REPORT ON COSTS

SACRAMENTO RIVER
CONSERVATION AREA
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December 8, 1999

Mr. Denny Bungarz, Chair
Sacramento River Advisory Council
526 West Sycamore Street
Willows, California 95988

Dear Mr. Bungarz:

Enclosed please find the *Riparian Habitat Committee Report on Costs of Easements, Acquisitions, Restoration and Bank Protection along the Sacramento River*.

At the March 10, 1999 meeting of the SB1086 Riparian Habitat Committee's management subcommittee, I was asked to work with the California Department of Water Resources Northern District to gather general cost estimates for several riparian habitat management tools that are outlined in the *Handbook*, and to develop a map of a "hypothetical river bend" showing how and where such tools might be used. These tools include bank protection, easements (including a "set-aside" program), acquisition and both active (cultivated) and passive (natural recruitment) restoration. The report is to be included as Appendix G in the *Sacramento River Conservation Area Handbook*, and is referred to in the Memorandum of Agreement Regarding the Sacramento River Conservation Area.

This report provides general information only. The cost of land and easement acquisitions are based on recent sales. Details on these sails can be obtained from SB1086 staff at DWR.

The Riparian Habitat Committee reviewed a draft of this report in subcommittee on June 15, 1999, and at its July 14, 1999 regular meeting. The attached report includes changes and comments made during those meetings.

We hope that this report will provide stakeholders with a better understanding of costs associated with riparian habitat restoration conducted under a Sacramento River Conservation Area Program, as well as a useful starting point for site-specific planning and project implementation.

Sincerely,

Burt Bundy
Sacramento River Conservation Area Coordinator

Report on Costs of Easements, Acquisitions, Restoration and Bank Protection within the Sacramento River Conservation Area

by the
SB1086 Advisory Council
Riparian Habitat Committee
and the
Sacramento River Conservation Area Coordinator

December 15, 1999

INTRODUCTION

The Sacramento River Conservation Area Handbook describes several tools available to restore and protect a continuous riparian corridor along the river. These include bank protection, easements (including a "set-aside" program), acquisition and both active (cultivated) and passive (natural recruitment) restoration. This report provides general cost estimates for each tool under various conditions (Table 1). In addition, the report provides an example of how and where such tools might be used on a hypothetical river bend (Figure 1).

The purpose of this report is to illustrate how the Sacramento River Conservation Area program would use restoration and management tools, and to illustrate the approximate proportion of funding that may be required for various aspects of a site-specific management plan.

To obtain background information, telephone interviews were held with people from a variety of organizations and agencies that currently use these tools. The basis for the actual cost estimates varies by tool. Land and easement acquisition costs are based on recent sales. These were compared with listing prices on the Internet and in the newspaper. Bank protection costs are based on discussions with two ranch managers, and on data provided by the U.S. Army Corps of Engineers (USACE). Set-aside costs are based on rental rates for various crops. Restoration costs are based on estimates provided by two nonprofit restoration organizations. Each tool has a high degree of cost variation, as described below. Each section of the river is unique, and the cost of each of the implementation tools varies with the circumstances.

This report does not cite specific sources because the Riparian Habitat Committee is concerned about protecting their privacy. However, source information can be obtained from SB1086 staff at the Department of Water Resources, Northern District office.

BANK PROTECTION

The Sacramento River Conservation Area program may use bank protection to achieve its goals, as described in the Handbook on page 9-6. The cost of both private and public bank protection along the Sacramento River is examined. Two river ranch managers in Tehama County with recent experience installing bank protection provided information on private costs, which ranged between $150 and $450 per linear foot. Cost depends on the height and slope of the bank, which alters the amount of rock needed per linear foot. Cost also depends on the environmental mitigation factors, including obtaining permits, working at night, and working around trees.

The USACE installs all of the publicly funded bank protection on the Sacramento River, under several authorities:

- Sacramento River Bank Protection Project (SRBPP), for purposes of protecting the proper functioning of the Sacramento River Flood Control Project;
- Chico Landing to Red Bluff Project, for purposes of preventing siltation downstream and in the Delta, and

- Public Law 84-99, for emergency flood control purposes.

Cost of publicly-installed bank protection was obtained from the USACE, Sacramento District. Costs of two bank protection sites, the lower American River and Steamboat Slough (both installed under SRBPP authority), were considered representative of the current range of costs of bank protection. These projects cost $2,000 and $1,000 per linear foot respectively. However, many of the proposed future sites may be $2,500 or more per linear foot given the high mitigation costs required for these sites.

Cost of installing emergency bank protection under PL 84-99 (such as that installed in Butte County in the winter of 1997-98) was not determined.

Trenched rock figures (Figure 1) were based on costs experienced by one landowner who has installed periodically beginning in the late 1980s. His costs have been $85-125 per linear foot, based on a 12'x12' trench filled with free concrete rubble. Costs included digging the trench, filling, and transporting the rubble. No permit costs were incurred on the project.

