Dutch Slough Tidal Marsh Restoration Project

Project Information

1. **Proposal Title:**

   Dutch Slough Tidal Marsh Restoration Project

2. **Proposal applicants:**

   Mary Small, California State Coastal Conservancy
   Stan Emerson, Emerson Dairy
   Brent Gilbert,
   Robert Burroughs,
   Nancy Shaefer, Conservation Fund
   John Cain, Natural Heritage Institute

3. **Corresponding Contact Person:**

   Mary Small
   Coastal Conservancy
   1330 Broadway, 1100 Oakland, CA 94612
   510 286-4181
   msmall@scc.ca.gov

4. **Project Keywords:**

   At-risk species, fish
   Restoration Ecology
   Wetlands, Tidal

5. **Type of project:**

   Implementation_Full

6. **Does the project involve land acquisition, either in fee or through a conservation easement?**

   Yes

   If yes, is there an existing specific restoration plan for this site?

   No

7. **Topic Area**:

   Shallow Water, Tidal and Marsh Habitat

8. **Type of applicant:**

   State Agency

9. **Location - GIS coordinates:**

Latitude:	38.004
Longitude:	-121.660
Datum:	NAD83

Describe project location using information such as water bodies, river miles, road intersections, landmarks, and size in acres.

The Dutch Slough site is approximately 1229 acres. The site is bounded by Dutch Slough on the north, the Contra Costa Canal on the south, Jersey Island Road on the east and Marsh Creek on the west.

10. **Location - Ecozone:**

1.4 Central and West Delta

11. **Location - County:**

Contra Costa

12. **Location - City:**

Does your project fall within a city jurisdiction?

Yes

If yes, please list the city: Oakley

13. **Location - Tribal Lands:**

Does your project fall on or adjacent to tribal lands?

No

14. **Location - Congressional District:**

10

15. **Location:**

California State Senate District Number: 7

California Assembly District Number: 15

16. **How many years of funding are you requesting?**

3

17. **Requested Funds:**
    a) Are your overhead rates different depending on whether funds are state or federal?

No

If no, list single overhead rate and total requested funds:

Single Overhead Rate: 3*

Total Requested Funds: 32500000

b) Do you have cost share partners already identified?

No

c) Do you have potential cost share partners?

Yes

If yes, list partners and amount contributed by each:

Coastal Conservancy $2,000,000

Landowners $10,000,000

d) Are you specifically seeking non-federal cost share funds through this solicitation?

No

If the total non-federal cost share funds requested above does not match the total state funds requested in 17a, please explain the difference:

18. **Is this proposal for next-phase funding of an ongoing project funded by CALFED?**

No

Have you previously received funding from CALFED for other projects not listed above?

Yes

If yes, identify project number(s), title(s) and CALFED program.

11332-0-J001 Introduced Spartina Eradication Project Ecosystem Restoration

B81642 Hamilton Wetlands Restoration Project Ecosystem Restoration

99-B189	**Inundation of a section of the Yolo Bypass to restore Sacramento splittail and to support a suite of anadromous and native species in dry years**	**Ecosystem Restoration**

99-B166	**Focused action to develop ecologically-based hydrologic models an water management strategies in the San Joaquin Basin**	**Ecosystem Restoration**
01-N32	**Marsh Creek Watershed Stewardship Project**	**Ecosystem Restoration**

19. **Is this proposal for next-phase funding of an ongoing project funded by CVPIA?**

    No

    Have you previously received funding from CVPIA for other projects not listed above?

    No

20. **Is this proposal for next-phase funding of an ongoing project funded by an entity other than CALFED or CVPIA?**

    No

    Please list suggested reviewers for your proposal. (optional)

    Bruce Herbold EPA 415-744-1992 herbold.bruce@epa.gov

    Chuck Armor Dept. Fish and Game 209-942-6068 carmor@delta.dfg.ca.gov

    Ted Sommer Dept. of Water Resources 916-227-7537 tsommer@water.ca.gov

21. **Comments:**

    17a. The Coastal Conservancy will not charge an overhead rate on Phase I of this project, the acquisition and planning. The Coastal Conservancy will charge a 3% overhead rate on Phase II the restoration implementation.

Environmental Compliance Checklist

Dutch Slough Tidal Marsh Restoration Project

1. **CEQA or NEPA Compliance**
   a) Will this project require compliance with CEQA?

      Yes
   b) Will this project require compliance with NEPA?

      No
   c) If neither CEQA or NEPA compliance is required, please explain why compliance is not required for the actions in this proposal.

2. **If the project will require CEQA and/or NEPA compliance, identify the lead agency(ies).** *If not applicable, put "None".*

   CEQA Lead Agency: Coastal Conservancy
   NEPA Lead Agency (or co-lead:)
   NEPA Co-Lead Agency (if applicable):

3. **Please check which type of CEQA/NEPA documentation is anticipated.**

   CEQA
   -Categorical Exemption
   -Negative Declaration or Mitigated Negative Declaration
   XEIR
   -none

   NEPA
   -Categorical Exclusion
   -Environmental Assessment/FONSI
   -EIS
   Xnone

   If you anticipate relying on either the Categorical Exemption or Categorical Exclusion for this project, please specifically identify the exemption and/or exclusion that you believe covers this project.

   Acquisition will be categorically except under Section 15313. Planning and feasibility studies for the restoration will be statutorily except under Section 15262. If funding for the acquistion and planning work is approved, the Coastal Conservancy will file a notice of exemption with Contra Costa County and the state clearinghouse.

4. **CEQA/NEPA Process**
   a) Is the CEQA/NEPA process complete?

      No

      If the CEQA/NEPA process is not complete, please describe the dates for completing draft and/or final CEQA/NEPA documents.

Implementation of the restoration in Phase II and III will require an environmental impact report. If funding for Phase II is approved, the environmental review of the proposed restoration will be completed once a conceptual design has been developed.

b) If the CEQA/NEPA document has been completed, please list document name(s):

5. **Environmental Permitting and Approvals** (*If a permit is not required, leave both Required? and Obtained? check boxes blank.*)

LOCAL PERMITS AND APPROVALS

Conditional use permit

Variance

Subdivision Map Act

Grading Permit

General Plan Amendment

Specific Plan Approval

Rezone

Williamson Act Contract Cancellation

Other

STATE PERMITS AND APPROVALS

Scientific Collecting Permit

CESA Compliance: 2081

CESA Compliance: NCCP

1601/03

CWA 401 certification

Coastal Development Permit

Reclamation Board Approval

Notification of DPC or BCDC

Other

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation

ESA Compliance Section 10 Permit

Rivers and Harbors Act

CWA 404

Other

PERMISSION TO ACCESS PROPERTY

Permission to access city, county or other local agency land.
Agency Name:

Permission to access state land.
Agency Name:

Permission to access federal land.
Agency Name:

Permission to access private land.
Landowner Name:

6. **Comments.**

5. No permits are needed for the acquisition and planning. The Coastal Conservancy will obtain all necessary permits for the restoration project once a conceptual plan for the project has been developed. The Conservancy will work with the permitting agencies to obtain input into the conceptual design development.

Land Use Checklist

Dutch Slough Tidal Marsh Restoration Project

1. **Does the project involve land acquisition, either in fee or through a conservation easement?**

   Yes

   If you answered yes to #1, please answer the following questions:

   a) **How many acres will be acquired?**

      Fee: 1229
      Easement: 0
      Total: 1229

   b) Will existing water rights be acquired?

      Yes

   c) Are any changes to water rights or delivery of water proposed?

      No

2. **Will the applicant require access across public or private property that the applicant does not own to accomplish the activities in the proposal?**

   No

3. **Do the actions in the proposal involve physical changes in the land use?**

   Yes

   If you answered yes to #3, please answer the following questions:

   a) How many acres of land will be subject to a land use change under the proposal?

      1229

   b) Describe what changes will occur on the land involved in the proposal.

      The project will acquire approximately 1229 acres and restore it to a mosaic of marsh habitats. About 2/3 of the property is currently used as pasture land, and the remaining land supports a dairy operation, including someforage crops for the dairy. The property has been approved for development of 4,500-6,100 housing units and, if the restoration project does not happen, the property will be developed.

   c) List current and proposed land use, zoning and general plan designations of the area subject to a land use change under the proposal.

Category	Current	Proposed (if no change, specify "none")
Land Use	pasture land dairy farm, with some forage crops	Restored to mosaic of shallow water, inter-tidal marsh, floodplain and riparian habitat.
Zoning	The site is designated mixed-use. It has several zoning designations, including: Single family residential, Multi-family residential, Commercial and Office.	none required
General Plan Designation	M-8 - Mixed Use - Oakley Community Center	none required

d) Is the land currently under a Williamson Act contract?

No

e) Is the land mapped as Prime Farmland, Farmland of Statewide Importance, Unique Farmland or Farmland of Local Importance under the California Department of Conservation's Farmland Mapping and Monitoring Program?

No

f) Describe what entity or organization will manage the property and provide operations and maintenance services.

The Coastal Conservancy or the Conservation Fund may act as the interim landowner. The project applicants will continue working with the local community to identify a longterm land management entity that has local support. support.

4. Comments.

3. This proposal would fund acquisition of up to 1229 acres. The landowners may elect to dedicate some portion of the property to the local community for recreational or other community facilities prior to this acquisition. Any dedication of land would reduce the landowner's contribution to this project, but would not be expected to effect the acquistion price of this proposal.

Conflict of Interest Checklist

Dutch Slough Tidal Marsh Restoration Project

Please list below the full names and organizations of all individuals in the following categories:

- **Applicants listed in the proposal who wrote the proposal, will be performing the tasks listed in the proposal or who will benefit financially if the proposal is funded.**
- **Subcontractors listed in the proposal who will perform some tasks listed in the proposal and will benefit financially if the proposal is funded.**
- **Individuals not listed in the proposal who helped with proposal development, for example by reviewing drafts, or by providing critical suggestions or ideas contained within the proposal.**

The information provided on this form will be used to select appropriate and unbiased reviewers for your proposal.

Applicant(s):

Mary Small, California State Coastal Conservancy
Stan Emerson, Emerson Dairy
Brent Gilbert,
Robert Burroughs,
Nancy Shaefer, Conservation Fund
John Cain, Natural Heritage Institute

Subcontractor(s):

Are specific subcontractors identified in this proposal? No

Helped with proposal development:

Are there persons who helped with proposal development?

No

Comments:

Budget Summary

Dutch Slough Tidal Marsh Restoration Project

Please provide a detailed budget for each year of requested funds, indicating on the form whether the indirect costs are based on the Federal overhead rate, State overhead rate, or are independent of fund source.

Independent of Fund Source

Year 1												
Task No.	Task Description	Direct Labor Hours	Salary *(per year)*	Benefits *(per year)*	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
1	Acquisition								26000000	26000000.0		26000000.00
2	Phase 1 Baseline MonitoringMonitoring						150000			150000.0		150000.00
3	Phase 1 Adaptive Management Planning						100000			100000.0		100000.00
4	Phase 1 Community Outreach and Access Design						50000			50000.0		50000.00
5	Management Endowment								1000000	1000000.0		1000000.00
6	Phase 1 Project Management	1000	40000	10000						50000.0		50000.00
7	Phase 2 Project Managment	1000	40000	10000						50000.0		50000.00
14	Phase 2 Monitoring						145500			145500.0	4500	150000.00
										0.0		0.00
										0.0		0.00
										0.0		0.00
										0.0		0.00
										0.0		0.00
		2000	80000.00	20000.00	0.00	0.00	445500.00	0.00	27000000.00	27545500.00	4500.00	27550000.00

Year 2												
Task No.	Task Description	Direct Labor Hours	Salary *(per year)*	Benefits *(per year)*	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
2	Phase 1 Baseline MonitoringMonitoring						150000			150000.0		150000.00
7	Phase 2 Project Management	1000	40000	10000						50000.0		50000.00
8	Phase 2 Planning and Permitting						121250			121250.0	3750	125000.00
9	Phase 2 Hydrodynamic Modeling						145500			145500.0	4500	150000.00
10	Pahse 2 Engineering Design						121250			121250.0	3750	125000.00
13	Vegetation planting and maintenance						1455000			1455000.0	45000	1500000.00
14	Phase 2 Monitoring						145500			145500.0	4500	150000.00
		1000	40000.00	10000.00	0.00	0.00	2138500.00	0.00	0.00	2188500.00	61500.00	2250000.00

Year 3												
Task No.	Task Description	Direct Labor Hours	Salary *(per year)*	Benefits *(per year)*	Travel	Supplies & Expendables	Services or Consultants	Equipment	Other Direct Costs	Total Direct Costs	Indirect Costs	Total Cost
7	Phase 2 Project Management	1000	40000	10000						50000.0		50000.00
11	Phase 2 Water Control Structures								242500	242500.0	7500	250000.00
12	Phase 2 Site Grading and Levees								679000	679000.0	21000	700000.00
13	Vegetation planting and maintenance						1455000			1455000.0	45000	1500000.00
14	Phase 2 Monitoring						194000			194000.0	6000	200000.00
		1000	40000.00	10000.00	0.00	0.00	1649000.00	0.00	921500.00	2620500.00	79500.00	2700000.00

Grand Total=32500000.00

Comments.

