon Kramer, Ph.D. – Senior Fish Ecologist

Ms. Kramer is an experienced fish ecologist in charge of HTH's fish ecology division and North Coast office, operating out of Arcata, California. Her expertise spans over 20 years and focuses on aquatic ecology and fisheries biology in the Pacific Northwest, California, Australia, and Hawaii. Her recent professional research and work has focused on integrating watershed and coastal processes and the freshwater, estuarine, and coastal ecology of fishes, including salmonids and tidewater goby. Since joining HTH in 2007, Ms. Kramer has been involved in a variety of projects, including developing the fish and invertebrate study plan and providing strategic input on the adaptive management plan for the Federal Energy Regulatory Commission (FERC) licensing process for Ocean Power Technology's Reedsport Wave Energy Park. In addition, she has conducted fish passage evaluations associated with Highway 101 widening, fish and habitat monitoring of levee repair projects on the Sacramento River, watershed condition assessments of three national park units, and monitoring and restoration projects in the Eel River Estuary including the Salt River Restoration Project, as well as working to develop an alternative conceptual design for the removal of San Clemente Dam on the Carmel River and being involved in fish aspects of the South Bay Salt Pond Restoration Program, from development of fish monitoring plans to BAs. Before joining HTH, Ms. Kramer opened the Arcata office of a North Coast consulting firm and managed a team of nearly 20 scientists as a principal. She was extensively involved in guiding projects through the FERC relicensing process. She was also the principal investigator for the Napa River Estuary Fisheries Monitoring Program for the U.S. Army Corps of Engineers and participated on the scientific peer review panel for the White Sea Bass Fishery Management Plan. She has previously worked for the National Marine Fisheries Service (NMFS) as a regional science coordinator and fisheries biologist and provided scientific guidance on regional

planning strategies for salmonid recovery, including the development of guidelines for forest practices.

Annie Eicher, M.A. – Senior Plant Ecologist

Ms. Eicher is a plant ecologist providing a range of services, including vegetation and rare plant surveys; habitat classification and mapping; habitat restoration design and monitoring; botanical impacts assessment and mitigation; wetlands assessment and jurisdictional delineation; California Rapid Assessment Method (CRAM) wetland monitoring; and research pertaining to plant ecology. Ms. Eicher has over twenty years of experience working in a variety of habitats throughout California, especially in North Coast wetlands. She is very familiar with estuarine, riparian, and dune habitats, and is dedicated to the conservation of native habitats and biotic communities using an ecosystem-based management approach, as well as working on several strategic conservation planning projects. Ms. Eicher is experienced in collaborating with other scientists, natural resource managers, permitting agencies, and stakeholder groups. Prior to joining HTH, her previous employers and clients have included the Humboldt Bay Harbor Recreation & Conservation District; the Humboldt Bay National Wildlife Refuge; the University of California Sea Grant Extension; the University of Agriculture Cooperative Extension; the California Department of Fish and Game; Humboldt County Public Works; Humboldt State University; and Redwood National and State Parks. Some of her key projects have included the Spartina Eradication Project, the Dwarf Eelgrass Eradication Project, Subtidal and Intertidal Habitat Goals Project, the Humboldt Bay Strategic Plan, Dwarf Eelgrass Eradication, the Status of Perennial Estuarine Wetlands of California, Demographics of Humboldt Bay Wallflower, Soil-Vegetation Correlations in Diked Former Tidelands, and the Tidal Marsh Plant/Elevation Model.

Christine D. Hamilton, M.S. – Wildlife Ecologist

Ms. Hamilton is a wildlife ecologist in HTH's North Coast office with field, academic, and applied experience in seabird and marine ecology, as well as a solid background and experience with environmental permitting in California. Since joining HTH in 2009, Ms. Hamilton has been involved in several renewable energy projects, including developing protocols for monitoring impacts from ocean renewable energy for BOEMRE; adaptive management and study plans for potential impacts on marine species from a wave energy project in Humboldt County in support of the FERC licensing process; developing a framework for analyzing environmental impacts from several wave energy scenarios in the Pacific Northwest and Hawaii for the Department of Energy; assessing potential impacts to listed species from a proposed solar project in the Carrizo Plain; and developing an HCP for a wind energy project in southern Humboldt County. She has also been involved with endangered species compliance, and NEPA and CEQA permitting documents for projects in marine and freshwater ecosystems, including a regional HCP for small dams and their effects on Atlantic salmon in Maine; the Salt River Ecosystem Restoration Project in Humboldt County; and the Arroyo Grande Creek Habitat Conservation Plan in San Luis Obispo County. Prior to her work at HTH, Ms. Hamilton was a biologist for the U.S. Fish and Wildlife Service, working on Endangered Species Act and NEPA compliance and consultation, Safe Harbor Agreements, designation of critical habitat, and endangered species listing, recovery, and delisting.