ACQUISITION

The Sacramento River Conservation Area Program may use fee title acquisition to achieve its goals, as described in the Handbook on pages 9-6 and 9-7. Acquisitions for riparian habitat conservation and flood control purposes have been made by private conservation organizations such as The Nature Conservancy (TNC), as well as the U.S. Fish and Wildlife Service (USFWS), the Bureau of Land Management, the Wildlife Conservation Board (WCB), and The Reclamation Board (Rec Board).

Cost estimates are based on actual sales of properties to the USFWS and two nonprofit land restoration organizations that work on the Sacramento River. Costs were compared with Internet and classified listings of land for sale on or near the Sacramento River. Acquisition prices were divided into land use type, with walnut orchards ranging between $6,000 and $10,000 per acre, almond and prune orchards ranging between $4,500 and $7,500 per acre, non-irrigated crops (grainland) ranging between $2,000 and $3,000 per acre, irrigated row crops ranging between $2,500 and $3,500 per acre, existing riparian habitat ranging between $800 and $1,200 per acre, and gravel bars ranging between $500 and $800 per acre. Reasons for variation in costs for each land use type include condition of the land, production records, and location of the property.

CONSERVATION EASEMENTS

The Sacramento River Conservation Area program may use conservation easements and set-aside agreements to achieve its goals, as described in the Handbook on pages 9-4 through 9-6. Both agricultural conservation and riparian conservation easements have been purchased by the WCB, The Reclamation Board, and TNC. Riparian conservation easements are deeded easements that have significant restrictions on land use—including prohibition of development for agricultural, residential, commercial, and industrial uses—and also limits on such activities as flood control, water use and gravel or mineral removal. Continued control of hunting and access may be reserved for the landowner.

Agricultural conservation easements are deeded easements that allow agricultural uses, but prohibit residential, commercial, and industrial development. Restrictions as to some crop uses and the incorporation of an integrated pest management (IPM) plan are usually included. Sometimes a "best management practices (BMP)" section is included. All other normal agricultural uses are reserved for the landowner.

Easement costs in this report are based on prices paid by the WCB for three separate conservation easements purchased in 1987, 1993, and 1994. These easements are on both agricultural and riparian land. Prices for easements on agricultural land averaged between $600 and $5,000 per acre, based on an easement in Colusa County at river mile 145. Prices for easements on riparian lands along the Sacramento River ranged between $400 and $900 per acre, based on an easement near Hamilton Bend in Colusa County. Prices for these easements vary greatly depending on current land market values, date of purchase, type and condition of land, and the nature of the restrictions placed on the land in the easement agreement.

A set-aside program is described in the Handbook that would be similar to an easement, but would be a renewable contract with the landowner rather than the outright purchase of an easement. Programs similar to this include the Conservation Reserve Program offered through Natural Resources Conservation Service and a set-aside program involving asparagus in the Delta that uses a percentage of average production revenues as a basis for determining annual payment. This method is also used to determine rental rates for cropland. The annual set-aside costs of $50 to $300 per acre in this report are based on rental rates for various crops grown along the Sacramento River.

RESTORATION

Restoration of riparian forests is part of the overall goal of the Sacramento River Conservation Area Program. Restoration priorities are listed on pages 1-7 to 1-8 of the Handbook.

Restoration is being carried out by local, state, and federal agencies and nonprofit organizations along the river. The largest efforts are being carried out by TNC, which has restored over 2,000 acres.

Costs of land restoration along the Sacramento River were obtained from two restoration organizations working on the river. Restoration methods on the Sacramento River can be grouped as active (cultivated) or passive (natural recruitment). Passive restoration costs run from negligible amounts to $1,000 per acre, depending on the level of land use and the existing infrastructure. Uses such as farming and gravel mining tend to require minimal restoration, while lands that contain extensive weeds and/or levees that need to be removed require a more intensive and costly restoration. Active restoration costs range from $2,000 to $5,000 per acre and this depends on the intensity of the current land use and the cost to discontinue that use. Controlling weeds, irrigation, and the planting of both over- and understory species all contribute to the high end of the cost range.

Table 1. Cost Estimates

Bank Protection	**Cost Estimate (High)** **(per linear foot)**	**Cost Estimate (Low)** **(per linear foot)**	**Factors Affecting Cost Variation**
Federal--USACE (Rock)	$1,000	$2,000	bank height, bank slope; environmental factors (e.g. working at night, working around trees obtaining permits, etc.)
Private (Rock)	$150	$450	
Private (Trenched Rock)	$85	$125	cost based on 12'x12' trench, with free concrete rubble fill
Conservation Easements	**(per acre)**	**(per acre)**	
Riparian	$400	$900	market values, date of acquisition, land conditions, land restrictions
Agricultural	$600	$5,000	market values, date of acquisition, land conditions, land restrictions
Setasides	$50	$300	rental prices for various crops
Acquisitions (by land use type)	**(per acre)**	**(per acre)**	
Orchard (almond/prune)	$4,500	$7,500	vary with location, soil quality, flood risk, etc.
Orchard (walnut)	$6,000	$10,000	vary with location, soil quality, flood risk, etc.
Non-irrigated Crops (Grainland)	$2,000	$3,000	vary with location, soil quality, flood risk, etc.
Row Crops (irrigated)	$2,500	$3,500	vary with location, soil quality, flood risk, etc.
Existing Riparian	$800	$1,200	vary with location, soil quality, flood risk, etc.
Gravel Bars	$500	$800	vary with location, soil quality, flood risk, etc.
Restoration	**(per acre)**	**(per acre)**	
Recruitment	$0	$1,000	cost varies greatly due to site-specific issues, such as weed control, levee removal, cost of discontinuing existing uses
Cultivated	$2,000	$5,000	cost varies greatly due to site-specific issues, such as weed control, levee removal, cost of discontinuing existing uses, complexity of planting design, and irrigation and maintenance.