Budget Justification

Dutch Slough Tidal Marsh Restoration Project

Direct Labor Hours. Provide estimated hours proposed for each individual.

The Project Management task estimates that both Phase 1 and Phase 2 will require 1000 hours per year from the Project Manager.

Salary. Provide estimated rate of compensation proposed for each individual.

$40/hour

Benefits. Provide the overall benefit rate applicable to each category of employee proposed in the project.

20%

Travel. Provide purpose and estimate costs for all non-local travel.

travel costs will not be covered by this grant

Supplies & Expendables. Indicate separately the amounts proposed for office, laboratory, computing, and field supplies.

none

Services or Consultants. Identify the specific tasks for which these services would be used. Estimate amount of time required and the hourly or daily rate.

Consultants will be hired for Tasks 4,5,6,8,9,10,12,13 and 14.

Equipment. Identify non-expendable personal property having a useful life of more than one (1) year and an acquisition cost of more than $5,000 per unit. If fabrication of equipment is proposed, list parts and materials required for each, and show costs separately from the other items.

Water Control Structures will be purchase in Phase 2 at an estimated cost of $250,000

Project Management. Describe the specific costs associated with insuring accomplishment of a specific project, such as inspection of work in progress, validation of costs, report preparation, giving presentatons, reponse to project specific questions and necessary costs directly associated with specific project oversight.

Project Management costs are accounted under direct labor costs. It is anticipated that each phase will require 1000 hours per year, approximately one half time position.

Other Direct Costs. Provide any other direct costs not already covered.

Land Acquisition $26,000,000

Indirect Costs. Explain what is encompassed in the overhead rate (indirect costs). Overhead should include costs associated with general office requirements such as rent, phones, furniture, general office staff, etc., generally distributed by a predetermined percentage (or surcharge) of specific costs.

The Coastal Conservancy will absorb overhead costs for Phase 1, the acquisition and initial planning. For Phase 2, the Coastal Conservancy will charge 3% overhead to help cover general office costs associated with project management.

Executive Summary

Dutch Slough Tidal Marsh Restoration Project

EXECUTIVE SUMMARY Title: Dutch Slough Tidal Marsh Restoration Project Amount Requested: $32,500,000 Applicant: California Coastal Conservancy, Mary Small 1330 Broadway, 11th Floor Oakland, CA 94612-2530 Phone: 510/286-4181 Fax: 510/286-0470 E-mail: msmall@scc.ca.gov Participants And Collaborators: Stan Emerson, Emerson Dairy Robert Burroughs Brent Gilbert Nancy Schaefer, Conservation Fund John Cain, Natural Heritage Institute The Dutch Slough site is the best - and perhaps the only - site in the Delta where the location, elevation, ownership, and physical configuration combine to create the opportunity for implementation of a large-scale tidal marsh restoration and research project. The project objectives are: 1) Implement a large-scale, locally supported restoration project that will serve the local community with shoreline access and other opportunities. 2) Restore the 1200-acre Dutch Slough properties to a fully functioning, self-sustaining ecosystem that includes a mosaic of habitat types including shallow water, emergent marsh, inter-tidal marsh, seasonal wetlands and flood plains, Antioch dune scrub, riparian forest, and oak savannah. 3) Significantly contribute to the state of scientific understanding of floodplain and tidal marsh restoration through ongoing experimentation and monitoring under an adaptive management framework. The Dutch Slough site includes approximately 1200 acres on three adjacent parcels. The site is located on the Marsh Creek delta and the Big Break shoreline in the City of Oakley in northeastern Contra Costa County. The site's proximity to Big Break and Marsh Creek creates an opportunity to protect and expand a continuous area of tidal marsh and floodplain encompassing over 3,000 acres and eight miles of shoreline. This project is the best, if not the only, opportunity for landscape scale tidal marsh restoration in the western Delta. If funding for acquisition and restoration is not obtained, the landowners have existing development approval for 4,500-6,100 housing units and the property will be developed.

Proposal

California State Coastal Conservancy

Dutch Slough Tidal Marsh Restoration Project

Mary Small, California State Coastal Conservancy
Stan Emerson, Emerson Dairy
Brent Gilbert,
Robert Burroughs,
Nancy Shaefer, Conservation Fund
John Cain, Natural Heritage Institute

A. Project Description: Project Goals and Scope of Work

1. Problem

Problem Statement. The Sacramento-San Joaquin Delta was once composed of over 350,000 acres of tidal marsh and adjoining seasonal wetlands. These wetlands provided habitat for a unique assemblage of native fish species. Today, however, over 97 percent of the Delta's historical tidal marshes have been eliminated and many of the native fish species that once depended upon them, particularly during early life stages, are in danger of extinction.

The CALFED Ecosystem Restoration Plan (ERP) for the Delta is largely based on the hypothesis that restoring large tracts of tidal marsh will improve conditions for the Delta's native fish assemblages. In reality, however, several factors combine to severely limit opportunities for large-scale tidal marsh restoration projects in the Delta. These constraining factors and the advantages of this restoration proposal relative to these factors are detailed below:

- *Elevation and topographic diversity*: Over the last 100 years, agriculture has become a predominant use of Delta lands. Farming has caused the oxidation and subsidence of the Delta's fragile peat soils, leaving very few historical marshlands at elevations currently suitable for restoration of tidal marsh. Many farmlands are subsided to 10–25 feet below sea level, a depth unsuitable for tidal marsh restoration given that it will require years, perhaps decades, to rebuild elevation at these sites to levels sufficient for tidal marsh restoration purposes. In addition, many possible restoration sites lack topographical diversity; in these cases, considerable resources must be expended to artificially create topography that allows for restoration of multiple habitat types.

The Dutch Slough site is one of the few, if not the only, large-scale sites in the Delta not already acquired for restoration that is currently at suitable elevations for tidal marsh restoration. The diverse topography of the site allows for restoration of an ecological continuum of tidal wetland, low marsh,

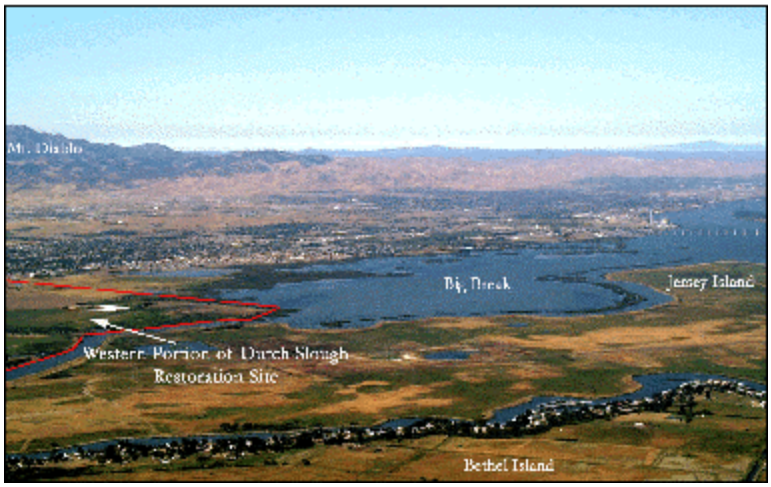

Figure 1: The western Delta location of the Dutch Slough restoration site provides a unique opportunity to restore a large area of tidal marsh.

high marsh, riparian habitat, and upland transition zones, including inland dune scrub habitat, with only minimal grading.

- *Site location*: Very few opportunities exist to restore tidal marsh in the western Delta where most native fish congregate. Lands suitable for tidal marsh restoration are distributed mostly along the margins of the Delta and are extremely limited in the western Delta. Most lands suitable for tidal marsh restoration in the northern Delta have already been acquired for that purpose. Lands near sea level on the eastern and southern fringes of the Delta cannot be restored to marsh without deeply inundating large tracts of farmland or building a new network of levees. Although lands with suitable elevations are relatively abundant on the southern margins of the Delta, the CALFED ERP cautions against marsh restoration in this area out of concern that it will increase entrainment of native fish in the south Delta pumps.

  The Dutch Slough site is the only available site in the western Delta. We hypothesize that restoration of the site will be particularly beneficial to target fish species because: 1) most native fish congregate in the western Delta; 2) unlike tidal marsh on the periphery of the northern or eastern fringes of the Delta, all anadromous fish in the watershed pass through tidal marsh in the western Delta; and 3) environmental gradients, particularly salinity gradients, in the western Delta are most likely to favor native fish.

- *Urbanization:* The Delta ecosystem and its prospects for restoration are threatened by rapid urbanization along the periphery of the Delta. This urbanization along the margins of the Delta where elevations are most suitable for restoration not only precludes future restoration, but will degrade what remains of the Delta ecosystem.

  The Dutch Slough site has been historically managed for dairy and range, but the larger 1,539-acre site has been approved for development as a master-planned community of 4,500 to 6,100 housing units. Goal 3, Objective 3 of the CALFED strategic plan emphasizes the importance of preventing urbanization adjacent to existing and restored habitats. A tidal marsh restoration project on this site would prevent urbanization of 10 miles of Delta shoreline (including sloughs) and create a critical buffer between the Delta ecosystem and the rapidly

Figure 2: Aerial photograph of Dutch Slough site

urbanizing communities of northeastern Contra Costa County. The Contra Costa Canal at the southern edge of the site will provide an ecological buffer for the development that will occur immediately south of the canal.

- *Sufficient knowledge of tidal marsh restoration***:** The prospects for successful tidal marsh restoration in the Delta are generally limited by a lack of knowledge on how best to restore tidal marsh for the benefit of native, endangered fish assemblages.

  This project will specifically address the gaps in scientific understanding of tidal marsh restoration processes by furthering scientific and practical knowledge of Delta restoration. The site is ideally configured for a large-scale experiment. The site consists of three nearly equal sized parcels with similar area, topography, and shape that can be flooded and managed independently to test restoration treatments under different hydrodyamic, salinity, temperature, and other physical regimes. Furthermore, each site encompasses a diversity of topography and soils, creating the opportunity to study marsh ecology and development on varying substrates. Using an adaptive management framework, the project will be designed as a series of experiments to test key hypotheses relating to tidal marsh restoration (see Section A2 of this proposal for more discussion of hypotheses). The understanding gained from these experiments could greatly reduce the uncertainties associated with marsh restoration and thus improve the prospects of success for future restoration projects in the region covered by CALFED and beyond. To date, no tidal marsh projects have been implemented under such an adaptive management framework.

- *Local opposition to farmland acquisition and conversion:* Delta residents and public officials have many legitimate concerns about how acquisition of private lands and conversion of farmlands will impact existing farming operations and the Delta economy. As a result they have adamantly opposed several land acquisition and restoration projects in the Delta, including Prospect Island, Liberty Island and the North Delta Wildlife Refuge, Stone Lakes National Wildlife Refuge, and Statten Island.

  This project is different than other projects restoring farmland because the landowners have vested rights for urban development of 4,500–6,100 units on the property pursuant to development agreements with Contra Costa County that are binding on the City of Oakley. Unlike other controversial restoration projects on Delta farmlands, the Dutch Slough Restoration site is not in the agricultural heart of the Delta, is not prime farmland, and is zoned for urban development. The site historically has been used as a dairy and for grazing and is zoned for agricultural development. Even if this restoration project is not completed, the property will be developed for residential and mixed uses.