KEY KAMMAN HYDROLOGY & ENGINEERING, INC. PERSONNEL

Greg Kamman, PG, CHg – Hydrologist (CA PG#5737; CA CHg#360)

As a principal hydrologist with over twenty two years of technical and consulting experience in the fields of hydrology, hydrogeology, and geology, Mr. Kamman routinely manages and implements projects in the areas of surface- and ground-water hydrology, water supply, water quality assessments, water resources management, geomorphology, and freshwater (riparian, wetland, pond and lake) habitat restoration. His areas of expertise include characterizing and modeling basin-scale hydrologic and geologic processes; evaluating surface- and ground-water resources and their interaction; assessing hydraulic and geomorphic responses to land-use changes in watersheds and causes of stream channel instability; designing and implementing field investigations to characterize surface and subsurface conditions; and stream and wetland habitat restoration design and feasibility assessments. Mr. Kamman has served as project manager and Principal-in-Charge on Kamman Hydrology & Engineering, Inc.'s (KHE) most recent restoration planning and design projects, including: the Salt River Ecosystem Restoration Project (Humboldt County); the Giacomini Wetland Restoration Project (Pt. Reyes National Seashore); the Lower Redwood Creek Floodplain and Salmonid Habitat Restoration near Muir Beach; the Bear Valley Creek Watershed and Fish Passage Enhancement Project; and the Tennessee Hollow Watershed Restoration Project at the Presidio of San Francisco. Mr. Kamman also managed and led KHE's lake and pond habitat restoration planning and design efforts for the Tolay Lake, Shadow-Cliffs, Laguna Salada, Lower Santa Clara River, East Arm Mountain Lake, and numerous freshwater pond wetland complex projects throughout the Bay Area. Additionally, Mr. Kamman has experience in the assessment and development of domestic groundwater supplies.

Mr. Kamman commonly serves on multi-objective projects that are driven in some part by fishery, wetland, wildlife, and/or riparian habitat concerns. He is a prime or contributing author to over 60 technical publications and reports in the discipline of hydrology, the majority of which pertain to ecological restoration. Mr. Kamman has co-taught an annual course on hydrologic and geomorphic processes in stream restoration since 2001 and routinely provides introductory hydrology and geomorphology seminars to local, State, and federal resource/regulatory agency staff, resource managers, and watershed groups. Mr. Kamman is a Professional Geologist and Certified Hydrogeologist in the state of California and a member of the American Geophysical Union and Society for Ecological Restoration.

Ms. Rachel Kamman, PE – Hydraulic Engineer (CA PE#56655)

Ms. Kamman is a registered civil engineer with broad experience in surface and sub-surface hydrology. She specializes in performing hydrologic, hydraulic, and hydrodynamic analyses in the assessment, restoration, and enhancement of coastal, estuarine, and river systems. Over the past 20 years, Ms. Kamman directed and participated in numerous interdisciplinary studies integrating hydrology, hydraulic engineering, geomorphology, biology, and land-use issues. In performing this work, Ms. Kamman often develops and applies innovative approaches, including advanced numerical models for the assessment of flood and sediment transport processes in rivers, and circulation, sedimentation, and contaminant transport processes in large bays and estuaries. Ms. Kamman has worked on a number of coastal and tidal wetland investigations in support of ecosystem planning and designs, including: Hydraulic and Coastal Processes Assessment for Fitzgerald Marine Reserve Coastal Trail Project; Water Level and Salinity Monitoring and Hydrodynamic Modeling of Lower Lagunitas Creek and Wetland Interface with Tomales Bay; Tidal Wetland Restoration Design, Baypoint Regional Shoreline, Suisun Bay; Tidal and Seasonal Wetland Restoration Design, Hamilton Airfield, Novato; Monitoring of Tidal Channel and Marsh Evolution, Tomales Bay; Big Lagoon Restoration Planning TAC, Marin County; Technical advisor providing technical support and project

review on coastal and estuarine projects throughout the Bay area, US Army Corps of Engineers, Bay Model, Sausalito; Water Quality and Circulation Assessment, Tijuana Estuary, San Diego; Hydrodynamic and Water Quality Assessment of Mugu Lagoon, Ventura; and Sedimentation and Water Quality Assessment of Newport Bay, Orange County.

Most recently, she has focused on the development and integration of field monitoring programs, numerical models, and long-term planning for the management and enhancement of river and coastal resources. A common objective in Ms. Kamman's work is to develop scientifically based decision support tools and facilitate their integration in resource management decision making and engineering design.