Estimates are based on actual costs (1987-1999). Sources are available from DWR's Northern District.

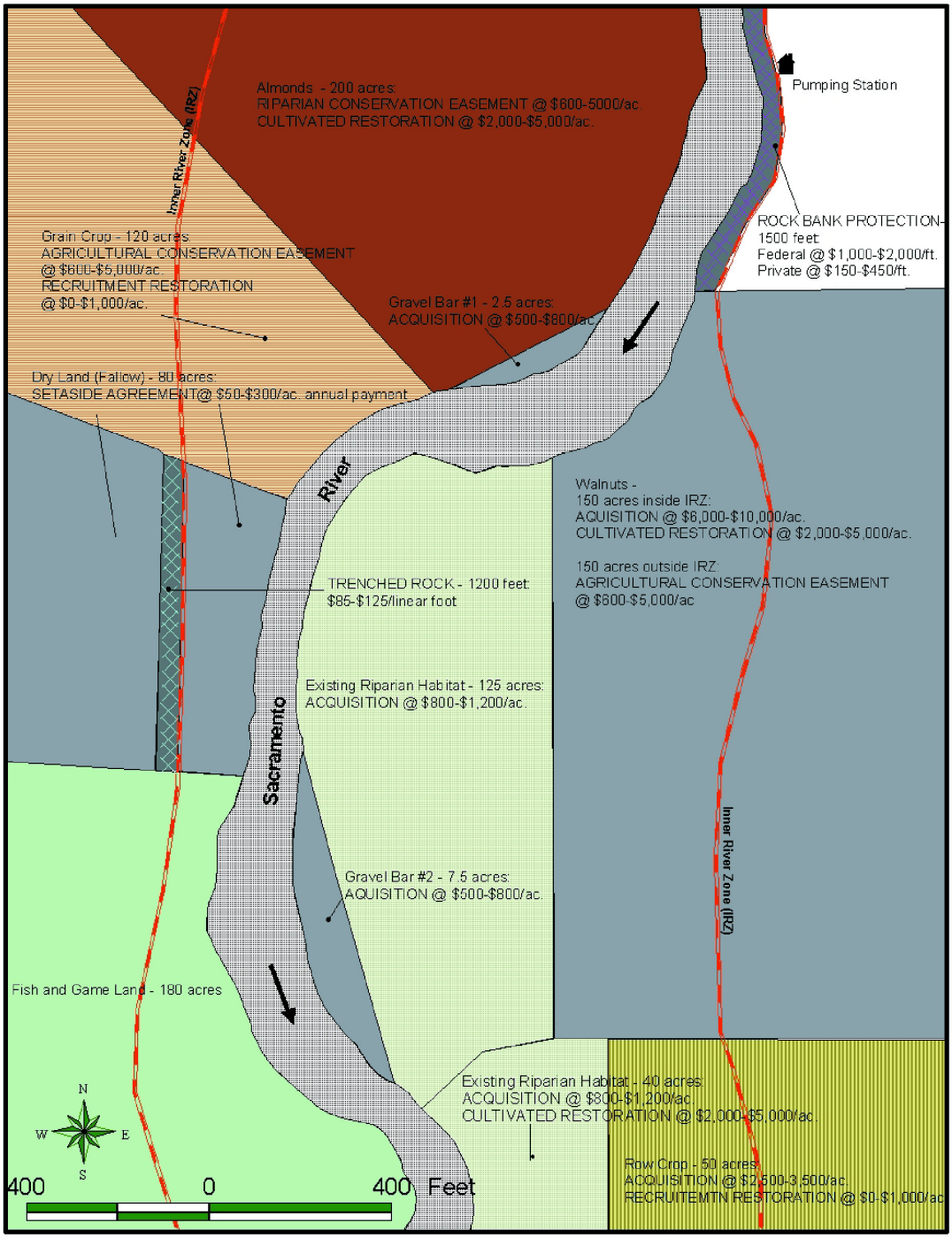

Figure 1[1]. Hypothetical river bend, showing use of some of the tools outlined in the Handbook. Each section of the river is unique and the cost of these actions varies with the circumstances. Estimates are based on actual costs (1987-1999). Sources are available from DWR Northern District.

[1] M. Kelly and J. Cunningham 12/16/99