Project Description. This proposal seeks $32.5 million dollars to acquire and initiate restoration of historical tide-lands in northeast Contra Costa to create a learning-rich

adaptive management restoration project. The site will be restored to a mosaic of shallow water, intertidal marsh, floodplain, and riparian habitats for multiple CALFED target species, with portions of the site available for public access and community amenities. The project applicants request funding for the first two phases of a three-phase project. Phase I includes $26 million for acquisition, $1 million for management endowment, and $0.5 million for planning and baseline monitoring. Phase II includes detailed design, restoration, and monitoring on one of the three parcels for $5 million. Phase III will require an approximately $12 million to complete restoration of the site.

Site Location. The Dutch Slough Tidal Marsh Restoration Project site covers approximately 1,229 acres on three adjacent parcels (473-acre Emerson, 312-acre Gilbert, and 444-acre Burroughs properties) located just east of the City of Oakley in northeastern Contra Costa County (Figures 1, 2, and 3). The site is bounded on the north by Dutch Slough, on the south by the Contra Costa canal, on the east by Jersey Island Road, and on the west by Marsh Creek. It is located on the Brentwood 7.5-minute U.S.G.S. quadrangle, and the UTM (Zone 10) coordinates for the geographic center of the project are N4207383 and E617220. The heavily used Marsh Creek regional trail goes along the western boundary of the site.

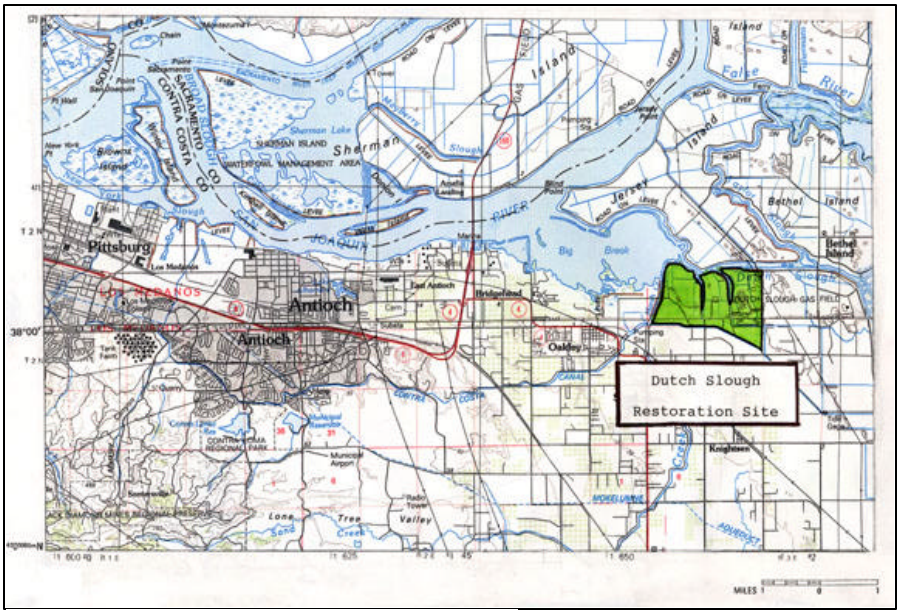

Figure 3: Dutch Slough site location

Project Goals & Objectives. Over years of work in the Delta, the Natural Heritage Institute (NHI) has identified this site in the western Delta (CALFED ERP Ecological Management Zone 1.4) that presents a unique and important opportunity for tidal marsh restoration and research in the Delta that will not harm the Delta's agricultural economy. The Dutch Slough site is the best—and perhaps the only—site in the Delta where the combination of location, elevation, current land use, ownership, and physical configuration is optimal for undertaking a large-scale tidal marsh restoration

experiment. Restoration of this site would contribute to the goal shared by NHI and CALFED of restoring the native habitats and species of the Delta.

The overall goal of this project is to restore a significant continuum of habitat from tidal marsh to upland forest in the western Delta. More specific objectives of this project are to:

1) Implement a large-scale, locally supported restoration project that will serve the local community with shoreline access as well as educational, recreational, and economic opportunities.
2) Restore the Dutch Slough properties to a fully functioning, self-sustaining ecosystem that includes a mosaic of habitat types including shallow water, emergent marsh, intertidal marsh, seasonal wetlands and flood plains, Antioch dune scrub, riparian forest, and oak savannah.
3) Significantly contribute to the state of scientific understanding of floodplain and tidal marsh restoration through on-going experimentation and monitoring under an adaptive management framework.

Project Hypotheses. This project will be part of a large-scale field experiment to evaluate numerous questions critical to the success of the CALFED ecosystem restoration program, including:

- What topography and substrates are most suitable to the successful establishment of tidal marsh restoration?
- What types of tidal marsh are most beneficial for native Delta fish species, including the Delta smelt, Sacramento splittail, and fall-run chinook salmon?
- Can restoration of Delta tracts and islands be designed and implemented in a manner that will improve water quality?
- What techniques are most effective for raising the elevation of subsided lands to elevations suitable for tidal marsh restoration?

More specific hypotheses related to these questions that will be tested in this project are described below.

2. Justification

Acquisition and restoration of this site is justified both for habitat and research purposes. The site currently encompasses nearly six miles of relatively barren levee shoreline along major tidal sloughs and Marsh Creek. This project intends to transform this area into shaded riverine aquatic habitat. In addition, restoring tidal inundation to the interior of the site would add nearly ten miles of shoreline edge habitat to the site. Restoration of the site can be accomplished cost-effectively without significant grading. Tidal inundation and restoration of the site would create a diverse mosaic of habitat types from tidal marsh to Antioch dune scrub. Table 1 and Figure 6 illustrate the impressive area and type of habitats that could be restored

without any existing grading.[1] The unique opportunity to restore the nearly extinct Antioch dune scrub habitat may, in and of itself, justify the project. Despite the site's impressive restoration potential, recent wetland and biological surveys conducted by the owners indicate that there are limited wetlands and no special status species on the site's interior that would delay restoration implementation or, for that matter, urban development. This is a time-sensitive acquisition opportunity: if CALFED fails to acquire the site during this funding cycle, the landowners will sell the property to a developer to construct a 4,500–6,100 unit master-planned community.[2]

Table 1. Land area summary for existing topography and corresponding habitat restoration potential at Dutch Slough, city of Oakley, California.

Current Elevation (feet)	Potential Habitat Type	Total (acres)
-10 to -3	Shallow Water	381
-3 to 0	Emergent Marsh	224
0 to 3	Intertidal Marsh	259
3 to 5	Seasonal Marsh & Floodplain	137
5 to 8	Mixed Riparian-Oak Woodland	126
8 +	Antioch Dune Scrub	101
	Total (acres)	1,228

In addition to restoration and conservation priorities, there are several unique learning opportunities associated with this project that justifies the investment needed to restore this site to tidal marsh habitat. First, the site location, at the upper end of the gradient between saline and freshwater environments in the Delta, provides an opportunity to evaluate tidal marsh ecology that is not available at the northern Delta tidal marsh restoration sites. Second, unlike all of

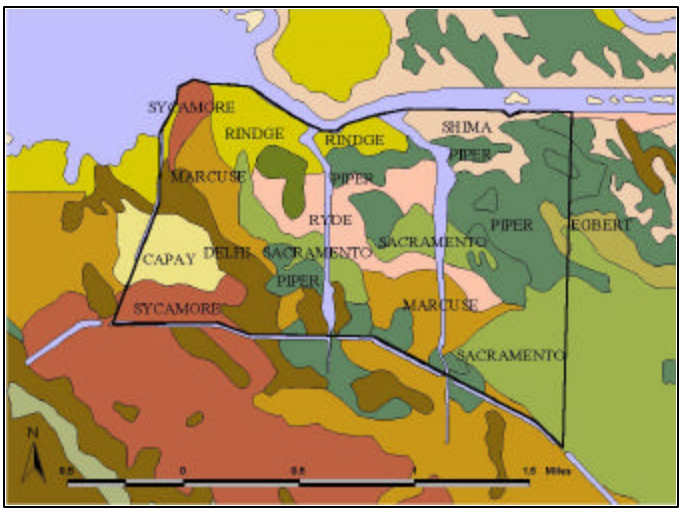

Figure 4: The soils at the Dutch Slough site provide a diverse selection of substrates upon which to test marsh evolution and ecology.

[1] More acres of particularly valued target habitats could be restored with relatively minor grading.
[2] The landowners have already obtained a final development agreement from Contra Costa County for this proposed development.

CALFED's currently planned tidal marsh restoration sites in the northern Delta, the topographic and edaphic diversity (see Figures 4 and 6) at the Dutch Slough site is well suited for testing hypotheses regarding marsh evolution and ecology on varying substrates.

In addition, the physical configuration of the Dutch Slough restoration site lends itself to designing field-scale experiments. Because the Dutch Slough property consists of three discrete parcels (473-acre Emerson, 312-acre Gilbert, and 444-acre Burroughs properties), it offers a unique opportunity to experimentally test a range of hypotheses essential to understanding and furthering tidal marsh restoration activities. The availability of three similar parcels for experimental studies on a relatively large scale gives this project unprecedented learning potential for tidal marsh restoration. On this site, scientists can test and refine approaches on the first site to improve the likelihood for success on subsequent parcels (restore parcels sequentially), or measure the response of native fish and other species to three different types of marsh restoration (restore parcels as replicates). It is also possible to control tidal flow into the site with gates to test various hypotheses or to manage for exotic species.

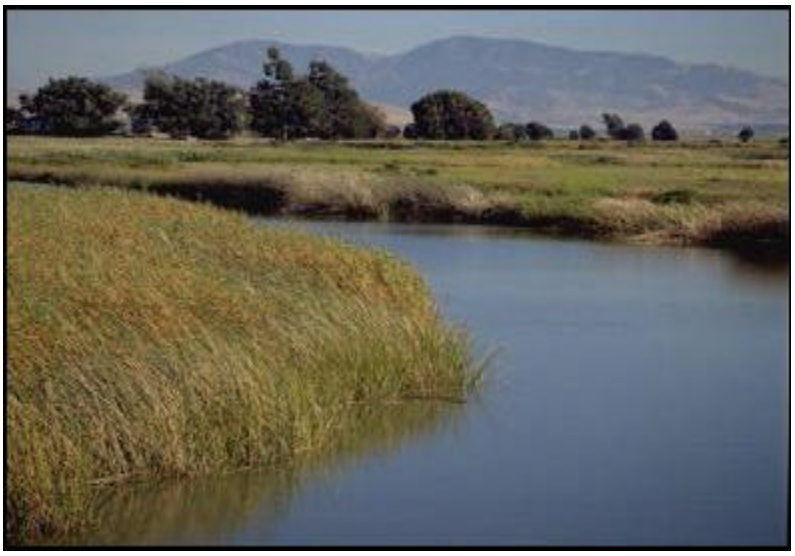

Figure 5: The intertidal elevation of the Dutch Slough restoration site is ideally suited for rapidly reestablishing a vegetated marsh plain dissected by a dentritic channel network.

Further, because restoration could proceed immediately at the Dutch Slough sites with minimum subsidence reversal efforts, restoration here will proceed more quickly than sites that require years for sediment deposition and build-up of marsh habitat (Figure 5). Thus, the results of these field-scale experiments will provide the early learning necessary to inform other restoration activities.

