

University of California
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California Rivers Assessment, UC Davis

Cooperative Agreement
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FINAL REPORT
for
RESTORATION PROGRAM WORK PLAN
PROJECT (96-CARA-319h)

Internet Homepage and Interactive Data Selection
for the Klamath Resources Information System

Applicant:

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Project Dates: September 1, 1997 – January 31, 1998

Date: February 4, 1998

Abstract

In cooperation with the Klamath Resource Information System (KRIS), the Information Center for the Environment (ICE) at U.C. Davis developed and currently provides advanced Internet services for KRIS on its existing, highly visible and well-respected World-Wide Web pages. As a result of this collaboration, the Klamath Resource Information System gains widespread exposure to current data providers, future participants, the general public, and others interested in the capture and evaluation of data concerning water quality parameters. ICE will continue to support the KRIS web pages for a period of one year from the start of the contract (until September 1, 1998).

After several meetings among KRIS, ICE, and RWQCB (Santa Rosa) staff, the KRIS web pages were developed and placed on the ICE web server. The KRIS web pages were designed and coded initially by Diane Higgins, and are maintained and edited where necessary by ICE. Additionally, ICE houses the web pages on their server and has fully integrated the KRIS and California Rivers Assessment (CARA) pages.

Due to some delays in posting of the newly enhanced California Rivers Assessment web pages, the KRIS integrated web pages are not directly available from links on the ICE and CARA web pages. However, the updated versions of the KRIS and CARA pages are available at <http://endeavor.des.ucdavis.edu/newcara> and <http://endeavor.des.ucdavis.edu/kris2>. As soon as the new CARA pages are released, the integrated KRIS pages will be linked from the ICE home pages (<http://ice.ucdavis.edu>) and will be accessible directly at <http://endeavor.des.ucdavis.edu/cara> and <http://endeavor.des.ucdavis.edu/kris>.

I. Introduction

The California Rivers Assessment (CARA) is a project initiated by the California Resources Agency in 1992 to better document environmental conditions in California's waterways and riparian corridors. CARA is part of The Information Center for the Environment (ICE) which is housed in the Department of Environmental Policy and Science at UC Davis. ICE is a cooperative facility supporting projects of an interdepartmental faculty, with funding from over a dozen agencies and programs, including the Environmental Protection Agency, U.S. Geological Survey Biological Resources Division, the California Department of Fish and Game, the National Park Service, the Man and the Biosphere Directorate at the State Department, California Biodiversity Council, the California Water Resources Control Board, the California Department of Parks and Recreation, and the Nature Conservancy.

ICE's goals include providing GIS, database systems, and modeling support to environmental resource projects, and developing easy-to-use public access to a wide variety of environmental information. Our ICE Web server hosts environmental data, maps, models, reports, and other related products. ICE also maintains one of the most extensive on-line environmental bibliographies available, and provides an easy to use array of links to hundreds of other environmental sites. The ICE server is accessed over 14,000 times per week from all over the world.

One of the most powerful features of the ICE server is our Web-to-GIS query system known as ICE MAPS. ICE MAPS is a powerful custom map generator consisting of a combination of ARC/INFO Arc Macro Language (AML) programs and a Perl script that work together to provide access to spatial and tabular data. The system allows Internet users to navigate to an area of interest within the state, select the data layers desired for a final map, and have our Web server and GIS software produce the map. The user then has the option to download GIF or PostScript files of the custom map. Currently users can develop custom reports and maps from public data sets in the CARA system, including fish distributions, riparian vegetation, and a variety of state and federal GIS coverages. We are currently obtaining permission to include several KRIS layers from the Salmon and Scott River watersheds in this system, and several of these watershed-based layers will be accessible on ICE MAPS (http://ice.ucdavis.edu/ice_maps) once this permission is granted.

II. Description of Study Area

The California Rivers Assessment (CARA) covers all of California. The CARA web pages provide users with information on all 149 USGS Cataloging Units in the State. The Klamath Resources Information System, however, includes only the North Coast Klamath bioregion. Integration of web pages occurs only in areas covered by KRIS.

III. Methods and materials

Web page integration was accomplished using html coding. The KRIS web pages are currently being served on a Microsoft Windows NT web server. In order to integrate GIS data layers, ICE technicians used both ArcView and ARC/INFO GIS software. Other materials include printers and associated supplies, as well as basic office items and materials. Travel costs were incurred for attending meetings with KRIS and RWQCB staff, as well transport to pertinent meetings and workshops.

IV. Results and Accomplishments

The following tasks were identified during the initial project discussions. All tasks have been completed as indicated except for the posting of detailed GIS layers within the ICE MAPS system. This task is in progress, and will be completed as soon as permission from the data providers is obtained. ICE has obtained these data layers (for the Shasta and Scott watersheds) that were compiled by the Humboldt State University Spatial Analysis Laboratory. ICE staff members are currently negotiating integration of these layers into the ICE MAPS system with HSU staff, and will include several layers once permission and proper metadata have been obtained.

