Lagoon Valley Ecosystem Restoration

Project Information

1. **Proposal Title:**

   Lagoon Valley Ecosystem Restoration

2. **Proposal applicants:**

   duke foster, National Grants
   bob farrington, vacaville

3. **Corresponding Contact Person:**

   duke foster
   ngs
   19221 red hill mine road pine grove, ca 95665
   209 296-5657
   duke@volcano.net

4. **Project Keywords:**

   Aquatic Ecology
   Water Pollution, Non-point Source
   Water and Sediment Quality

5. **Type of project:**

   Implementation_Full

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

   No

7. **Topic Area**:

   Ecosystem Water and Sediment Quality

8. **Type of applicant:**

   Landowner

9. **Location - GIS coordinates:**

   Latitude: 38.326

   Longitude: -121.966

   Datum:

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

Lagoon Valley lake is between Fairfield and Vacaville adjacent to I-80 and is approximately 670 acres in size

10. **Location - Ecozone:**

    2.1 Suisun Bay & Marsh

11. **Location - County:**

    Solano

12. **Location - City:**

    Does your project fall within a city jurisdiction?

    Yes

    If yes, please list the city: vacaville

13. **Location - Tribal Lands:**

    Does your project fall on or adjacent to tribal lands?

    No

14. **Location - Congressional District:**

    1 & 3

15. **Location:**

    California State Senate District Number: 4

    California Assembly District Number: 8

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

    2

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: 15 + -

       Total Requested Funds: 340,925

b) Do you have cost share partners already identified?

Yes

If yes, list partners and amount contributed by each:

calfed 431,000

c) Do you have potential cost share partners?

Yes

If yes, list partners and amount contributed by each:

wcb 800,000

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?**

Yes

If yes, identify project number(s), title(s) and CALFED program (e.g., ERP, Watershed, WUE, Drinking Water):

wsp01-0001 Lagoon Valley Watershed Restoration Watershed

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

No

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)

21. **Comments:**

Environmental Compliance Checklist

Lagoon Valley Ecosystem Restoration

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.

      None

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

   CEQA Lead Agency: CITY OF VACAVILLE
   NEPA Lead Agency (or co-lead:) None
   NEPA Co-Lead Agency (if applicable): None

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

   CEQA
   -Categorical Exemption
   XNegative Declaration or Mitigated Negative Declaration
   -EIR
   -none

   NEPA
   -Categorical Exclusion
   XEnvironmental Assessment/FONSI
   -EIS
   -none

   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.

   None

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.

1st quarter of 2002

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

None
None
None

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	Obtained
Variance	Obtained
Subdivision Map Act	Obtained
Grading Permit	Obtained
General Plan Amendment	Obtained
Specific Plan Approval	Obtained
Rezone	Obtained
Williamson Act Contract Cancellation	Obtained
Other	Required

STATE PERMITS AND APPROVALS

Scientific Collecting Permit	Obtained
CESA Compliance: 2081	Required
CESA Compliance: NCCP	Required
1601/03	Required
CWA 401 certification	Required
Coastal Development Permit	Required
Reclamation Board Approval	Required
Notification of DPC or BCDC	Required
Other	Required

FEDERAL PERMITS AND APPROVALS

ESA Compliance Section 7 Consultation	Required
ESA Compliance Section 10 Permit	Required
Rivers and Harbors Act	Required
CWA 404	Required
Other	Required

PERMISSION TO ACCESS PROPERTY

Permission to access city, county or other local agency land. Agency Name: CITY OF VACAVILLE	Obtained
Permission to access state land. Agency Name: None	Obtained
Permission to access federal land. Agency Name: None	Obtained
Permission to access private land. Landowner Name: HINES NURSERY	Obtained

6. **Comments.**

None

Land Use Checklist

Lagoon Valley Ecosystem Restoration

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

   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?**

   No

   If you answered no to #3, explain what type of actions are involved in the proposal (i.e., research only, planning only).

   Land use will remain the same. Corrections to sediment loadings thru implementation of improvements such as: Implementation of retention basins, drainage stabilization, riparian restoration and erosion control measures

4. **Comments.**

   All improvements are designed to restore the ecosystems of Lagoon Valley between Fairfield and Vacaville

Conflict of Interest Checklist

Lagoon Valley Ecosystem Restoration

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):

duke foster, National Grants
bob farrington, vacaville

Subcontractor(s):

Are specific subcontractors identified in this proposal? No

Helped with proposal development:

Are there persons who helped with proposal development?