Conceptual Model. This proposal is premised on a conceptual model that assumes that restoration of tidal and hydrologic dynamics on the site will form a mosaic of habitats, including freshwater tidal marsh, creating habitat for a range of native species (Figures 6 and 7). Recent studies in the Delta suggest that intertidal zone habitat promotes the most rapid colonization of tidal marsh vegetation (Simenstad *et al.* 2000; Grimaldo *et al.* 1998). Primary productivity is high in these areas and

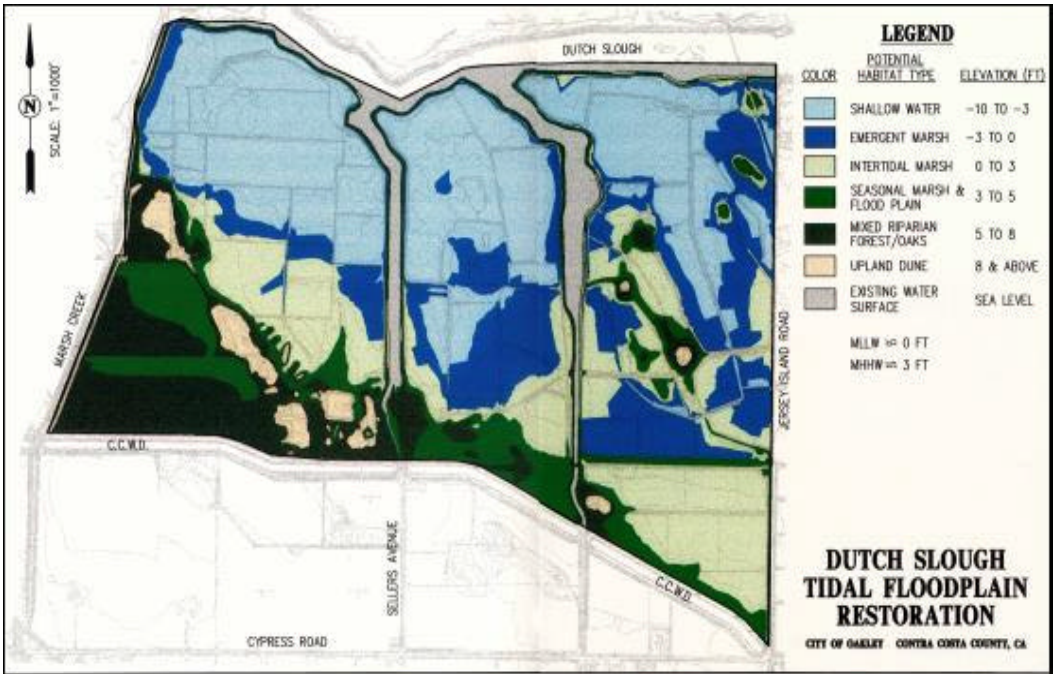

Figure 6: Potential Habitat Types for Dutch Slough Restoration

provides optimal spawning, rearing, and refuge habitat for at-risk native fish.

This conceptual model considers three key issues associated with tidal marsh restoration: 1) native fish abundance in restored sites, 2) evolution and sustainability of tidal wetlands in restored sites; and 3) tidal wetland restoration and water quality. These issues and their associated hypotheses and uncertainties are presented below.

1) Native Fish Abundance in Restored Sites. Explicit studies of freshwater tidal wetlands in the Delta are rare, but several sources of information exist for fish in shallow-water habitats (California Department of Fish and Game Resident Fish Monitoring Survey 1980–84, 1995, 1997, 1999). These studies indicate that freshwater tidal marsh and associated shallow-water habitats are likely to be dominated by introduced species. However, evidence is accumulating in the Pacific Northwest that estuarine and tidal wetland habitat can be very important to the juveniles of anadromous salmonids (Healy 1991 and references therein; Shreffler *et al.* 1990; Simenstad *et al.* 1993), and recent research indicates that floodplain habitat enhances growth and survival of juvenile chinook salmon in the Sacramento River (Sommer *et al.* 2000). There is some question about the status of Sacramento splittail

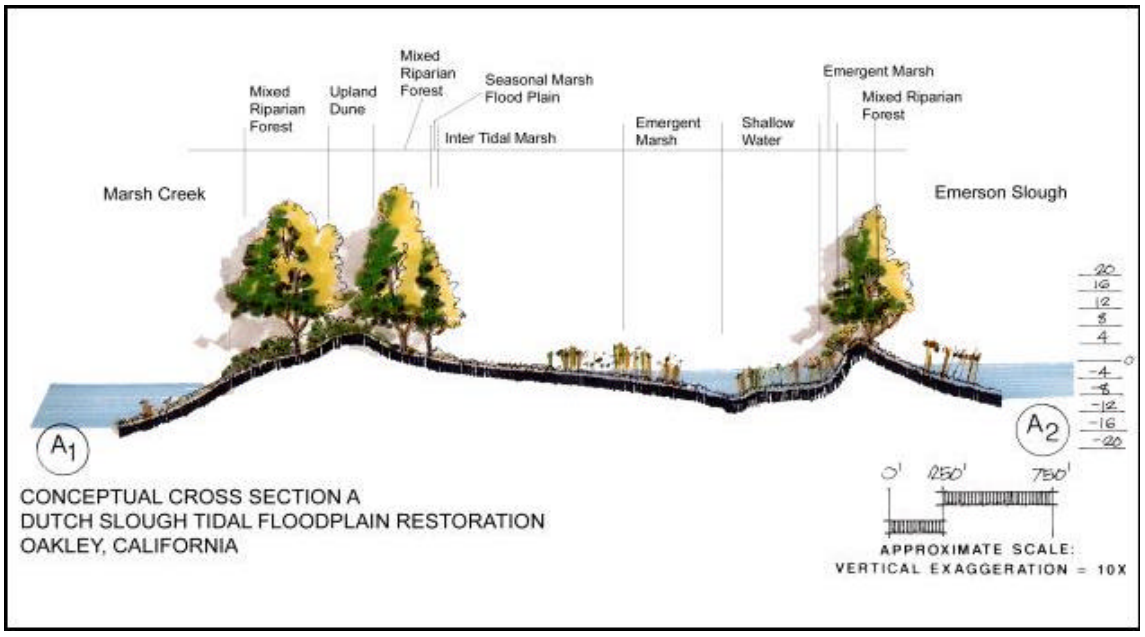

Figure 7: Conceptual cross section of restored Dutch Slough site

in freshwater marsh habitat, and the importance of freshwater tidal wetlands to native delta smelt is also speculative (Lindberg and Marzuola 1993). Thus, the assumption that restoring tidal wetland habitat will substantially increase remaining populations of native species should be accepted with considerable caution.

The following hypotheses outline the alternatives relative to native fish abundance in restored tidal wetlands: H_1: Native fish species are not limited by area of tidal wetland habitat; H_2: Native fish species are limited by area of tidal wetland habitat, and restoration actions increasing the area of tidal wetland habitat will increase their populations; and H_3: Native fish species are limited by area of tidal wetland habitat, but restoration actions increasing the area of tidal wetland habitat will not result in a net increase in their populations because of other ecosystem changes. For Delta tidal wetlands, the net benefit of such wetlands to native fish species in general and fish species of concern in particular is the major uncertainty. This uncertainty can be broken down into several parts, which this project will address:

(a) Which species, introduced and native, prey on native species and is such predation limited to specific life stages of prey?[3]
(b) What environmental factors influence rates of predation? Such factors might include seasonal temperature regime, salinity, turbidity, flow conditions, and habitat type.
(c) How can tidal wetlands be designed to minimize predation effects?

[3] This uncertainty could be important if predation on early life stages of prey is compensated by increased growth and survival of older, larger individuals in tidal wetland habitat.

(d) What is the role of disturbance regimes on seral stage and colonization by target species?

2) Evolution and Sustainability of Tidal Wetlands in Restored Sites. In contrast to natural marshes, the establishment of vegetated marsh in subsided sites requires the rapid accumulation of sediment until mudflats are high enough for vegetation colonization.[4] Such an accumulation is greatly affected by physical processes and is not a foregone conclusion.

A primary determinant of whether a vegetated marsh will form on a restored area is if accretion relative to sea level will build ground elevations sufficient for colonization by emergent vegetation. Accretion at subsided breached sites generally follows one of three trajectories represented by the following hypotheses (Simenstad *et al.* 2000). Under H_1, accumulation does not keep pace with sea level rise, erosion, and subsidence, and the site gets deeper over time, creating permanent subtidal habitat. With H_2, accumulation initially occurs faster than erosion, sea level rise and subsidence. As elevations increase, accumulation rates decline and equilibrium occurs below the elevation where emergent vegetation can colonize. The site then becomes permanent shallow subtidal or intertidal mudflat habitat. Under H_3, accumulation raises mudflat levels high enough for emergent vegetation colonization that then expands laterally into lower elevation zones, reducing erosive processes and increasing *in-situ* bioaccumulation. As marsh plain elevations increase, accumulation rates decline and eventually an equilibrium elevation is reached—typically at about the elevation of the diurnal high tide (MHHW) (Atwater and Hedel 1976; Atwater 1980).

The first two of these trajectories fail to result in restored vegetated tidal marsh. The deepening open water endpoint (H_1) has not been observed in artificially restored sites in the San Francisco Bay-Delta and is not expected to be significant in this system. Open water/mudflat equilibrium (H_2) is a possibility for restored sites, as is vegetated tidal marsh (H_3).

In addition to the potential endpoints for tidal marsh restoration, the sustainability of ecosystem components at the restored site must also be considered. The drive for tidal wetland restoration in the San Francisco Bay-Delta is based on the assumption that the benefits of restoration will be sufficiently long-lasting to be ecologically significant. There are, however, many uncertainties associated with predicting whether a site will become marsh or remain open water/mudflat and if ecosystem benefits will be sustained over time (Simenstad *et al.* 2000). By testing this hypothesis under an adaptive management framework, this project will work toward resolving key uncertainties such as the following:

(a) What topographic and edaphic surfaces are most conducive to marsh restoration?

[4] Natural marshes are formed by gradual upward and landward expansion that keeps pace with sea level rise. This pattern of evolution of natural tidal marshes cannot necessarily be extrapolated to restored sites.

(b) How will marsh plain accretion change in response to future evolution of suspended sediment concentrations and sea level rise; and what natural and human-induced changes will affect future sediment dynamics and suspended sediment concentrations?

(c) What are the effects of wave action on marsh edge erosion in the Delta; what methods can be used to limit erosion; and how will changes in erosion potential through increased boat traffic, creation of long fetches, and mudflat lowering affect future rates of erosion?

(d) Is it necessary to grade major channels in shallowly subsided sites or will they evolve through tidal scour?

3) Tidal Wetland Restoration and Water Quality. Different types of restoration actions may have different effects on water quality, including mercury accumulation and organic carbon export. For example, altered hydrological regimes may change rates of delivery of mercury to areas where net methylmercury production is high. In addition, creation of tidal wetlands through flooding of diked farmlands or floodplains could result in particularly high rates of mercury bioaccumulation (Bodaly *et al.* 1984, 1997, Hecky *et al.*, 1987, Kelly *et al.* 1997, Paterson *et al.* 1998). Further, tidal wetland restoration may alter many processes that are known to influence net methylmercury production and accumulation in food webs. Increases in food web accumulation could exacerbate concerns that currently exist over human and wildlife exposure to mercury in the Bay-Delta.

Also, it has been suggested that restoration of tidal wetlands in the Bay-Delta will export organic carbon in various forms to deep water habitats such as channels and bays. Organic carbon forms as a natural product of plant decay. Sources of total organic carbon (TOC) include runoff from peat soils and urban storm water drainage, agricultural drains and other agricultural activities, tidal wetlands, algae, and wastewater treatment plant discharges (CALFED 1998). Unfortunately, some forms of organic carbon react with oxidative disinfectants used to treat drinking water and help form a variety of chemicals referred to as disinfection byproducts (DBPs), which can have adverse human effects. The amount of total organic carbon (TOC) contributed by natural wetlands is not known, and the restoration of tidal wetlands may increase the total amount of organic carbon at drinking water intakes (CALFED 1998). It is therefore possible that export of organic carbon from restored tidal wetlands in the Delta might have negative effects on drinking water quality.

The hypotheses addressing local-scale effects of tidal wetland restoration actions on mercury accumulation in food webs are H_1: Tidal wetland restoration will not change rates of food web accumulation of mercury on a local scale; H_2: Tidal wetland restoration will cause decreased rates of food web accumulation of mercury on a local scale; and H_3: Tidal wetland restoration will cause increased rates of food web accumulation of mercury on a local scale.