Ms. Kamman was a founding member and participant of the San Francisco Bay Wetland Restoration Projects Design Review Group (DRG) from 2002 to 2004. She currently serves on as part of the design review group for the San Francisco Bay Joint Venture. She also routinely provides introductory hydrology/geomorphology seminars to local, State, and federal resource/regulatory agency staff, resource managers, and watershed groups. Ms. Kamman is a prime or contributing author to over 40 technical publications and reports in the discipline of hydrology and tidal/fluvial hydraulics. She is a member of the American Society of Civil Engineers, International Association of Hydraulic Research, American Geophysical Union, Estuarine Research Federation, and Society for Ecological Restoration.

KEY LACO ASSOCIATES PERSONNEL

Bryan Dussell, PG, CEG – Geologist (CA PG#7947; CA CEG#2555)

Mr. Dussell is a licensed professional geologist and certified engineering geologist in the State of California, and he earned a Bachelor's degree in Geology at Humboldt State University in 1999. Since graduating from HSU, Mr. Dussell has served as a consulting geologist in Northwest California and Southwest Oregon. Mr Dussell is currently a senior engineering geologist with LACO Associates in Eureka California, providing clients with engineering geologic, geotechnical, hydrogeologic, environmental, and paleosiesmic expertise.

Richard Yahn, PE, GE – Geotechnical Engineer (CA PE#31022; CA GE#913)

Mr. Yahn is a licensed professional civil engineer and geotechnical engineer in the State of California. Mr. Yahn has worked as a professional engineer and geotechnical engineering for over 35 years and is currently a senior geotechnical engineer with LACO Associates. Prior to joining LACO in 2010, Mr. Yahn served as a consulting engineering with Kleinfelder Associates, Herzog and Associates, Harding Lawson and Associates, Field Engineering Associates, and Pacific Materials Laboratories Inc. Mr Yahn specializes in geotechnical investigations, site soil assessments, and project managing construction materials testing and inspection services for public works, residential, educational, industrial, and commercial projects. These projects include pipelines, water tanks, water and wastewater handling/treatment facilities, wineries, hospitals, schools, subdivisions, apartments, office buildings/business parks, shopping centers, airports, warehouses, churches, geothermal plants, solar arrays, recreational parks, retaining walls, parking structures, roadways, and bridges

Philip Tayler, PLS, CFedS – Surveyor (CA PLS#7925; CFedS#1455)

Philip Tayler is a licensed Professional Land Surveyor in California and Oregon, as well as a certified federal surveyor. Mr. Tayler is currently a senior surveyor with LACO Associates and has served as a

professional surveyor for over 15 years. He provides topographic mapping, hydrographic and boundary surveys, easements and various types of recorded mapping, resolution to boundary issues, and construction staking operations.

KEY ROSCOE AND ASSOCIATES PERSONNEL

All personnel meet the professional standards described in Archaeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines. All field crew providing technical support meet the Secretary of the Interior Standards.

James Roscoe, M.A. – Principal Investigator

Mr. Roscoe has worked as an archaeologist in the North Coast for more than 30 years and has extensive knowledge of the prehistory and history of Northern California. He possesses an M.A. in cultural resource management and archaeology from Sonoma State University. Mr. Roscoe has completed over 600 cultural resource projects in Humboldt, Siskiyou, Sonoma, Napa, Trinity, Lake, Mendocino, Del Norte, and Shasta Counties. He also serves as Director of the Cultural Resources Facility at Humboldt State University. Additionally, he has worked as lecturer in archaeology and history at Humboldt State University and at the College of the Redwoods, and he is a former president of the 3,000-member Humboldt County Historical Society.

William Rich, M.A., RPA – Research Associate

Mr. Rich is a registered professional archaeologist with over 15 years of archaeological experience in California. Mr. Rich has extensive knowledge of the prehistory and history of Northern California and has managed and completed hundreds of cultural resources projects in Humboldt, Trinity, Siskiyou, Shasta, Mendocino, and Del Norte counties, for various agencies, including the Bureau of Land Management, Caltrans Local Assistance Program, the Federal Aviation Administration, Department of Fish and Game, National Park Service, other local agencies and private entities. He is currently employed as the Co-Director at the Cultural Resources Facility at Humboldt State University and has also worked as a contract archaeologist for the California Department of Forestry and Fire Protection, reviewing timber harvest plans throughout northwest California.

Jerry Rohde, M.A. – Research Associate; Historian and Ethnographer

Having lived in, hiked through, and studied northwestern California for over 30 years, Mr. Rohde has been described as knowing the area "like the back of his hand." Mr. Rohde has conducted research in Humboldt, Sonoma, Mendocino, Del Norte, Siskiyou, Trinity, and Shasta counties, and is one of the few known experts on the history of Klamath County, the only county ever established in California that no longer exists. Mr. Rohde's work is focused on: 1) extensive library and archival research, including the study of the unpublished field notes of such ethnographers as Alfred L. Kroeber, John Peabody Harrington, Pliny Earle Goddard, and C. Hart Merriam; 2) detailed field observation which makes extensive use of historical maps; and 3) a clear, comprehensive, and interesting writing style that has been honed in the authoring of five books. For the last decade, Mr. Rohde has supplied local, State, federal, and tribal organizations with documents ranging from community history overviews to Native American geographical summaries to museum display text. He takes pride in producing readable and reliable ethnographic and historical reports.