TASK 1: Obtain a subset of the KRIS GIS and other (charts, graphs, photos) layers for inclusion on the ICE Web server.

TASK 2: Design KRIS homepage and determine the structure and capabilities desired by the user community.

TASK 3: Implement the pilot design and integrate additional data sets for other KRIS sub-basins.

TASK 4: Maintain the resultant system for a period of one year from the start of the contract. This includes replacement of GIS layers and other files already existing on the system that have been updated, but does not include the addition of new layers.

V. Summary and Conclusions

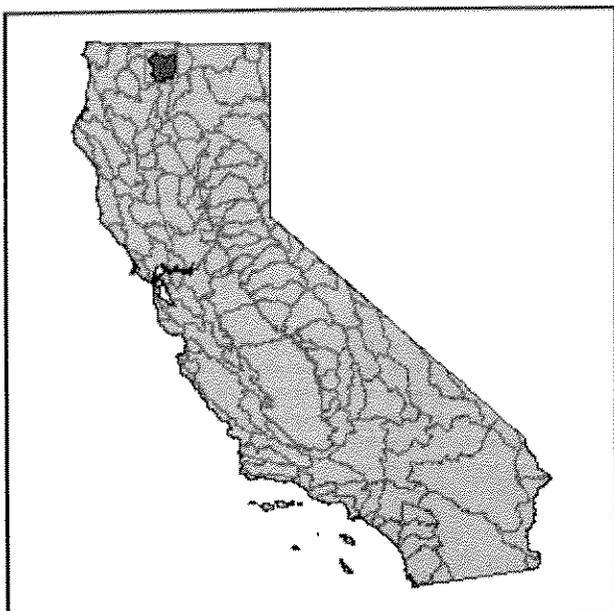
Integration of the KRIS and CARA pages has helped benefit both projects and the public user community. The Klamath Resource Information System gains widespread exposure to current data providers, future participants, the general public, and others interested in the capture and evaluation of data concerning water quality parameters by its integration with the ICE and CARA web sites. ICE and CARA obtain data and links into multiple information describing riverine, aquatic, and riparian conditions in several KRIS watersheds. The general public gains access to data of multiple scales, content and format, thereby maximizing their chance of finding information useful to them on the World-wide Web.

VI. Summary of Expenditures

| | |
|--|-----------------|
| Salaries and Benefits | \$ 9,783 |
| Travel and transportation (including per diem): | \$ 1,500 |
| Expendable equipment, materials, and supplies | \$ 3,372 |
| Operations and maintenance (incl. software licenses) | \$ 800 |
| General and Administrative Expenses (10% overhead): | \$ 1,545 |
| Total Budget: | \$17,000 |

| | |
|--|-----------------|
| In-kind contribution: | \$ 2,000 |
| Michael C. McCoy, Academic Administrator | |
| \$1000 (5% for 4 mos) | |
| James F. Quinn, Professor of Environmental Studies | |
| \$1000 (5% for 3 mos) | |
| Web server access | |

VII. Appendix—Samples of web pages



[Search by Basin](#) [Search by County](#)
[Search by Assembly District](#) [Search by Congressional District](#)

General Information

Basin Name: Shasta
Area: 508734.42 acres

Watershed Statistics

Naturally Occurring Waterways: 603 miles
Percentage of Free Flowing River Miles: 93 %
Percentage of River Miles in Protected Lands: 2 %
Protected Lands: 4 %
River Segments with complete Professional Judgement Assessments: 6
Number of Dams: 14
Number of Selected Watershed Projects:
Number of Stream Crossings: 399
Near-Stream Roads: 252.96 miles
Average Precipitation per Year: 25.71 inches
Percentage Area above 15% Slope: 21.15 %
Number of CalWater Units: 47
WBS Water Quality Index: 0.6267
Number of Special Status Species: 16
Number of Holland Communities: 39

Maps Available

Dynamic, Interactive Map Systems

- [ICEMAPS2](#) new
- [ICEMAPS](#)

Static, Pre-defined Maps

Additional Information from "AIM"

| County | Congressional District | State Assembly District |
|-----------------|------------------------|-------------------------|
| <u>Siskiyou</u> | <u>2</u> | <u>2</u> |
| <u>Trinity</u> | | |

Internet Resources

Dynamic River Basin Information

[USGS Gaging Stations](#)

[USGS Water Use Data for 1990](#)

[EPA Surf Your Watershed](#)

Web Sites of Interest

No Web Sites Available, Yet



Klamath Resource Information System

[Klamath Resource Information System](#)

[KRIS Shasta River Tour, General Introduction](#)

[KRIS Shasta River Tour, Fisheries Introduction](#)

[KRIS Shasta River Tour, Water Quality Introduction](#)

[KRIS Shasta River Tour, Geology Introduction](#)

[KRIS Shasta River Tour, Hydrology](#)

[KRIS Shasta River Tour, Economy](#)

[KRIS Shasta River Tour, Restoration Introduction](#)