Yes

If yes, please list the name(s) and organization(s):

George Molnar LSA

Comments:

None

Budget Summary

Lagoon Valley Ecosystem Restoration

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.

State Funds

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	Ditch Stabilization & Sediment Capture System/Plans & Specs.	176	10600	Incl.	200	0	0	0	0	10800.0	0	10800.00
1a	City Project Coordinator	90	6300	Incl.	150	0	0	0	0	6450.0	0	6450.00
1b	Contract/Earthwork	0	0	0	0	0	3500	0	0	3500.0	0	3500.00
1c	Contract/Check Dams	0	0	0	0	0	30000	0	0	30000.0	0	30000.00
1d	Contract/Erosion Control	0	0	0	0	0	60000	0	0	60000.0	0	60000.00
2	Lagoon Drain Rehabilitation/Plans & Specs.	264	19400	Incl.	150	0	0	0	0	19550.0	0	19550.00
2a	City Project Coordinator	80	5600	Incl.	0	100	0	0	0	5700.0	0	5700.00
2b	Dredging & Vegetation Removal	0	0	Incl.	0	0	50000	0	0	50000.0	0	50000.00
3	Permits	0	0	Incl.	0	0	53500	0	0	53500.0	0	53500.00
4	Bypass Channel Restoration/Survey & Eng. Drawings	216	14600	Incl.	150	0	0	0	0	14750.0	0	14750.00
4a	City Project Coordinator	160	11200	Incl.	100	0	0	0	0	11300.0		11300.00
4b	Dredging	0	0	0	0	0	17775	0	0	17775.0		17775.00
4c	Planting, site preparation & ancillary work	0	0	0	0	0	57600	0	0	57600.0		57600.00
		986	67700.00	0.00	750.00	100.00	272375.00	0.00	0.00	340925.00	0.00	340925.00

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**
		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

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**
		0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Grand Total=340925.00

Comments.
We could possibly complete all 4 tasks in one year. The permit process tends to be lenghthy

Budget Justification

Lagoon Valley Ecosystem Restoration

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

Surveyor - 360, Design Engineer - 216, Environmental Consultant - 80, City Coordinator - 330

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

Consultant billing rate for Design Engineer & Environmental Consultant - $100/hr. Surveyor - $41.67/hr., City Coordinator - $70/hr.

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

Overall rate is 15%+ -

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

Field Surveys, Out-of-area meetings, conference with consultants. Mileage reimbursement cost of .34 per mile

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

Office supplies of $100

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.

The bulk of this project is implementation of a contract for on site restoration work. #1 Ditch stabilization: Earthwork 500cy for $3500, Check dams 600sf for $30000, Erosion control 15000sf for $60000. #2 Lagoon drain rehabilitation: LS $50000 #3 Bypass channel restoration: Dredging 1185cy for $17775, debris disposal LS $10000, site preparation .5ac for $5000, tree/shrub planting 600ea for $21600, willow wattle etc. 200 for $20000, tree protection LS $3000, drip irrigation 800 for $8000. City coordinator 330hrs @ $70/hr., Surveyor, eng. design & Environmental consultant billing rate of $100/hr for 656 hours #3 Bypass channel restoration:

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.

Not applicable

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.

Included under Services or Consultants.

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

Not applicable

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.