4. *Examples of Similar Work:*

Salt River Ecosystem Restoration Project
Humboldt County Resource Conservation District, California
(2009-Present)

The purpose of the Salt River Ecosystem Restoration Project is to restore historic processes and functions necessary for re-establishing a riparian floodplain corridor, wetlands and estuarine ecosystems as part of a land use, flood alleviation, and watershed management program within the Salt River watershed. Levees constructed to protect the productive agricultural lands of the Salt River floodplain from the adjacent Eel River's tidal and flood influences have altered regional drainage patterns, which, coupled with naturally high influent sediment loads, have resulted in accelerated aggradation and loss of stream and sediment transport function and habitat value across the Salt River floodplain. The ongoing aggradation and flooding of local infrastructure and agricultural land have led to loss of habitat for threatened and endangered species, reduced property values, and decline in agricultural productivity.

The project will re-connect the Eel River estuary to a series of five tributary streams draining from the Wildcat Mountains. The connection will include restoration of 7.7 miles of the lower Salt River channel and riparian floodplain that will restore passage to over 15 miles of historic salmonid spawning tributaries. The project also includes restoration of 300 acres of tidal wetlands to support a broad list of special status and native species. Specific goals of the Salt River Ecosystem Restoration Project include:

• Restoring the Salt River channel and adjacent riparian floodplain by adding channel habitat complexity, increasing hydraulic conveyance and constructing habitat features that re-establish ecological processes beneficial to fish and other native species; Restoring tidal connectivity to historic tidal wetlands to allow for the natural evolution of diverse and self-sustaining salt- and brackish water tidal marshes, intertidal mudflat, and shallow water habitats;

• Providing wintering habitat for migratory waterfowl and shorebirds as well as nesting habitat for neo-tropical migrant birds;

• Maximizing riparian habitat extent and complexity by increasing plant species diversity, corridor shading, and large wood recruitment, as well as minimizing invasive species;

• Managing excess sediment loads by minimizing upper watershed sediment inputs, maximizing fluvial and tidal channel sediment transport capacity, and designing passive sediment management areas along the Salt River channel corridor;

• Initiating a long-term corridor adaptive management process that maximizes ecological restoration success in a working landscape

The Salt River Ecosystem Restoration Project, with an estimated construction fee of $18M, is being funded by the California Coastal Conservancy, State Water Resources Control Board, U.S. Department of Fish & Wildlife Services, CA Department of Fish & Game (CDFG), Wildlife Conservation Board, Natural Resource Conservation Services, U.S. Army Corps of Engineers (USACE), and multiple other project partners. GHD has been providing project management, environmental compliance, and design-related services since 2010 for this multi-year project. Environmental and permitting services have included wetland delineations, rare plant and animal protocol surveys with GIS mapping, development of State and federal BAs and Avoidance Measures for consistency determinations of threatened and endangered species, including longfin smelt, Yellow-billed Cuckoo, Willow Fly Catcher, Coho salmon, and tidewater goby. Additionally, GHD has developed

an Adaptive Management Plan (AMP), Habitat Mitigation and Monitoring Plan (HMMP), and a Rare Plant Mitigation and Monitoring Plan as well as permit applications for the USACE (404), CDFG (1600), Regional Water Quality Control Board (RWQCB) (401), State Lands Commission Lease, California Coastal Commission (CDP), State Historic Preservation Office (SHPO), and County of Humboldt Conditional Use and Grading Permits. GHD has also assisted with CEQA to support the Final Environmental Impact Report. GHD is currently finalizing the Salt River channel corridor design and will include the development of the construction documents. Design considerations involve limited right-of-way, low channel gradients, high sediment loads, and multiple utility/bridge crossings, including bridge replacements. Design work has included 1-D and 2-D hydraulic modeling and development of cost-effective bioengineering and re-vegetation strategies compatible with competing objectives such as creation of diverse habitats, long-term adaptive management and maintenance approaches to sedimentation, and natural recruitment of vegetation through a channel corridor that bisects 40-private parcels. Extensive stakeholder outreach and public meetings were also a part of the project management services provided by GHD. GHD has worked as part of a team of consultants on this project including Kamman Hydrology and Engineering Inc., LACO Associates, HT Harvey & Associates, Roscoe and Associates, and others.