Each of the three possible outcomes—an increase, decrease, or no change in mercury bioaccumulation—might be observed in this particular project. From a management

perspective, the prudent course would be to minimize risk as much as possible based on existing knowledge while conducting targeted research to assess regional and local impacts, such as the research being conducted by the University of California Davis at Montezuma Slough, and to reduce negative impacts of future restoration projects.

The following hypotheses represent the range of possible alternatives regarding the effect of tidal Delta wetlands on production of TOC and formation of DBPs. H_1: Restored tidal wetlands will not export organic carbon to adjacent deep-water habitats; H_2: Restored tidal wetlands will export organic carbon to adjacent deep-water habitats but the quantity or quality will be limited such that there will be little or no enhancement of the food web; H_3: Restored tidal wetlands will export organic carbon to adjacent deep-water habitats, and the quantity or quality will be sufficient to enhance the food web but will have no effect on the formation of DBP precursors; and H_4: Restored tidal wetlands will export organic carbon to adjacent deep-water habitats, and the quantity or quality will be sufficient to enhance the food web and the formation of DBP precursors.

It seems likely that restored tidal wetlands will export organic carbon to adjacent channel areas; however, the importance of various types of organic carbon to the local food web or to the Sacramento-San Joaquin estuary as a whole is unclear. Evaluation of organic carbon in the estuary as a whole is a relatively recent effort. Most of the work accomplished to date concerns organic carbon cycling through the estuary, from the rivers to the sea, rather than within a particular geographic area.

The overall uncertainty that this project will address relative to water quality is the issue of the relation between water quality, restoration, and delta and local hydrodynamics. More specific uncertainties include:

(a) What are the spatial patterns in methylmercury production within tidal marshes?
(b) What are sources of local variation in mercury accumulation among tidal wetlands?
(c) What are the pathways for mercury contamination in the food web of the Bay-Delta?
(d) What are the sources of organic carbon in tidal wetlands and how are they exported to open-water systems?
(e) How would restoring large parcels of tidal marsh habitat affect the carbon cycle and formation of dissolved organic carbon?

Experimental Restoration. The Dutch Slough project will involve the design of a field-scale restoration experiment that integrates a range of disciplinary approaches to address the hypotheses and uncertainties outlined above. Although the specifics of the restoration experiment will be hammered out as part of a collaborative effort involving the input of many scientists and managers, the manipulation of environmental gradients on the three parcels has been discussed as a potentially

powerful tool to address a range of uncertainties associated with tidal marsh restoration. This approach is described briefly below:

There are many factors governing the distribution and abundance of species—environmental gradients and the interaction among them is one organizing factor. Species composition and collective properties such as species richness vary as a continuum in a multi-dimensional environmental space. Environmental gradients, an important concept in ecology, are defined as changes in measurable characteristics of the environment, often with respect to direction. There are four major gradients in tidal marsh habitat:

Vertical gradients run from the terrestrial upland to the aquatic habitat. Species inhabit this gradient according to their resistance to the physical stresses (for example temperature) and their responses to biological processes such as competition. This biological response to a vertical gradient is called zonation.

Horizontal gradients are determined by the aspect of the shore in relation to the prevailing winds. Wave action may have an important effect on the biological characteristics of a shore, determining the species able to inhabit.

Sediment gradients occur where the average particle size varies greatly from micrometers to tens of meters, and reflects the exposure of the shore to water movement and other geological properties of the area.

Salinity gradients occur where freshwater run-off affects the salinity of the coastal areas and can produce a salinity gradient running from marine to completely freshwater conditions. This gradient has a large influence on the distribution of species.

Through the use of tidal gates, variables such as temperature, salinity, and sediment could be controlled and manipulated across the three parcels. Through manipulation of these gradients, one can begin to address some of the following questions:

- What is the role of disturbance regimes on colonization and survival of native and exotic species?
- How does salinity influence the benthic community and predatory fish populations?
- What level of salinity is optimal for achieving project goals?
- What environmental factors most influence species distribution?

Project Type. The Dutch Slough project is a full-scale adaptive management restoration project that can be implemented sequentially so that lessons learned from one phase can be applied to later phases. Additionally, we anticipate that multiple, smaller-scale pilot projects could be implemented within the larger restoration effort. For example, pilot-scale subsidence reversal techniques could be applied on small, subsided portions of the property.

3. Approach

Phased Implementation, Learning, and Design. The project will be designed and implemented in three phases. Phase I includes site acquisition, baseline data collection, adaptive management planning for the entire site, and a community access and design program to ensure that the ultimate site design serves the local community as well as the CALFED Bay-Delta program. Phase II includes restoration design, implementation, and monitoring for the middle parcel, the 312-acre Gilbert property, which is the most suitable for immediate restoration.[5] Phase III encompasses design and restoration of the remaining 926 acres on the Burroughs and Emerson properties and a long-term adaptive management monitoring program. Key components of all phases of the design process include comprehensive site modeling, evaluation of preliminary long-term monitoring results, and refinement of restoration techniques. To ensure positive community involvement and support, it would be desirable to have development of public access and other amenities important for the local community take place in Phases II and III with an emphasis on providing these amenities at the earliest possible time. We are currently seeking funding for Phases I and II, which are therefore the focus of this proposal.

Implementation of the Phase II project at the Gilbert Property will be a significant component of the restoration design process for the Emerson and Burroughs parcels. It will be implemented experimentally, and lessons learned will serve as the framework for designing restoration projects and experiments during Phase III. Long-term monitoring will continue after completion of the project to document project performance, identify adaptive management opportunities, and ensure that the project satisfies restoration and CALFED Program goals and objectives. In addition, long-term monitoring will document project components for use in future restoration projects. Phase III will be funded and implemented with next-phase funding and is not discussed further in this proposal.

Relevant sampling, analytical, planning, and construction procedures for each objective of this project are described in more detail below.

Study Design Method. During both Phases I and II, NHI and the Department of Water Resources (DWR) will organize a series of adaptive management planning workshops to ensure that restoration design and implementation will maximize restoration and research benefits. The opportunities for restoration and research are so great and the site is so large and complex, that it is neither wise nor practical to pre-ordain research restoration and design at this early stage of the proposal process without broader scientific input. Rather, NHI and DWR will invite, and where necessary, compensate experts from academia, agencies, and non-governmental

[5] The easternmost Burroughs parcel can not be restored to tidal action until a new, 1-mile reach of levee is constructed parallel to Jersey Island Road to prevent flooding of the Hotchkiss tract to the east. Restoration of the westernmost Emerson property is more complicated because of the opportunity to restore it in conjunction with Marsh Creek immediately to its west.

organizations to participate in structured design workshops to identify and prioritize research and restoration goals. Workshop participants will develop a strategic set of hypotheses that will then be tested as part of the restoration implementation and monitoring. With guidance from DWR and the Coastal Conservancy, NHI will then contract with consultants as well as agency and independent scientists to develop restoration and study designs to achieve restoration goals and test priority hypotheses.

Project Objective 1: Implement a large-scale, locally supported restoration project that will serve the local community with shoreline access as well as educational, recreational, and economic opportunities.

If the technical review teams recommend the proposal for funding, the Burroughs, Gilbert, and Emerson families and other project applicants will work with the City of Oakley and other local interests to develop elements that will serve local access, education, recreational, and economic needs consistent with the larger ecological objectives of the project. At a minimum, the project is envisioned to provide public access along some of the levees and out to the waterfront through the development of trails and other improvements. The project applicants will work with the local community to develop other educational and recreational benefits in the project design. Some land may be dedicated to the local community for recreational or other facilities prior to this acquisition. Before the land is acquired with CALFED funds, the applicants will work with the City to ensure the incorporation of local amenities in the less environmentally sensitive areas of the project site. During Phase I, we will further work with the City to develop a more detailed land-use plan that will meet both local needs and the ecological objectives of the project.

Project Objective 2: Restore the Dutch Slough properties to a fully functioning, self-sustaining ecosystem that includes tidal wetland, low marsh, high marsh, riparian habitat, and upland transition zones.

Methods and Techniques. Existing hydrologic and water quality data, such as flood and CALFED/IEP studies will be reviewed and utilized. A hydrologic monitoring program will assess tidal flow and water quality, and estimate local sediment accretion rates. Representative bed samples will also be collected and used to characterize local bed composition and shear strength—important variables in defining site-specific velocity thresholds for sediment mobilization and deposition.

Project biologists will review existing documents such as the 1999 biological assessment of the Burroughs and Emerson properties and California Natural Diversity Data Base (CNDDB) records. They will conduct a comprehensive field analysis of biological resources on and in proximity to the site. Field surveys will include wetland evaluations and mapping, vegetation mapping, and surveys for sensitive plant and wildlife species.

An important link between the hydrologic and biologic components of the design process will be predicting the type and extent of habitat zones that could result from proposed restoration activities. Site data including elevation, frequency of inundation, soils, and vegetation of nearby tidal wetlands will provide information to develop a GIS model of the project site. The spatial model will then be used to design an effective restoration plan.

Equipment and Facilities. The project engineers will review existing engineering and infrastructure analyses and conduct on-site surveys to identify constraints associated with existing utilities, structures, access and rights-of-way, floodways, and geologic features. Specific emphasis will be placed on access routes suitable for heavy construction equipment. GIS will be used to assist project engineers in the review process.

Data Collection. Project hypotheses and objectives will guide collection of baseline information. Baseline information will consist of the following minimum data: aerial photography; bathymetry and shoreline topography; site hydrology and sediment analyses; geotechnical and geologic assessments; field assessment of aquatic and terrestrial vegetation; fish and wildlife reconnaissance; assessments to determine presence of invasive plant species or exotic or invasive invertebrates or animals; cultural resource assessment; and a description of existing land uses and facilities. The baseline assessment will also include focused surveys for sensitive species and evaluate the potential for the restored site to support these species.

Quality Assurance Procedures. Technical memos associated with restoration design and adaptive management will be circulated to the Science Advisory Team and CALFED for review and comment. The Coastal Conservancy will act as the fiscals contract manager. Subject to review by DWR, engineering and biological consultants will produce all final bid packages and specifications for habitat creation, including planting plans. A specific biological monitoring plan and program report will include the quality assurance program plan and will define interim and final reporting requirements. Annual monitoring reports will be provided in digital and hard copy formats. Information derived from this project will be presented at technical, professional meetings or can be disseminated as professional papers subject to peer scientific review.

Project Objective 3: Contribute to the state of scientific understanding of floodplain and tidal marsh restoration through on-going experimentation and monitoring under an adaptive management framework.

Methods and Techniques. This project will utilize an adaptive management process that will refine or modify the conceptual models and hypotheses described in previous sections of this proposal, as well as establish an appropriate monitoring and evaluation system based on input from the adaptive management workshops. Developing an adaptive management restoration plan worthy of the

opportunities presented at Dutch Slough will require a process that efficiently solicits and incorporates the knowledge and expertise of the large CALFED scientific community. We propose to establish an Adaptive Management Working Group to identify key hypotheses for testing at Dutch Slough and to assist project consultants in physically designing and building the project to test these hypotheses. We envision the Working Group collaborating closely with the CALFED Science Board, USGS, DFG, the Interagency Ecological Program, and other members of the CALFED science consortium to ensure that the best scientific expertise is applied consistently within the framework established by these two groups.

The Working Group will provide an interface for an effective science/ management/outreach partnership, and will broadly solicit expertise from researchers and managers interested in pursuing restoration experiments in this setting, and public outreach representatives, such as those at the Delta Science Center. The Working Group process will provide guidance throughout the life of the project on all aspects of adaptive management and will develop a plan that includes: 1) clear restoration goals, objectives, and success criteria; 2) a detailed conceptual model that synthesizes existing knowledge (including information summarized in the CALFED white papers on Delta smelt and tidal wetlands) and identifies key uncertainties; 3) a schedule of restoration experiments in light of the key assumptions that they test and conservation values; 4) a pragmatic monitoring plan linked to specific project goals and hypotheses, and based on appropriate spatial and temporal scales; and 5) a public education and outreach plan. In addition, the plan will explicitly indicate how a short-term planning time frame relates to multi-decade ecological processes that are the real subjects of monitoring and research.