Overhead rate is approximately 15% + -

Executive Summary

Lagoon Valley Ecosystem Restoration

Executive Summary Lagoon Valley is located within a 670-acre area on the east side of I-80 between Vacaville & Fairfield. The project type is restoration. Our first objective is the immediate and long-term reduction in point and non-point sediment production into the Lagoon Valley and associated waterways eventually impacting the Bay Delta. The second objective is habitat restoration and special species protection/enhancement. Other outcomes that are expected will be reduced erosion and soil loss, improved water quality, and restoration of vegetative cover. The Approach & Technical Feasibility will be the use of current best management practices to achieve the desired results. The selective measures of construction were determined by collaborative efforts and input from DF&G, Public Works, Planning, City Engineers and professional consultants dealing with range management, riparian restoration, hydrology and lake management. There are no uncertainties as to the success of this proposed ecosystem restoration project. Extensive studies confirm the proposed implementation program has proven workable and effective in sediment capturing and ecosystem/habitat restoration. Expected Outcome will be the immediate and long-term reduction in point and non-point sediment production into the Lagoon Valley and associated waterways eventually impacting the Bay Delta. Other outcomes that are expected are reduced erosion and soil loss, improved water quality, habitat restoration, native species restoration & protection and restoration of vegetative cover. This project is align with the Habitat Restoration Program specifically the Delta Region and Goal 1: Endangered and other At-Risk Species and Native Biotic Communities, Objectives 1,2,3 & 4. Goal 2: Ecological Processes, Objectives 1, 4, & 5. Goal 4: Habitats, Objective 1. Goal 5: Nonnative Invasive Species, Objectives 3, 4 & 7. Goal 6: Water & Sediment Quality, Objectives 1, 2 & 3.

Proposal

National Grants

Lagoon Valley Ecosystem Restoration

duke foster, National Grants
bob farrington, vacaville

Lagoon Valley Ecosystem Restoration

A. Project Description Project Type - Restoration

Geographic Location

Lagoon Valley is located within a 670-acre area of continuous open space and regional parkland owned by the City of Vacaville. The site is situated between the Vaca Mountains to the west and the Laguna Hills. The City of Fairfield and Vacaville are to the west and east of the watershed. The streams impacted by this watershed are Alamo, Putah, Laguna and Ulatis Creeks. The project is in Solano County.

The Problem

The current status of resource conditions is deterioration and putrefaction of the lake, wetlands & riparian areas. Fisheries of the lake and exiting riparian areas and streams have declined due to extensive sedimentation deposits from the surrounding watershed. LSA Associates completed a specific Lagoon Valley Lake Management Plan dated October 13, 1999. The plan identified conditions, design, study results, recommendations, cost analysis and regulatory considerations. The State Department of Fish and Game (DF&G) has actively monitored the fisheries of the lake and noted continual degradation and sedimentation of the lake.

The upper watershed comprises the zone between the base of the adjacent hills to the tops of the ridgelines (elevation range - approximately 300 feet to 800 feet NGVD). It consists of relatively steeply sloped terrain containing numerous drainages, gullies and small canyons. The upper watershed appears to be a major source of sedimentation to the lake. Many drainage's are somewhat incised, have obvious headcut problems and lack stabilizing vegetation along channel slopes. Hillside slump areas are also found. Evidence of the degree of sedimentation flowing down the drainages is found in the upper storm collection system where large volumes of sediment collect annually.

Justification

The proposed project is patterned after a well-established model for watershed restoration. The fundamental approaches for both the upper and lower watershed work use a watershed stabilization and ecological enhancement model successfully applied elsewhere in Solano County and throughout California. Numerous projects have demonstrated the effectiveness of a watershed restoration approach that combines elimination of cattle from drainages and streams, stabilization of eroding and sediment producing streams and revegetation of denuded stream and riparian corridors. These combination of techniques, all of which we are proposing, will effectively reduce of eliminate ecosystem stressors.

Examples of watershed management approaches that have followed some or all of this model include on-going management at The Nature Conservacy's (TNC) Cosumnes River Preserve and Kern River Preserve, the Upper Stoney Creek Preserve and the Deer Creek Preserve (Deer Creek Watershed Conservancy, the Vacaville Hidden Valley Open Space Preserve (Bernhardt and Swiecki 2000), Big Chico Creek (UCD-ICE 1997), the TNC Vina Plains Preserve (Macon 1999) and the Jepson Prairie Preserve, and TNC Lassen Foothills Project (TNC 1999).