Martin Slough Tidal Wetland Enhancement Project
Natural Resources Services Division, Eureka, CA
(2007-Present)

GHD prepared a feasibility study with the purpose of developing alternatives for improving fish passage and flood conveyance through the Martin Slough study area, which contains a tidal control structure, a municipal golf course, and private residential and agricultural lands. Existing problems that have been identified in the Martin Slough study area include obstructed fish access, poor fish habitat, poor sediment routing, lack of riparian habitat, and frequent prolonged flooding that has a negative economic impact on current land uses. GHD developed an enhancement plan to improve fish access, enhance aquatic habitat, improve sediment transport, and reduce flooding impacts on land use activities within the study area. Four feasible alternatives were developed and ranked with a common set of criteria developed by the Martin Slough Technical Advisory Committee. Several different approaches were used to evaluate the alternatives; a simplified numerical model of tidegate hydraulics was then created to allow for rapid analysis of the effectiveness of different tidegate designs in providing fish passage and flood routing within the project area.

Passage conditions were evaluated using the stream crossing design criteria developed by NOAA Fisheries (2001) and the CDFG (2002). The geomorphic stability of enlarging the Martin Slough channel within the project area to increase conveyance area for both flood flows and a diurnal tidal exchange was analyzed using design guidelines developed for tidal channels. This was done because reintroducing a muted tide cycle into the project area would result in large volumes of water flowing up and down the channel with each tide cycle, changing the fluvial processes that maintain the channel. The feasibility study included a comprehensive hydrologic analysis to determine design flow events. Hydrographs were developed for existing and anticipated future land-use conditions to determine how changes in runoff characteristics influence effectiveness of the different project alternatives. Version 2.2.2 of the ACOE Hydrologic Engineering Center's Hydrologic Modeling System software (HEC-HMS), which simulates precipitation-runoff and flow routing processes, was utilized to compute hydrographs for selected rainfall events. Hydraulic modeling of the alternatives was conducted with the two-dimensional finite-element model, ADCIRC (Luettich et al 1992). Objectives of the hydraulic modeling

were to evaluate and compare alternatives in terms of inundation levels, inundation duration, and sediment transport for two-year and 10-year storm events.

The Martin Slough project is located in the tidal reach of Swain Slough, which is known to support threatened and endangered species, including salmonids and tidewater goby. The project team inclusive of designers and biologists integrated measures to avoid and mitigate impacts to these species by design and construction sequencing.

Giacomini Wetlands Restoration
National Park Service; Point Reyes National Seashore Association, CA
(2008-2009)

In 2000, the National Park Service (NPS) used a combination of federal and state funds to purchase the Waldo Giacomini Ranch property. However, the NPS turned to its non-profit cooperating partner, the Point Reyes National Seashore Association (PRNSA), to lead the effort to raise funds for the actual restoration. The Giacomini Wetlands Restoration Project restored most of the 563-acre Giacomini Ranch and nearby Olema Marsh. The Point Reyes National Seashore Association (PRNSA) raised over $6.2 million from private, non-profit organizations, and governmental grants, the largest fund-raising effort to date for this relatively small non-profit organization. Key funders of restoration planning and Phase I and II construction were:

- California Department of Transportation
- California Coastal Conservancy
- Gordon and Betty Moore Foundation
- Kingfisher Foundation
- National Fish and Wildlife Foundation
- Natural Resource Damage Assessment/Cape Mohican Oil Spill Mitigation
- State Water Board/Proposition 50
- US Fish and Wildlife Service/National Coastal Wetland Conservation
- US Fish and Wildlife Service/North American Wetlands Conservation Act
- California Wildlife Conservation Board

Because of sensitive habitats present at or near the Giacomini site and the potential impacts on these habitats from construction activities, regulatory agencies limited the allowable construction period to between July and October. These time constraints necessitated Phase I and Phase II construction contracts. Phase I construction took place between late September and October 2007. Phase II construction began in July 2008 and was substantially completed by the end of October 2008

GHD's role in this project included:

- Project and construction management services for Phase I and Phase II construction;
- Overall coordination of the design process and close collaboration with the designer, Kamman Hydrology & Engineering, Inc. (KHE), who we are teaming with for this project;
- Technical and constructability reviews of the subsequent design submittals (plans, specifications, and cost estimates);

• Development of a project schedule showing final design through completion of Phase II construction;

• Development of the "front-end" specifications (general conditions), the bid schedule, the Invitation for Bid, and other contract documents;

• Public outreach functions, including a door-to-door notification of the construction start and schedules and weekly status updates via the NPS website.

Innovative Construction Contracting: GHD's approach to the construction contracting process represented a paradigm shift in traditional public works contracting, including a qualifications-based bid package based upon many construction challenges evident early in design, as well as a "Success Criteria Matrix," which helped develop appropriate technical specifications and established quality control protocol amongst difficult site features and conflicting points of view regarding team members' desired outcomes.