As stated above, the Working Group will develop a detailed plan for appropriate adaptive management experiments that will be tested by numerical models, pilot phases, or full scale implementation as appropriate. Below are examples of the type of experiments that will be considered by the Working Group:

- *Use of Tide Gates:* The effectiveness of tide gates to improve Delta-wide water quality, enhance conditions for native fish, and control invasive plant and animal species by manipulating site hydrology and salinity.
- *Species-specific Benefits:* Testing the effect of restoration design and location on species-specific benefits including "intensive monitoring of the successional changes in physical conditions, vegetative cover, and species utilization." (Strategic Plan for Ecosystem Restoration, June 1999).
- *Numerical Simulations:* Utilize numerical simulations to estimate the effects of large-scale tidal wetland restoration on estuarine salinities compared to existing conditions and compared to the "no action" alternative. On-going work by DWR and RMA addresses the salinity effects of potential restoration in Suisun Marsh (DWR 1999). It will be

important to conduct similar work for potential restoration of the Dutch Slough site.

- *Species' Habitat Usage and Recolonization Rates:* Conduct research to determine use of restored tidal wetland habitats by target species and assess the rate at which restored habitats are colonized. Restoration of the basic physical and vegetation elements of tidal wetland may be accomplished; however, re-establishment of rare plant and animal taxa formerly found in these habitats may be more uncertain.
- *Pattern of Vegetation and Site Physical Parameters:* Determine the relationship of vegetation pattern to depth and duration of flooding, soil salinity, soil redox potential, soil pH, and channel water salinity (Suisun Ecological Workgroup, June 1999).
- *Methods of Marsh Vegetation Establishment:* Testing different methods of marsh vegetation establishment to determine which methods result in the least establishment of non-indigenous plant species and greatest establishment of vegetation favorable to ERP/MSCS species (Strategic Plan for Ecosystem Restoration, June 1999).
- *Active vs. Passive Restoration Activities:* Comparing the effects of active wetland restoration with intensive planting against less active techniques such as flooding islands without further management intervention to achieve previously mentioned attributes of habitat quality.
- *Beneficial Re-Use of Dredge Material:* Testing the effects of different techniques of dredge material re-use in marsh restoration on vegetation establishment and succession, including establishment of non-indigenous plant species.
- *Subsided Lands:* Testing opportunities for rebuilding subsided lands using rice straw bale and other abundant fill materials.

4. Feasibility

Schedule: If CALFED approves acquisition funding, the Conservation Fund is scheduled to complete the project purchase by June 2002.

The project applicants have designed a management infrastructure that will expedite restoration and research opportunities at Dutch Slough. To avoid contracting delays that have stalled other projects, the Coastal Conservancy will serve as the fiscal agent and will contract to other consultants and private partners capitalizing on their proven track record of rapidly distributing funds. With funds from the Coastal Conservancy and CALFED, the Conservation Fund will acquire the property and transfer title to an interim or long-term landowner who is supported by local interests. The Coastal Conservancy is willing to assume interim title to the land if necessary but does not have the authority or resources for long-term land management. DWR and the East Bay Regional Park District both are logical candidates for long-term ownership and management. With local support, DWR is willing to take over ownership and management, and the Park District is willing to do so with local support and a management endowment. The University of California Natural Reserve System

combined with the Delta Science Center would also be an ideal candidate for long-term management and ownership, but they would also need a management endowment. The City of Oakley might also participate in ownership and joint management of portions of the property used for community amenities and public access.

Over the next few months, the applicants will work with the local community to identify a long-term landowner that will be most satisfactory to them. NHI and DWR will contract and organize a collaboration of agency and university scientists and private consultants to plan an adaptive management plan and design the first phase of the project.

The landowners, Emerson Dairy, the Gilbert family and the Burroughs family**,** will organize local support for the project from the City of Oakley, Contra Costa County, and other local agencies.

Ownership: The property owners are not only willing participants—they are applicants to the proposal.

Permits: This proposal is a project under CEQA. An Initial Study will be circulated and the appropriate environmental document, prepared. The necessary permits will be obtained to implement this proposal. The assessment will be conducted in compliance with California PRC 5024, Executive Order W-26-92 and CEQA Section 21000 *et seq.* Significant biological, wetland, topographic, geotechnical, and hazardous materials surveys have already been conducted and did not uncover any issues that would slow restoration (or, for that matter, urban development) at the site.

5. Performance Measures

Because this is an acquisition project and the restoration and scientific aspects of it are in the early stages of design, the performance measures that we outline in Table 2 below are largely administrative measures and measures of action. When baseline and project impact monitoring begins, we will develop more specific performance measures and quantitative environmental indicators.

Project monitoring will include tidal monitoring inside and outside of the created wetlands; velocity measurements in breaches and channels; channel cross-section surveys as channels develop; documentation of sediment and accretion rates; absolute elevation surveys (per Simenstad *et al.* 2000); bed composition and invertebrate sampling; recruitment of wetland vegetation; fish and wildlife habitat and species surveys; and water quality monitoring. Additional monitoring components can be added as additional uncertainties are identified. Long-term monitoring will continue after completion of the project to document project performance, identify adaptive management opportunities, ensure that the project satisfies restoration and CALFED Program goals and objectives, and document project components for use in future restoration projects.

Table 2. Performance Evaluation Plan				
Objectives	**Performance Measures**			
	Phase I		**Phase II**	
	Measure	**Metric**	**Measure**	**Metric**
Objective 1: Implement a large-scale, locally supported restoration project that will serve the local community with shoreline access as well as educational, recreational, and economic opportunities.	**1:** Escrow closed on acquisition	General Services approved appraisal completed Due diligence surveys completed		
	2. Local support for project obtained	Detailed land use plan to include community access, recreation, and education activities Letters of local support from city officials and residents obtained		
Objective 2: Restore the Dutch Slough properties to a fully functioning, self-sustaining ecosystem that includes a mosaic of habitat types including shallow water, emergent marsh, intertidal marsh, seasonal wetlands and flood plains, Antioch dune scrub, riparian forest, and oak savannah.	**1.** Baseline data collected	Existing hydrologic, water quality data reviewed Existing biological assessments reviewed Hydrologic monitoring program established Bed samples collected and analyzed Field analysis of biological resources completed GIS model of the site completed	**1.** Restoration design for Gilbert parcel completed **2.** Restoration design implemented	Hydrodynamic modeling completed Breach/gate design completed Necessary grading completed

Objective 3: Significantly contribute to the state of scientific understanding of floodplain and tidal marsh restoration through on-going experimentation and monitoring under an adaptive management framework.	**1.** Adaptive management plan for the site completed including: clear restoration objectives, and success criteria; a detailed conceptual model; a pragmatic monitoring plan; and a public education and outreach plan	Number of adaptive management planning workshops (target = 6) Adaptive Management Working Group established Strategic set of hypotheses developed Restoration and study design integrated and completed	**1.** Monitoring for restoration work on Gilbert parcel started	Integrated monitoring protocol established

6. Data Handling and Storage

Data for this proposal will be managed under the direction of the DWR management team. Data storage will be at DWR offices and on DWR servers. As appropriate, DWR will incorporate project data into the existing DWR Delta GIS database. The DWR GIS network infrastructure will be used to maintain, update, and distribute the DWR Delta GIS database for visualization, communications, and analysis purposes. All data will be made available to CALFED in digital format based on metadata standards and protocols established at the time of award, or as defined in the Comprehensive Monitoring Assessment and Review Program Report (CMARP, CALFED 1999). A project web site will provide data and report accessibility.

7. Expected Products/Outcomes

Reports, designs, and project implementation that will be outcomes of Phases I and II of this project are shown in the Performance Evaluation Plan above. In summary, major outcomes include: 1) acquisition of the property, 2) a detailed land use plan to include community access, recreation, and education activities, 3) collection of baseline data for the entire site, 4) completion of design, implementation, and monitoring for restoration of the Gilbert parcel, and 5) an adaptive management plan for the entire site.

8. Work Schedule

We anticipate that Phase I of this project will require two years to complete. However, the Conservation Fund is in negotiations with the landowners and current discussions anticipate a closing date of June 30, 2002, if CALFED, Coastal

Conservancy and other matching funds are secured. This relatively short timeframe will yield results that can inform the next phase of CALFED restoration. The expected start and completion dates for each task are shown in Table 3. Phase I will be developed and constructed as a stand-alone project. All cost and scheduling requirements will incorporate the level of flexibility central to adaptive management.

Each task can be separately funded, but the project will fail if CALFED does not fund the acquisition of the land for $26.5 million. Tasks 2, 3, and 4 (baseline data collection, development of an adaptive management plan, and a community design process) are key for moving the restoration process forward. Task 5, a management endowment, is important for ensuring that the property is managed properly by a locally supported entity. The East Bay Regional Park District, DWR, and the University of California Reserve system are logical long-term landowners if there is community support, but they will only be able to assume ownership if a long-term management endowment is provided. Phase II entails implementation of the Gilbert parcel. Planning for Phase II is not scheduled to begin until June of 2003 when the adaptive management restoration and research plan is scheduled for completion. Physically flooding the Gilbert parcel is not scheduled until May of 2005 at the end of Phase II.

Table 3. Project implementation timeline

Implementation Schedule	Start Date	Completion Date
Phase 1: Land Acquisition	Underway	July 2002
Phase 1: Adaptive Management Restoration Planning and Design	June 2002	June 2003
Phase 1: Baseline Monitoring and Surveys	Fall 2002	June 2004
Phase 1: Adaptive Management Restoration Planning and Design	June 2002	June 2003
Phase 1: Community Outreach and Access Design	On-going	June 2002
Phase 1: Management Endowment	June 2002	Continuous Endowment
Phase 2: Planning and Permitting for Gilbert Parcel	June 2003	June 2004
Phase 2: Hydro-dynamic Modeling	January 2003	Ocober 2003
Phase 2: Engineering Design for Gilbert Parcel	October 2003	June 2004
Phase 2: Water Control Structures	March 2005	June 2005
Phase 2: Site Grading and Levee Breach	August 2004	May 2005
Phase 2: Vegetation Planting and Maintenance	October 2002	June 2005
Phase 2: Baseline Data and Monitoring for Gilbert	June 2002	June 2005

B. Applicability to CALFED ERP and Science Program Goals and Implementation Plan and CVPIA Priorities

1. ERP, Science Program, and CVPIA Priorities

This application directly supports multiple CALFED ERP goals and CVPIA priorities (summarized in Table below). The proposal targets Goal 1 (At-risk Species), Goal 2 (Ecosystem Processes and Biotic Communities), Goal 4 (Habitats), Goal 5 (Introduced Species), and Goal 6 (Sediment and Water Quality). It also directly

supports the purposes of Title 34, Section 3402, of Central Valley Project Improvement Act (Public Law 102-575).

Consistent with CALFED Goal 1, the restoration of complex tidal wetlands at Dutch Slough would most likely benefit several at-risk fish species, including Delta smelt, Sacramento splittail, and early life stages of the winter-run chinook. The intertidal channels could increase foraging and cover habitat and provide greater zooplankton productivity. Habitat benefits may also occur for other runs of chinook salmon and steelhead. Similarly, the project will restore ecosystem processes to approximately 1,229 acres through modification of the existing farmlands. The project will be designed to promote self-sustaining communities (Goal 2).

The project focuses on the restoration of several types of habitats (Goal 4). Among these habitats are shallow water, emergent marsh, intertidal wetlands, seasonal marsh/floodplain, mixed riparian forest, and upland dune habitat. Implementation of this project would also create educational opportunities in conjunction with the Delta Science Center as well as provide a living laboratory for scientific research. The project will evaluate and apply methods of control or eradication for non-native aquatic and terrestrial species (Goal 5) such as the use of tide gates to manipulate site hydrology. In addition, the project will monitor the establishment of native species and native/non-native species interactions. Restoration of the project site will benefit local water quality (Goal 6) by creating significant wetland acreage and reducing agricultural infiltration and run-off in the area.

This application also supports provisions of the CVPIA to protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley [Section 3402(a)]; to improve the operational flexibility of the Central Valley Project [Section 3402(c)]; and to contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary [Section 3402].