An extensive analysis of current watershed conditions was performed in 1998-1999 in support of the Lagoon Valley Lake Management Plan (LSA Associates 1999), Sources of sedimentation and erosion problems were mapped; tributary streams were assessed as to erosion, flow and nutrients; watershed hydrological and biological characteristics were analyzed and sensitive habitats mapped. The actions proposed in this submittal constitute one key group of recommendations of the overall lake management plan. The 1998-1999 studies in support of these recommendation (LSA Associates 1999) are listed below:

1. Field investigations and mapping of sources of watershed runoff sources and patterns;
2. Flow routing and HEC-1 modeling of watershed runoff for all individual sub-basins in the watershed; peak flow discharges to the lake under 100-uear storm conditions;
3. Calculations of lake water holding capacity and seasonal water losses;
4. Calculations of lake watersurface elevations under 100-year storm;
5. Calculations of lake sedimentation rates based on bottom depth changes over two decades;
6. Mapping of erosion problem areas;
7. Mapping of wetlands, riparian habitats and special status species observations.

The city has expended funds for extensive studies and assessments which included sediment analysis of the lake at a cost of $16,000, grazing assessment and vegetation management analysis of the watershed at a cost of $10,000, a Red Legged Frog study at a cost of $7,000 and dredging assessment at a cost of $2,000.
Based on study results, the City Council adopted an extensive capital improvement plan to correct the water quality and sedimentation problems associated with the lake and surrounding watershed.

The Objective is the immediate and long-term reduction in point and non-point sediment production into the Lagoon Valley and associated waterways eventually impacting the Bay Delta. By eliminating sediment impacts, we will strive for and achieve habitat restoration & protection, stabilization & restoration of native species. Other outcomes that are expected will be reduced erosion and soil loss, improved water quality, and restoration of vegetative cover. We will:

1) Initiate a localized sediment capture system.
2) Improve water quality to lake, drainages and downstream impacts including the delta.
3) Restore wetland/riparian areas.
4) Initiate remedial actions for a quality ecosystem.

The proposed project will complement upper watershed restoration work that has already funded for Lagoon Valley Lake. The upper watershed work entails a range of short and long-term management actions to stabilize and enhance the upper watershed ecosystem (*e.g.,* grazing plan, cattle exclusionary fencing from all streams, stream stabilization and planting, and eroded trail improvements and stabilization). The proposed project will take the next needed step by restoring and enhancing key elements of the lower watershed. Together the upper and lower watershed work will result in a significant overall improvement to the ecological health of Lagoon Valley, particularly Lagoon Valley Lake.

By undertaking a combined upper and lower watershed enhancement effort, the City is taking a holistic approach to ecosystem restoration. The goal of attaining improved water quality, an improved native fishery, and expanded wetland and riparian habitats in and around Lagoon Valley Lake can only be accomplished when all the key watershed influences on the lake are addressed (*e.g.*, sedimentation, nutrient enrichment, bypass channel habitat quality, downstream flow).

The Approach & Technical Feasibility will be the use of current best management practices to achieve the desired results. The selective measures of construction were determined by collaborative efforts and input from DF&G, Public Works, Planning, City Engineers and professional consultants dealing with range management, riparian restoration, hydrology and lake management.
Additionally, this project proposal provides for grant administration, environmental permits and compliance, monitoring, and public education and outreach.

The proposed measures were determined to be technically feasible by collaborative efforts and input from DF&G, Public Works, Planning, City Engineers and professional consultants dealing with range management, riparian restoration, hydrology and lake management.

The proposed project involves watershed stabilization and ecological enhancement techniques similar to those successfully applied elsewhere in Solano County and throughout California. For example, bioengineering techniques proposed under this project for stabilization of watershed streams and drainages are techniques that have been successfully used throughout California. Examples include watershed stabilization work at Big Chico Creek (UCD-ICE 1997), the Feather River CRM (Harris 2000), Cottonwood Creek, Elkhorn Slough and Carmel River (UCD-ICE 1997).

We will implement a monitoring program that will use standard protocols for wetland and watershed monitoring. These are summarized as follows:

Geomorphic Cross Sections - These cross sections will be will be carefully placed at representative transition points where erosion or sediment deposition is most likely to occur. The cross sections will serve as a control for the map-based geomorphic interpretations, and will also provide the standard "hydraulic geometry" data to evaluate future stability or instability. Geomorphic channel monitoring will be conducted in the summers of years 1, 3, and 5 following stabilization.

Photographic Monitoring - The condition of the channels at selected, standard monitoring locations will also be documented annually by photography in order to assist in evaluating how the channel changes over time. If photopoints are used, they will be carefully chosen to minimize the possibility that vegetation may later obscure the view of the channel from that location.