Community Benefits: GHD provided a full range of public outreach services, which involved, among other things, a door-to-door outreach to the local citizens of the two surrounding townships, and sponsoring two local elementary school field trips to the site for science education and hands-on planting efforts of native plant species. The NPS/PRNSA sponsored a series of free, open field seminars on various topics related to the project and wetlands in general, held at the project site.

Complexity: The project involved a substantial amount of earthwork and grading: the removal of nearly three miles of earthen levees, the excavation of 1.5 miles of new tidal channels, and the handling and disposition of over 40,000 cubic yards of excavated soil and vegetation. On any given day, GHD had to manage and coordinate the work of numerous biological monitors, fisheries biologists, the construction contractor, and the Giacomini family (for disposition of salvaged dairy equipment). The project site was visited by countless wildlife throughout construction, which often required the halting of construction activities and engagement of wildlife specialists.

Humboldt Bay Spartina Eradication Programmatic Environmental Impact Report,
Humboldt County, CA
(2010-present)

GHD and H.T. Harvey & Associates teamed in preparing the Programmatic EIR for a region-wide eradication of the invasive Spartina in Humboldt Bay, the Eel River estuary, and the Mad River estuary.

The PEIR assess potential impacts to biological, water quality, visual atheistic, air quality, and hazardous materials within the management area resulting from a wide range of eradication treatment techniques. The development of the PEIR has also included stakeholder outreach, awareness and collaboration with multiple municipalities, Humboldt State University and resource agencies.

Section 7: Landowners Access, Permits

1. Landowners Granting Access for Project: (Attach provisional access agreement[s]) Wildlands Conservancy	
2. Permits:	• State Lands Commission Lease Application Adaptive Management Plan (AMP) Army Corps of Engineers Permit (ACOE) California Environmental Quality Act (CEQA) CDFG 2081(b) Incidental Take Permit (ITP) Coastal Development Permit County Grading Permit DFG 1600, Lake and Streambed Alteration Agreement (LSA) Federal Biological Assessment (BA) Habitat Mitigation & Monitoring Plan (HMMP) Humboldt County Conditional Use Permit (CUP) Invasive Plant Removal and Rare Plant Mitigation and Monitorin Permit Condition Database State Historic Preservation Office (SHPO) Consultation Letter SWRCB 401 Certification USACE Section 404
3. Lead CEQA agency:	CDFG or State Coastal Conservancy
4. Gallons of Fuel Used to Complete the Project:	Gasoline: 400 Diesel: 0
5. Required Mitigation:	No
6. Listed Species Consultations:	Tidewater goby

Section 8: Project Budget

1. *Detailed Project Budget* (Excel spreadsheets can be used)

DETAILED PROJECT BUDGET									
PROJECT NAME: 95, The Wildlands Conservancy's Eel River Estuary Preserve Restoration Design									
Level of staff / Unit description	**Hours or Units of Amount Requested**	**Hours or Units of Applicant Cost Share**	**Hours or units of Partner Cost Share**	**Hourly Rate or Unit Price ($)**	**Staff Benefits (%)**	**Amount Requested**	**Applicant Amt. of Cost Share**	**Partner Amt. of Cost Share**	**Total Project Cost**
A. PERSONNEL SERVICES									
Level of Staff									
Project Lead		640		$75	22.00	$0	$48,000	$0	$48,000
Project Assistant		240		$35	22.00	$0	$8,400	$0	$8,400
Grants Management		110		$80	22.00	$0	$8,800	$0	$8,800
Accounts/Audits		96		$80	22.00	$0	$7,680	$0	$7,680
Marketing and Communications		80		$80	22.00	$0	$6,400	$0	$6,400
Subtotal						$0	$79,280	$0	$79,280
Staff Benefits						$0	$17,442	$0	$17,442
TOTAL PERSONNEL SERVICES						**$0**	**$96,722**	**$0**	**$96,722**
B. SUBCONTRACTOR EXPENSES									
Level of staff / Unit description (indicate units of measure)	**Hrs/units for Amount Requested**	**Hrs/units of Applicant Cost Share**	**Hrs/units of Partner Cost Share**	**Hourly rate / Unit cost ($)**		**Amount Requested**	**Applicant Amt. of Cost Share**	**Partner Amt. of Cost Share**	**Total Project Cost**
GHD	1			$694,483		$694,483	$0	$0	$694,483
KHE		1		$49,260		$0	$49,260	$0	$49,260
HT Harvey		1		$65,128		$0	$65,128	$0	$65,128
LACO		1		$48,480		$0	$48,480	$0	$48,480
Roscoe		1		$15,920		$0	$15,920	$0	$15,920
TOTAL SUBCONTRACTOR EXPENSES						**$694,483**	**$178,788**	**$0**	**$873,271**
C. OPERATING EXPENSES									