Program Goals and Priorities Addressed	Description of Project Actions and Targeted Parameters
(DR-1.) Restore habitat corridors in the North Delta, East Delta and San Joaquin River	
• Restore tidal marsh and mid-channel island littoral zone - Strategic Goal 4, Shallow water, tidal and Marsh habitat • Acquire protect and restore habitat - Strategic Goal 1, at risk species and Strategic Goal 4, habitats • Restore inland dune scrub habitat - Strategic Goal 1, at risk species and Strategic Goal 4, habitats	• Restore 1200 acres of freshwater tidal marsh and seasonal floodplain for the benefit of Sacramento splittail, juvenile salmon, Delta smelt, and other native aquatic and avian species. • Create nesting and foraging habitat for black rail, tricolored black bird, yellow breasted chat and perching habitat for Swainsons hawk. • Create south facing slope of less than 25% in silty-clay to clay soil for pond turtle nesting habitat. • Restore several acres of dune habitat for Antioch dune plant and animal species to test efficacy of dune restoration techniques
(DR-4) Restore habitat that would specifically benefit one or more at-risk species; improve knowledge of optimal restoration strategies for theses species.	
• Adaptive experimentation with species-specific restoration approaches - Strategic Goal 4, habitat • Restoration of Sacramento splittail and delta smelt - Strategic Goal 1, at risk species assessments and Strategic Goal 4, habitats • Life histories and restoration or habitat requirements of at risk species - Strategic Goal 1, at risk species assessments.	• Create 1000 acres of tidal marsh and inundated habitat for spawning and rearing by splittail and Delta smelt, and rearing by salmonids. • Design and manage wetland features to test hypothesis about the interrelationship of hydrodynamics, vegetative structure, salinity, temperature, avian predation, fish stranding, etc. • Measure spawning splittail and rearing salmon on high marsh and tidally influenced floodplain. • Monitor for CALFED priority fishes; particularly delta smelt, splittail, Chinook salmon (all runs), steelhead as well as non-native exotic species.
(DR-5) Implement actions to prevent, control and reduce impacts of non-native invasive species.	
Develop pilot projects and research - Strategic Goal 5, non-native invasive species	• Physically manage pilot tidal marsh and floodplain restoration site to test actions that may limit exotic species use, such as dewatering or salinity increase • Implement a monitoring plan to document the number and spatial-temporal distribution of non-native fish and plant species.
(DR-6) Restore shallow water habitats in the Delta for the benefit of at-risk species while minimizing potential adverse effects of contaminates	
• Finding solutions to the constraints to restoring ecosystems of inundated islands by advancing process understanding of Delta ecosystems - Strategic Goal 1,2,5, and 6 • Restoration and monitoring strategies for riparian zones - Strategic Goal 4, riparian • Fish survival in the Central and South Delta - Strategic Goal 6, water and sediment	• Biological and physical monitoring at the Dutch Slough site which included subsided lands. • Remediate point and non-point pollution sources by creating and restoring biofilration wetlands, and riparian floodplains along 5,000 feet of Marsh Creek. • Employ innovative and tested shallow water monitoring techniques to measure tidal marsh/flood plain processes and species preference for future tidal marsh restoration projects. • Measure key water quality parameters at the Dutch Slough site. • Employ innovative new enzyme bio-marker technique to identify biological stressors that may not be evident from traditional water quality sampling techniques.
Multi-Regional Bay Delta Areas (MR-3): Implement environmental education actions throughout the geographic scope	
Environmental Education Programs – Draft Stage 1 Implementation Plan	• Develop a environmental education and outreach plan as a component of Phase I and Phase II.
Central Valley Improvement Act Goals	
Section 3402 (a), (b), and (c); Section 3406 (b) (1) Anadromous Fish Restoration Program	• Restore juvenile salmon rearing habitat in the Delta

2. Relationship to Other Ecosystem Restoration Projects

The proposed project is related to DWR's "flooded island" modeling analysis that was funded by CALFED last year. Under that project, DWR and consultants will model how reconfiguring flooded islands might affect Delta hydrodynamic and water quality. Big Break, a flooded island adjacent to Dutch Slough, is one of the sites that they will model. Flooding Dutch Slough and measuring the hydrodynamic changes will provide an opportunity to calibrate the model.

The proposal is also linked with another proposal submitted this round, the Big Break and Marsh Creek Water Quality and Habitat Restoration Program. The Big Break /Marsh Creek proposal is oriented toward protecting water quality flowing into Big Break (and Dutch Slough) as well as developing tidal marsh restoration data that will be useful for planning the Dutch Sough project.

3. Requests for Next-Phase Funding

This proposal is not a request for next-phase funding.

4. Previous Recipients of CALFED Program or CVPIA Funding

CALFED Project #	Title	Primary Contractor
99-B189	Inundation of a section of the Yolo Bypass to restore Sacramento splittail and to support a suite of other anadromous and native species in dry years	NHI
99-B166	Focused action to develop ecologically-based hydrologic models and water management strategies in the San Joaquin Basin	NHI
01-N32	Marsh Creek Watershed Stewardship Project	NHI
11332-0-J001	Introduced Spartan Eradication Project	Coastal Conservancy
B81642	Hamilton Wetland Restoration Project	Coastal Conservancy

5. System-Wide Ecosystem Benefits

The ecosystem-wide benefits of this project will be both physical and knowledge based. The shear size of this project will probably have a measurable, if not major, impact on primary productivity as well as spawning and rearing success of several native fish. The learning opportunities presented by the site will yield important information for managing the Delta and restoring more tidal marsh in the future.

6. Additional Information for Proposals Containing Land Acquisition

This proposal conforms with all five of the criteria outlined for private land acquisition.

Willing Seller: The three landowner families have longstanding ties to the Dutch Slough, the Delta, and the Oakley community. Two of the landowner families have rich historical ties to the Dutch Slough dating back 100–150 years. The landowners enthusiastically join as co-applicants in this Dutch Slough Tidal Marsh Restoration Project proposal and, if this proposal is approved, they intend to devote substantial energy working with the local community to assure local support for this project.

Consistent With City General Plan or Evidence of Local Support: The property is outside of the Delta Primary Zone and the jurisdiction of the Delta Protection Commission. The City of Oakley recently incorporated and is currently in the process of developing its initial general plan. The City is currently considering two options for the parcels: 1) Delta recreation uses, and 2) urban development. If CALFED recommends this proposal for funding on December 15, the applicants, and particularly the landowners, will work with City officials and residents to obtain strong evidence of public support during the public comment and review period following December 15.

The urban development option being considered by the City is consistent with the landowners' legal rights vested under the Development Agreements. The Delta recreation/resource conservation alternative also being considered would be consistent with the Dutch Slough Restoration Project. Under either scenario, the approximately 300 acres south of the Dutch Slough Project Site and the Contra Costa Canal would be developed. If the Dutch Slough Restoration Project is not approved, the landowners intend to sell the entire Project Site to developers for urban development consistent with the development agreements.

Prime Farmland: The Dutch Slough property is not designated prime farmland by any entity. Rather it is currently slated for urban development. The Dutch Slough property was designated for mixed-use development in the Contra Costa County General Plan in 1991. This designation could permit approximately 4,500–6,100 residential units and other development to be constructed on the larger 1,539 acres, which includes the entire Dutch Slough Restoration Project area. The Dutch Slough property remains inside the County's urban limit line. Residential development around Dutch Slough has already occurred or is imminent, and the landowners have already secured a verified delineation from the Army Corps of Engineers covering 2 of the 3 properties. This delineation identifies less than 45 gross acres of wetlands.

Ecological Opportunities: As discussed above in the problem statement and justification section, the property is a one-of-a-kind opportunity for tidal marsh restoration consistent with meeting CALFED goals.

Time Sensitive: If CALFED does not grant acquisition funds, the Dutch Slough properties will be immediately sold for development. It is no longer feasible for the landowners to continue dairy and grazing operations at Dutch Slough, and thus, they have expended substantial sums to study and successfully secure non-agricultural development entitlements on the Dutch Slough property over the last decade, which

they will exercise if CALFED does not fund this application. By joining in this application, the landowner families fully preserve their vested development rights in the recorded Development Agreements with Contra Costa County, recorded on January 17, 1997.

C. Qualifications

Phase I of the Dutch Slough project will be jointly implemented by a special private/public partnership composed of: the landowners (Emerson Dairy, the Gilbert family and the Burroughs family); the Coastal Conservancy; and nonprofit partners (the Conservation Fund and NHI). DWR has offered to help implement the project if CALFED desires.

The **Emerson, Burroughs, and Gilbert families** have long-standing ties to the local community. As owners of the affected property, the historical landowners are in a unique position to secure the necessary local support for the project.

Project Partner Qualifications. The **California Coastal Conservancy**, the grant applicant, was created by the State Legislature in 1976 to protect, restore, and enhance coastal resources. The Conservancy has a staff of 63, who, from 1999 to 2001, managed a budget of over $398 million, of which $230 million has already been put to work on over 300 projects along the coast of California and in the nine-county Bay Area.

The Conservancy has taken the lead in developing innovative approaches to wetlands restoration throughout the state, including: Sonoma Baylands, Hamilton Airfield, and Arcata Marsh projects. The Conservancy has acted quickly to seize unique opportunities to obtain and protect significant resource lands, including Cullinan Ranch and the former Cargill Salt Ponds in the Napa-Sonoma Marshes. The agency has taken the lead in complex, multi-agency efforts, such as Tijuana Estuary, and has extensive experience in wetland restoration acquisition, planning, and implementation projects, including: Rush Ranch, Los Penasquitos, Bolsa Chica, Elkhorn Slough, Huntington Beach, and the Huichicha Creek Watershed.

The Conservancy's San Francisco Bay Area Conservancy Program was established by the State Legislature in 1997. Through the program the Conservancy has undertaken over 100 projects in the nine counties surrounding San Francisco Bay, working with more than 60 federal, state, regional, and local government agencies, nonprofit conservation organizations, and private landowners to: construct and manage regional trails and related recreational facilities; protect and improve natural habitats; and provide open space accessible to urban populations.

The Conservancy's team for the Dutch Slough Restoration Project includes Nadine Hitchcock, Program Manager; Mary Small, Project Manager; Marcia Grimm, Staff Counsel; Sam Schuchat, Executive Officer; and the support of the accounting, contracts, and clerical staff of the Conservancy. Nadine Hitchcock, Program Manager for the San Francisco Bay Conservancy Program, will oversee the Conservancy's role in this project, including project management, interagency

coordination, environmental compliance, facilitation of public and nonprofit organization forums, and consultant and contractor selection and oversight.

Ms. Hitchcock has over 17 years experience managing projects with the Conservancy, and 5 previous years experience with the Coastal Commission. Along with overall management of the Bay Program, she has managed or supervised several large-scale projects involving multiple agencies and nonprofit organizations, including the Napa River Flood Control Project, the San Francisco Bay Joint Venture, the Napa-Sonoma Marsh Project, the Introduced Spartina Eradication Project, and the Regional Wetlands Monitoring Plan. Ms. Small, who will assist with project management, has a master's degree in Environmental Planning from the University of California. She has managed restoration and public access projects at both the Coastal Conservancy and previously at the Tahoe Conservancy. She also taught Geographic Information Systems at the Lake Tahoe Community College and worked for 3 years at Santa Clara County's Office of Advanced Planning.

The **Conservation Fund** is a national nonprofit 501(c)(3) organization dedicated to preserving America's land legacy by acquiring and protecting open space, wildlife habitat, and historic sites throughout the nation. The Fund also assists partners in business, government, and the nonprofit sector with projects that integrate economic development with environmental protection. Since 1985, the Fund has protected more than 3 million acres across the country.

Nancy Schaefer, Director, California Office, The Conservation Fund: Nancy's role in the Dutch Slough Restoration project is to oversee all aspects of the acquisition process including securing a purchase contract, completing due diligence requirements, securing matching acquisition funding, and assisting with the development of local and state support. Nancy Schaefer was hired in February 1999 to open a California office for The Conservation Fund. Nancy has thirteen years of experience in developing land protection programs throughout California in partnership with resource agencies and land trusts. Prior to joining the Fund, Nancy founded and coordinated the San Francisco Bay Joint Venture. Her responsibilities included identifying and securing critical wetland habitat, creating public/private partnerships to ensure the restoration, enhancement and permanent stewardship of these properties, securing funding to accomplish these goals, and raising operating funds. Nancy also worked at the Trust for Public Land where she managed the Trust's Wetlands Protection Program for seven years and served on the board on the Central Valley Habitat Joint Venture. Nancy is a founding member and officer of the Muir Heritage Land Trust where she chairs the Land Acquisition Committee. Nancy holds a BS in Forest Science from the University of New Hampshire (1980) and an MBA from California State University, Sacramento (1987).