Suspended Sediment Volumes – Suspended sediments will be measured in streams using a single stage sampler, or an equivalent apparatus, in coordination with stream flow measurements at suitable locations in the streams. At least one set of samples will be collected during each storm season during a large storm event.

Bedload Sediment Volumes – These will be estimated in years 1, 3 and 5 by measuring the depth of accumulated sediments at the mouths of each stream outlet and at key locations within the stabilized streams (e.g., plunge basins, cutoff walls, check dams).

Vegetation Cover - Quantitative-sampling methodology will be used to monitor vegetational parameters. To assess plant cover, random plots (quadrants) will be established in selected stabilized and seeded channel zones. Photographs will be taken of a representative selection of sampling plots in order to provide visual verification of estimation data. Cover will be estimated by absolute cover class for each species. Basal area cover by woody species will be combined with
herbaceous cover in woody riparian habitats. Unequal cover class intervals allow for an easier estimation of species-cover to area relationships than do equal class intervals (Mueller-Dombois and Ellenberg 1974).

Riparian and Oak Planting Survival – Percent survival will be estimated annually by counting the number of live individuals during the growing season during each monitoring year.

Residual Dry Matter (RDM) – At the end of the growing season, RDMs should be measured in random locations in the grazed grassland areas. This parameter measures the amount of residue (*e.g.,* dead and decaying vegetation, duff) found in each vegetation type and provides a good indication if the modified grazing plan is meeting fuel reduction goals while not overtaxing watershed forage.

The proposed work will entail amelioration of three lower watershed environmental problems: excessive sedimentation from the Hines Nursery tributary, constrictions in the downstream drain from Lagoon Valley Lake and degradation of the stream/riparian habitat in the lake bypass channel. Each of these are described below:

Ditch Stabilization/Sediment Capture System - Extensive bank erosion problems will be corrected by stabilizing the entire channel bank with vegetation and/or geotextiles. Check dams and small sedimentation basins (Figures 18 and 20) will be integrated into the ditch system.

Lagoon Drain Rehabilitation - In order to restore the design capacity of the Lagoon Drain, growths of cattails and tule will be removed. Concentrations of woody debris in the drain will be removed. A continued annual maintenance program for this purpose has been implemented. The DSD also identified a constricted zone in the drain, near the Pena Adobe footbridge, that impedes design flow. This constricted zone has a bedrock impediment that will be removed to improve flow.

Bypass Channel Enhancement **-** The bypass channel on the west side of the lake already provides well established riparian habitat with mature cottonwood and willow trees, stands of emergent marsh and a good deal of cover for waterfowl and aquatic fauna. At least 25 western pond turtles, a state-listed Species of Special Concern, have been observed within the channel as well as muskrats and various wading birds and waterfowl. The bypass channel also provides some of the best fishing in the Lower Lagoon Valley due to the presence of an apparently healthy population of largemouth bass. However, the woody riparian vegetation along the channel suffers from extensive beaver cutting damage. Along some segments, nearly 50 percent of the willows and cottonwoods have been toppled by beavers.

The city has taken action to remove beavers from the bypass channel. Given the propensity of beavers to re-colonize areas, this removal program will probably need to continue for the foreseeable future. Without this program the quality of the bypass channel habitat will decline. Moreover, the felling of trees into the channel can conflict with its flood flow capacity.

The southern and northernmost segments of the bypass channel have relatively few riparian trees and could benefit from a planting program. Trees will also be planted in locations where beaver damage has been significant. The following additional trees are proposed for planting along the bypass channel: white alder (*Alnus rhombifolia)*, Oregon ash *(Fraxinus latifolia)*, and California Black Walnut *(Juglans hindsii)*. Additionally, the bypass channel is an excellent location for planting stands of elderberry, in an attempt to provide habitat for the federally listed valley elderberry longhorn beetle.

In order to ensure the maintenance of the bypass channel's function as a conduit for storm flow, riparian vegetation will be periodically trimmed back (once every 2-3 years) and dense stands of cattails that may have taken hold in the middle of the channel will be treated with an herbicide, approved by the EPA for use in aquatic systems, and then harvested.

To ensure that the bypass channel's function as a conduit for storm flow is maintained for the long term, bottom depths will be surveyed and a channel profile and storm flow capacity ascertained. If design capacity has been significantly reduced by the accumulation of sediments and organic matter, limited dredging of the central (deepest) portion will be considered.