Item Description (indicate units of measure)	Units for Amount Requested	Units of Applicant Cost Share	Units of Partner Cost Share	Unit Cost ($)	Amount Requested	Applicant Amt. of Cost Share	Partner Amt. of Cost Share	Total Project Cost
agency permit fees		1		$24,000	$0	$24,000	$0	$24,000
agency permit fees	1			$5,000	$5,000	$0	$0	$5,000
TOTAL OPERATING EXPENSES					**$5,000**	**$24,000**	**$0**	**$29,000**
D. SUBTOTALS & ADMIN								
Subtotal A + C (Personnel + Operating)					$5,000	$120,722	$0	$125,722
Requested Administrative Overhead (max. 15%) @ 15.00					$750			$750
Applicant Administrative Overhead @ 0.00						$0		$0
Partner Administrative Overhead @ 0.00							$0	$0
Subtotal for Subcontractors					$694,483	$178,788	$0	$873,271
D. GRAND TOTAL					**$700,233**	**$299,510**	**$0**	**$999,743**

2. *Budget Justification:*

The full project scope from concept, environmental assessment, stakeholder outreach, CEQA and permitting - through 100% design plans to achieve complete implementation readiness - is presented in this proposal. We acknowledge the ambitious nature of the proposal and believe, if awarded, this comprehensive approach will benefit the project management, timeline, and potential opportunity for significant federal implementation funds - expected to sunset over the next few years.

To facilitate accurate budgeting, work has been broken into seven key tasks with each task including four to sixteen subtasks:

1) Environmental and supporting studies,
2) Preliminary design plans (30%)
3) CEQA documentation,
4) Intermediate design plans (65%),
5) Permit applications and supporting documentation,
6) Final design plans (100%),
7) Stakeholder outreach and meetings.

If the full project scope is not feasible in this round of FRGP we hope the review committee might consider a first phase or Feasibility Study, to be followed by a Planning and Design FRGP proposal in 2013. The Feasibility Study portion of the proposal would include tasks 1, 2, 3 and 7.

The Coastal Conservancy has committed to 25% cost share for the full scope of work, whether over one or two years, as well as pro bono assistance in the preparation of CEQA documents.

The budget can be broadly broken down into engineering and permitting:

Engineering design is divided into 3 phases: the first up to 30% will establish the footprint of the project, evaluate the necessary habitat conversions and their impact – at a cost of $93,400. The second phase, to 65% completion represents the bulk of the design work – nailing design concepts, producing design sheets, working extensively with agencies to get their input and convey our intent – at a cost of $151,600. The final design phase to 100% integrates the conditions from permits and CEQA into the design plan and completes the fine design details – at a cost of $101,000. The total engineering and design package comes in just under $350,000.

Permitting costs in a coastal zone are unavoidably high. To the project benefit is the recent experience of the design team on the Salt River Ecosystem Restoration Project, both from established relationships with permitting authorities and the ability to carry over recent proximate experience with many similar design components and regulatory requirements. Given the regulatory complexity of the project, the involvement of multiple stakeholders, the technical challenges of some project components including hydrology, agricultural

lands, and the presence of listed species, and a review of actual costs for similar recent efforts, we feel that the proposed budget is reasonable.
All team members are familiar with the project area, minimizing project start-up time with related savings.
Most team members have local Humboldt County offices, minimizing travel costs.

3. *Administrative Overhead:*
Modest administrative costs will cover the portion of field and central office utilities, space, supplies, computers, phones, copies, communications, and postage that this project will expend.

5. Summary Project Costs

Funding Source	Cash	In-kind (if applicable)	Status S,P,U (secured, pending, unknown)	Source Type	Cost Share Used As Match	Expected Award Date	Total
Fisheries Restoration Grant Program	$700,233						$700,233
California State Coastal Conservancy	$299,510	$0	Secured	Applicant	☐	By August 15, 2012	$299,510
Total	$999,743	$0					$999,743

5. *Is Any of the Cost Share Being Used As Match for Other (non-FRGP) Funding for the project?*

6. ***In-kind Detail:***

Source of In-kind contribution	Total volunteer hours	Value of volunteer labor ($)	How Value of Volunteer Labor Determined	Non-volunteer donated labor value ($)	Non-labor contribution description	Non-labor contribution value ($)
FRGP	0.0	$0		$0		$0
California State Coastal Conservancy	0.0	$0		$0		$0