For over a decade the **Natural Heritage Institute** has applied state-of-the-art science and law to resolve complex environmental problems, particularly in the Bay-Delta arena. NHI was an original signatory to the Bay-Delta Accord that precipitated the CALFED program and has contributed significantly to the development of several CALFED programs. NHI Restoration Ecologist, **John Cain, M.L.A.**, will coordinate

planning and design of the restoration projects. Mr. Cain has over twelve years of experience in the field of stream and river restoration. **Dr. Elizabeth Soderstrom**, Ph.D., who will oversee the development of an adaptive management plan, is an expert on adaptive management and has extensive experience in water resources management in the international and domestic arenas. **Richard P. Walkling**, **M.L.A.**, who will assist in restoration planning, is an environmental planner who focuses on water management and environmental restoration. He has designed restoration plans for alluvial streams in California and for subsided islands in the Sacramento-San Joaquin delta**. Jim Robins, M.S.,** who has a graduate degree in rangeland ecology and six years of experience in watershed research, will assist in the vegetation restoration planning. NHI Board member **Luna Leopold, Ph.D**.,is world renowned for his expertise in hydrology and fluvial systems, and will regularly advise NHI staff in project implementation.

Responsibilities of Partners. The Coastal Conservancy will serve as fiscal administrator. The Conservation Fund will manage acquisition of the property and transfer it to the Coastal Conservancy, which will serve as the interim landowner if we are unable to identify a locally supported, long-term landowner before acquisition. Provided there is local support for their involvement, both DWR and the East Bay Regional Park District (EBRPD) are logical candidates for assuming long-term management and ownership. EBRPD owns the adjacent 1,600 acres of Big Break and its shoreline and would be willing to assume ownership and management if funding is provided for a management endowment. DWR owns two neighboring Delta islands and is responsible for the management of levees in the western Delta. They are also willing to assume long-term ownership and management if the local community supports them. The City of Oakley might also participate in ownership and joint management of portions of the property used for community amenities and public access. NHI will convene and oversee the Adaptive Management Working Group and begin a series of workshops to develop a restoration and research design and an adaptive management plan. Under the fiscal umbrella of the Coastal Conservancy, DWR and NHI will contract and organize a collaboration of agency and university scientists and private consultants to plan an adaptive management strategy and design the first phase of the project.

There are no known conflicts of interest or issues related to meeting the proposed budget or schedule.

D. Cost

1. Budget

We are requesting a total of $32.5 million for the following two phases.

- Phase 1: Acquisition, management, maintenance endowment, planning, and baseline monitoring — $27.5 million
- Phase 2: Design and Implementation on Gilbert Parcel — $5.0 million

. TOTAL $32.5 million

2. Cost-Sharing

The project applicants have secured significant cost-sharing from the landowners and the Coastal Conservancy. Two MIA appraisals, neither of which have been approved yet by the Department of General Services, valued the property at $38 million and $44 million respectively. According to their preliminary purchase agreement with the landowners, the Conservation Fund will not pay more than 90 percent of the appraised values. The landowners are asking for $28 million, which amounts to more than a $10 million cost-share supported by the landowners. Further, the Coastal Conservancy cost-share contribution to the purchase of the property is $2 million. In summary, the property is valued at $38 million (the lower of the two appraisals), but with a cost-share of $12 million, we are requesting $26 million in support of acquisition of the property, and additional funding for planning and restoration. NHI, the Coastal Conservancy, and the Conservation Fund continue to seek additional cost-share funding from various sources and will inform CALFED if any of these applications are successful.

E. Local Involvement

The applicants will work with the City of Oakley and other interested parties to ensure that the Dutch Slough Restoration program provides benefits to the local community. The project applicants will work with the City to design and site public access and amenities in areas where they will benefit families and students in the loca community while not conflicting with the ecological objectives of the project. One conceptual illustration for further review and public input is depicted in Appendix A. It will be important to provide guarantees that these amenities will be implemented as part of the project. The applicants also wish to work with the City to develop a community access plan that will allow access to the shore for fishing and other purposes. If designed properly, the site could not only restore 1,200 acres of prime habitat, but also provide recreational opportunities for bird watching, nature walks, trails, photography, ball fields, historical and interpretive centers, non-motorized boat launch areas, fishing, and natural resource education, and scientific study and analysis. Some opportunities include adapting the historic ranch buildings (circa 1913) for use as a research and educational facility. The project also provides potential interpretive opportunities within both a historical and natural resource context, for example Native American use of the Delta and Delta farming history and land development. Successful creation of fisheries habitat will improve fishery resources within this region of the Delta for the benefit of local recreationists.

Local groups. Local environmental and education nonprofit, the Delta Science Center, is interested in this project and would like to make it part of its curriculum if the project goes forward.

Public outreach & benefits. The Dutch Slough site location on the edge of the Bay Area metropolis, adjacent to a regional trail, and near the proposed $10 million Delta

Science Center offers an excellent opportunity to publicly showcase the promise of Delta restoration. The site is also located on the heavily used Marsh Creek regional trail.

Third party impacts. No third-party impacts have been identified in conjunction with habitat restoration at Dutch Slough.

F. Compliance with Standard Terms and Conditions

The Coastal Conservancy is agreeable to, and able to comply with, terms and conditions included in Attachment D, the Terms and Conditions for State Funds, except as follows: (1) the Conservancy would revise or exclude Paragraph 11 in the "Attachment D Terms and Conditions for State Funds", requiring it to indemnify, defend, and save harmless the State because the Conservancy is itself an agency of the State. (2) The Conservancy would exclude Paragraph 12 in the "Attachment D Terms and Conditions for State Funds", because agents and employees of the Conservancy are, in fact, officers and employees or agents of the State of California.

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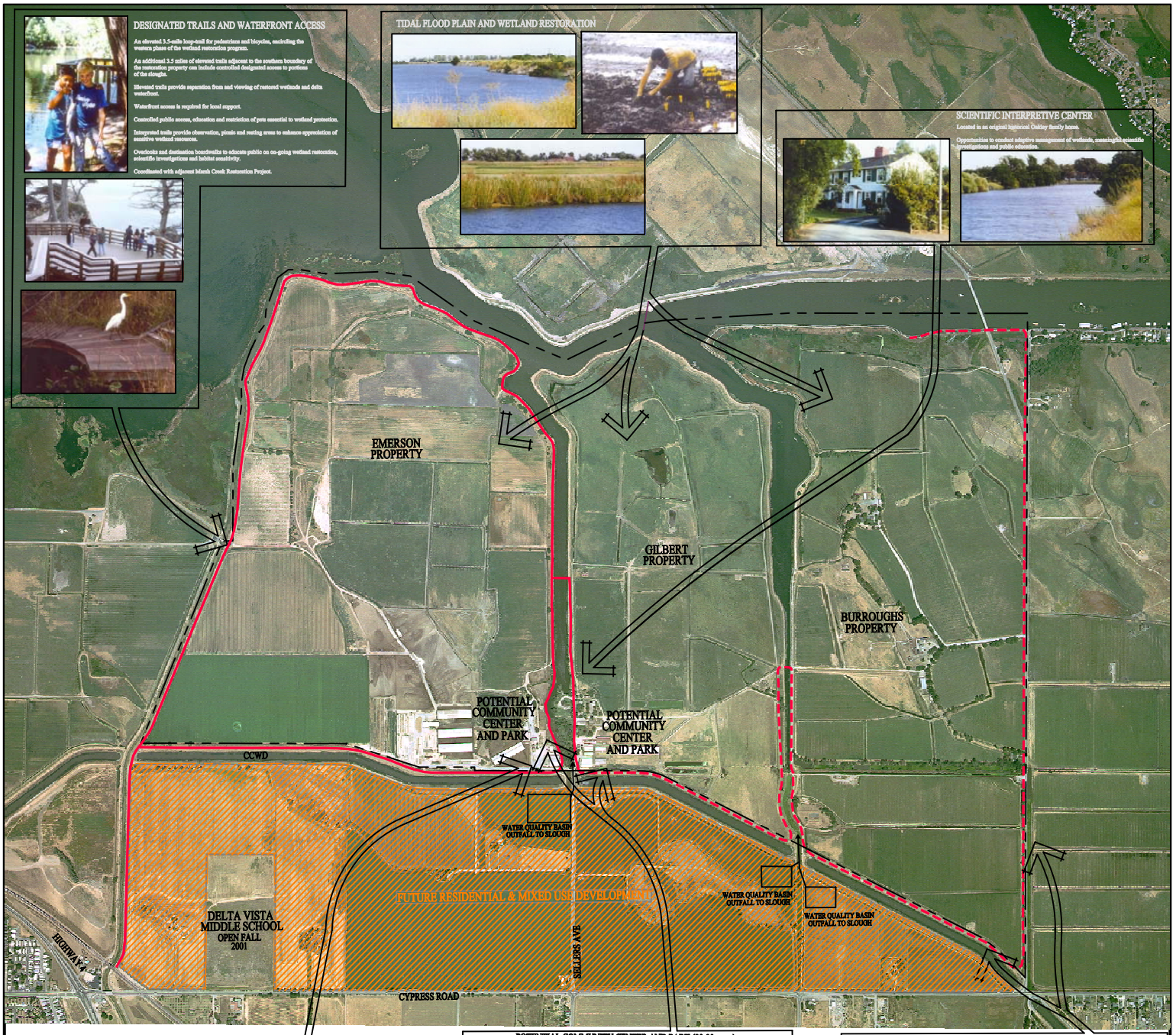
Appendix A

Dutch Slough Community Access and Recreational Use Conceptual Plan



HISTORICAL INTERPRETIVE CENTER

Located in 1896 Iron House Schoolhouse.

Depicting the rich histories and human experiences of the original Oakley families including: World War and depression eras, home steadarism, delta barge transportation as only commerce connection to San Francisco, massive flood years and manual levee construction by families, other episodic events in the delta, dairy and grazing operations, and cattle epidemic and quarantine.

Featuring photos, artifacts, written and oral histories of the delta families, their culture and landscape.

Opportunities to interpret regional history.

POTENTIAL COMMUNITY CENTER AND PARK (20-30 acres)

- Sports and Recreation
- Historic Interpretive Center
- Scientific Interpretive Center
- Designated Trails and Waterfront Access
- Future Public Access

Ball fields and other recreation facilities fulfill local needs for active recreation.

Recreation will attract individuals and families to a broad range of resources offered at the Community Park.

Designated staging areas and parking that will be controlled to avoid and minimize impacts to sensitive habitats.

Opportunities to provide access and enhance appreciation and understanding the rich delta resources.

Centralized interpretive staging area and trail access to ensure habitat protection.

Significant education opportunities to promote conscientious stewardship of these valuable public resources.

Controlled non-motorized boat access from existing launching facilities provided through the education and scientific programs.

FUTURE PUBLIC ACCESS

Jersey Island Road will be elevated to provide flood protection.

Controlled public access to waterfront in conjunction with scientific and educational programs.

Opportunities for interpretation and public education of the on-going adaptive management of this phase of the wetland restoration.

An additional 3.5 miles of elevated trails adjacent to the southern boundary of the restoration property can include controlled designated access to portions of the sloughs.

DUTCH SLOUGH COMMUNITY ACCESS AND RECREATIONAL USE CONCEPTUAL PLAN

CITY OF OAKLEY
CONTRA COSTA COUNTY, CALIFORNIA

LEGEND

- Approximate 3.5 miles of loop trail
- Approximate 3.5 miles of potential future public access

Community elements are conceptual and not to scale

APPROXIMATE SCALE: 1"=400'
SEPTEMBER 2001
DATE OF PHOTO: AUGUST 1998

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