The arm of the bypass channel, which parallels Lagoon Valley Road, is very narrow and shallow. Several mature cottonwood and willow trees have become established in the middle of the channel and will be removed to maintain flood flow capacity.

Hypotheses & Uncertainties

There are no uncertainties as to the success of this proposed ecosystem restoration project. As stated above, numerous projects and programs have been implemented throughout the state by many entities. Extensive studies confirm the proposed implementation program has proven workable and effective in sediment capturing and ecosystem/habitat restoration.

The city contracted with LSA Associates to conduct an extensive study of the watershed and lake at Lagoon Valley. Additionally, the City conducted subsequent studies to fill needed information gaps. These included sediment analysis of the lake, grazing assessment and vegetation management analysis of the watershed, a Red Legged Frog study and dredging assessment. Based on study results, the City Council adopted an extensive capital improvement plan to correct the water quality and sedimentation problems associated with the lake and surrounding watershed.

Expected Outcome & Performance Measures

Performance measures shall reflect the overall project goal of restoring the Lagoon Valley Lake Watershed. Monitoring shall be designed to detect trends in the post-project system on both a spatial and temporal basis so that needed adjustments and refinements in the plan can be made when needed and in the specific locations needed. Key performance measures shall include but not be limited to the following:

1. Sediment Volumes - *There should be significant decline in the volume of sediment reaching Lagoon Valley Lake at the mouths of each intermittent and perennial stream.*

2. Stream Cross Sections – *Stabilized stream segments should remain stable or should evolve over the monitoring period in the direction of stability. There should be no evidence of new significant downcutting, rill formations or formation of new headcuts.*

3. Sediment Accretion - *Following initial stabilization there will likely be evidence of accretion in key stream locations such as riprap check dams and plunge pools. Over time, the rate of accretion should decline as the stabilized system matures*

4. *Wetland Vegetation Establishment* – Within the flatter and broader portions of stabilized stream zones, and within seeded areas, cover by hydrophytic herbaceous species should expand.

5. Woody Riparian Establishment – *Planted zones of woody riparian vegetation should show evidence of maturation and canopy cover expansion over the monitoring period.*

6. Erosion Seed Mix Establishment – *Seeded sideslopes and other graded areas along the stabilized streams should rapidly germinate and expand cover.*

7. *Oak Establishment* – Planted zones of oaks in the watershed should demonstrate a reasonable level of survival and maturation.

8. *Grassland Condition* – There should be a reduction in eroded, over-grazed conditions in the watershed.

We will implement immediate and long term reduction in point and non-point sediment production into the Lagoon Valley and associated waterways eventually impacting the Bay Delta. Other outcomes that are expected are reduced erosion and soil loss, improved water quality, habitat restoration, native species restoration & protection and restoration of vegetative cover. The following specific outcomes will be realized:

1) Initiate a localized sediment capture system.
2) Improve water quality to lake, drainages and downstream impacts.
3) Restore wetland/riparian areas.
4) Initiate remedial actions for a quality ecosystem.
5) Implement habitat interconnections within the ecosystems of Lagoon Valley

The monitoring performance measures will be the effectiveness of the stabilization effort in reducing and controlling erosion, sedimentation, excessive runoff and sediment capturing.

The measures implemented will be the actual monitoring of stream courses recording sedimentation and turbidity of the drainages as well as the presence of non-eroded surface areas throughout the watershed. Photos of watershed elements, which have degraded the site, will be compared with long term implementation strategies (timeline photography).
The monitoring team will review current eroded surfaces, drainages and vegetative cover and measure rill depths, percentage of canopy cover and stream flow regimes.

In essence, the monitoring team will contrast current detrimental conditions of the ecosystem with proposed remedial actions and their long-term impact for rehabilitation of the watershed.
We will measure the time lapse of vegetative restoration of road and trail closures. We will observe and note the effectiveness of stabilization options as well as the presence of non-eroded surface areas within de-commissioned roads and trails by contrast and comparison with current conditions.
The team will measure current feed density of the grasses, reduction in grazing impacts to the drainages, improved riparian conditions, reduction and/or elimination of cattle eroded areas, and a more definitive number for AUM's appropriate to the areas.