7. ***Estimated Project Cost by Task***

Type of Work	Amount Requested	Cost Share	Total
Fish Screens	**$0**	**$0**	**$0**
Fish Passage	**$0**	**$0**	**$0**
Instream Flow	**$0**	**$0**	**$0**
Instream Habitat	**$0**	**$0**	**$0**
Riparian Habitat	**$0**	**$0**	**$0**
Upland Habitat	**$0**	**$0**	**$0**
Wetland Habitat	**$0**	**$0**	**$0**
Estuarine Habitat	**$0**	**$0**	**$0**
Planning / Assessment / Design	**$700,233**	**$299,510**	**$999,743**
Outreach / Education / Training	**$0**	**$0**	**$0**
Monitoring	**$0**	**$0**	**$0**
Salmon Enhancement / Rearing	**$0**	**$0**	**$0**
Total	$700,233	$299,510	$999,743

Section 9: Supplemental or Specialized Information

Project Location Topographic Map

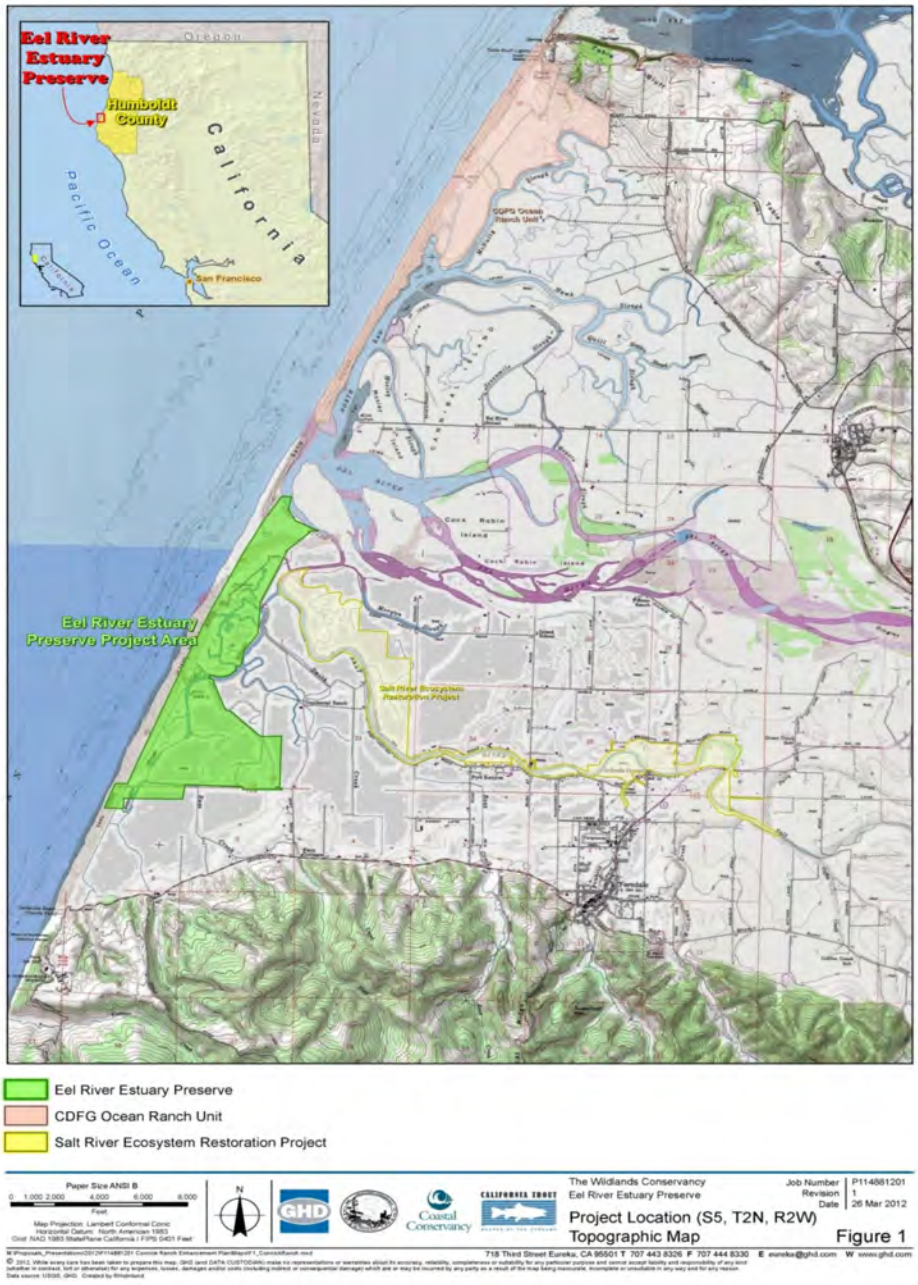

Figure 1. USGS project location map, showing The Wildlands Conservancy's Eel River Estuary ***Preserve***, the footprint of the Salt River Project, and the footprint of the CDFG Ocean Ranch Unit.

Provisional Landowner Access Agreement/Provisional Resolution

Existing Condition Sketch

Watershed (or County) Map

Photographs

Other Documents (Optional)