We will measure by actual monitoring and recording numbers and types of native regeneration trees and shrubs and herbaceous species within the ravines. Success will be measured throughout the years as progress reports divulge the success or failure of the restoration improvements. Annual reports will include required maintenance needed for watershed stability, physical repairs, required materials and equipment.
The special interest groups, stakeholders and schools will assist in monitoring vegetative growth, site suitability, and plant effectiveness within the watershed.

Expected Products & Reports /Value of Products

The finished products and results of effort will be a valuable tool for other watershed/ecosystem managers to review and apply to their particular problems. The on-site value will be evident by:

1) The initiatiation of a localized sediment capture system.
2) Improved water quality to lake, drainages and downstream impacts.
3) Restoreation of wetland/riparian areas.
4) The Initiation of remedial actions for a quality ecosystem.
5) Completion of habitat interconnections within the ecosystems of Lagoon Valley

Monitoring results will be shared with monitoring conducted under the on-going Solano Water Agency Regional Habitat Conservation Plan, other on-going watershed enhancement and restoration efforts in Solano and Yolo Counties (*e.g.,* Cache Creek, Lake Solano, Lower Putah Creek), the pending Rockville Hills Regional Park Management Plan, and on-going management efforts at the Jepson Prairie Preserve. Results will also be shared with the UC-Davis Information Center for the Environment for posting on their web site.

We understand that this watershed is quite unique to this area. The city will avail efforts of this project with work proposed by Yolo County, Contra Costa Flood Control District and the Amador & Yolo County Resource Conservation Districts. These entities have multiple partners too and we are most willing to collaborate with their proposals to enhance everyone's needs.

In addition, the city has been involved with stream restoration work on Alamo, Ulatis and Laguna Creeks. This watershed directly impacts Laguna and Alamo Creeks, which are currently reviewed for their stream flows and riparian conditions.

Success will be measured by timely completion of reports, engineering design, general supervision, effectiveness of meetings and their required frequency, lack of hindrances in preparing, submitting and awarding bids and completion of permits in a sequential manner appropriate to project implementation. ***The ultimate aim will be for the coordinators to connect all facets of this project to the primary program goals and objectives as outlined in the CALFED Ecosystem Restoration Program.*** To insure that our project tasks are successful, we will require that the coordinators read and review this plan and specifically the Ecosystem Program Elements.

Approximately 3 meetings per month will be held to allow all interested parties an opportunity to provide input for this implementation phase. On-going meetings will be frequent between consultant and city staff to insure project flow and continuity. The City Landscape Architect will supervise and coordinate the meetings and communications necessary for a successful project.

Work Schedule Estimate (Specific dates for each task is dependent upon notice to proceed from CALFED)

Task 1 - Ditch Stabilization & Localized Sediment Capture System

Task 1A – Earthwork	2 days
Task 1B – Check Dams	45 days
Task 1C – Erosion Control (Geotextile)	32 days

Task 2 – Lagoon Drain Rehabilitation

Task 2A – Dredging & Vegetation Removal	14 days

Task 3 - Bypass Channel Restoration

Task 3A - Depth Survey	2 days
Task 3B – Dredging	14 days
Task 3C – Debris Disposal	22 days
Task 3D – Site Preparation	14 days
Task 3E – Tree/shrub Planting	12 days
Task 3F – Willow Wattle & Pole Planting	6 days
Task 3G – Tree Protection	3 days
Task 3H – Drip Irrigation	32 days

Task 4 – Permits	Unknown
Task 5 – Plans & Specifications	44 days
Survey of Tasks 1, 2 & 3	15 days

B Applicability to CALFED Goals

CVPIA Priorities

This project is align with the Habitat Restoration Program specifically the Delta Region and Goal 1: Endangered and other At-Risk Species and Native Biotic Communities, Objectives 1,2,3 & 4. Goal 2: Ecological Processes, Objectives 1, 4, & 5. Goal 4: Habitats, Objective 1. Goal 5: Nonnative Invasive Species, Objectives 3, 4 & 7. Goal 6: Water & Sediment Quality, Objectives 1, 2 & 3.

The over-all project will result in progress toward the above priorities by re-establishing Sacramento perch thru lake restoration and wetland efforts. We will re-establish riparian plant communities and related fauna (Habitat restoration). The project includes completion of habitat interconnections within the ecosystems of Lagoon Valley as well, as improved water quality to lake, drainages and downstream impacts. Nonnative invasive species will be removed from riparian corridors and zones throughout the watershed. Only native plants will replace those removed.. We will incorporate restoration & protection of vegetative cover.

We will implement immediate and long-term reduction in point and non-point sediment production into the Lagoon Valley and associated waterways eventually impacting the Bay Delta. The project will also reduce erosion and soil loss, improve water quality within and beyond the watershed.

Relationship to other Ecosystem Restoration Projects

This project will correct a portion of lower watershed/ecosystem problems. Additional improvements for future phases include intermittent drainage channel stabilization, lake deepening & restoration, creation of new wetlands, shoreline stabilization, bypass channel dredging, trail and boardwalk, wildlife viewing platforms, Blackfish seining, nuisance species relocation, water quality monitoring, regulatory approval, upper watershed management, drainage stabilization & sediment capture system, drain rehabilitation, sedimentation basins & plunge pools and ancillary items.

A Calfed Watershed Restoration Grant was awarded for the upper watershed and we anticipate support from the Wildlife Conservation Board for intermittent drainage channel stabilization & sedimentation basins & plunge pools. A URCC grant through the legislature is hopeful for some regulatory permits, wildlife viewing platforms, crest trail enhancement & boardwalk,

Request for next phase funding

Several elements of this total project remain to be funded. Of the 19 Items required we have approximately 6 Items remaining which total approximately $2.8 million. We will continue to solicit funds from a variety of sources but would like to request at least half of this from CALFED.

Previous CALFED funding

We were approved for $432,000 for Upper Watershed Management and have yet to finalize the agreement.

System-Wide Ecosystem Benefits

A direct link between upper & lower watershed restoration efforts will be appreciated by the funding of this proposal. A previously awarded grant for upper watershed work will correct sedimentation and habitat restoration in the upper reaches of the watershed/ecosystem. The lower watershed can now be addressed by a localized sediment capture system & riparian corridor improvements along the bypass channel which leads to interconnecting streams in and away from the valley.

An extension and enhancement of riparian habitat will be appreciated by this work which will restore the corridors to more natural conditions for native flora & fauna.

C Qualifications

The City will contract with qualified civil engineering, geotechnical and environmental firms that have had direct experience working in Lagoon Valley Lake or similar projects. Experience in dealing with lower watershed stabilization and stream rehabilitation projects will be required. The City's civil engineering and planning staff will directly oversee all work.

D Costs - Detail Budget

Please see budget forms

E Local Involvement

As described in the CALFED Bay-Delta Program – Ecosystem Restoration Program we will:

- Facilitate and improve coordination among governmental agencies, other organizations and local watershed groups by involving their efforts in our project. This has occurred in the past with such groups as the Vacaville Tree Foundation, Vacaville Unified School District, Department of Fish and Game, Wildlife Conservation Board, Yolo County Cache Creek Project and State Parks Local Assistance Programs.
- Develop watershed monitoring and assessment protocols
- Support education and outreach. Public awareness and local school involvement with monitoring, education and interpretive displays will go far in achieving our educational efforts for the watershed.
- Integrate and collaborate with other CALFED common programs. As a partner with CALFED we will actively communicate with them to insure cohesiveness and compatibility with their programs.
- Identify the relationships between watershed/ecosystem processes and the goals and objectives of CALFED

F Compliance with Standard Terms & Conditions

The city and associated consultants will comply with Standard Terms & Conditions determined appropriate for this project.

G Literature Cited

Harris, R.R. 2000. Process and reality: working with a local watershed organization to develop a restoration effectiveness-monitoring program. Journal of Extension, April 2000 Vol. 8. No.2.

LSA Associates, Inc. 1999. City of Vacaville – Lagoon Valley Lake Management Plan. Prepared for City of Vacaville. 110p+appends.

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Bernhardt, E. and T.J. Swiecki. 2000. Effects of cattle grazing on survival and growth of valley oak seedlings. Phytosphere Research.

The Nature Conservancy (TNC). 1999. Lassen Foothills Project. The Nature Conservancy Newsletter, Fall 1999.