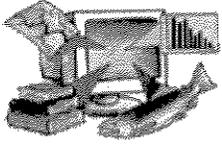
[Water Quality Conditions, Shasta River](#)

[Shasta/Klamath Rivers Water Quality Study](#)

[Siskiyou County 1995 Annual Crop and Livestock Report](#)

[KRIS Bibliography, Shasta River Sub-basin](#)



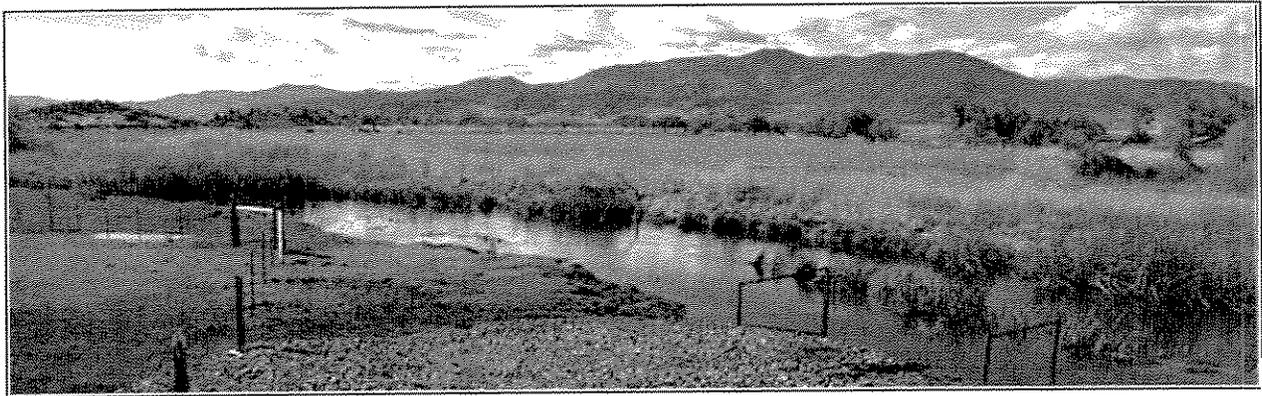


KRIS Shasta River Tour

Water Quality Introduction

Water Quality Overview

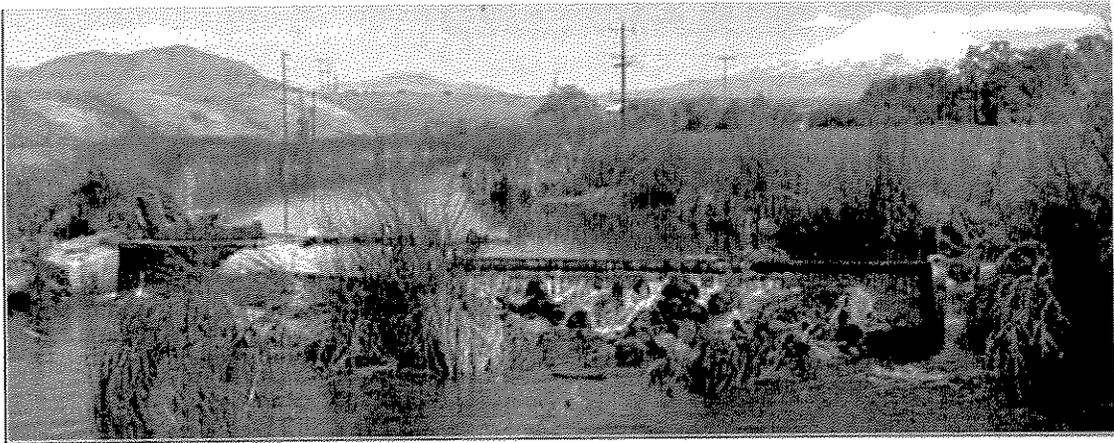
The Shasta River is fed by cold streams that drain rain and snowmelt from the Klamath Mountains, to the west of the valley. The Cascade Range, on the east side of the watershed, also pipes cold water to the river all year via underground channels. Much of the water from upper Shasta River and Parks Creek is now captured behind Dwinell Dam, in Lake Shastina. Flow depletion in the river below the dam compounds water quality problems in the Shasta River.



The river moves slowly over the flat, dry Shasta Valley floor. Ranchers are fencing riparian zones to allow trees to grow and shade the river. The Klamath Mountains are in the background.

The main water quality problems in the Shasta River are high water temperatures and periodically depressed oxygen levels. Both are affected by flows in the river. The mid-part of the river is low gradient, and it moves slowly across the open, hot valley floor. Unrestricted grazing in riparian zones has led to a decrease in streamside trees and the cool shade they provide.

Agricultural water, which is diverted from the river or pumped from the ground, is often very warm when it flows back into the river. Runoff water may be rich in organic matter, which can raise nitrogen and phosphorus levels in parts of the river.



Diversion dams slow the river's flow, allowing algae to grow in the nutrient enriched water. Bacteria that feed on dead organic matter can deplete oxygen levels, and exposure to the sun warms the water.

Diversion dams slow the river's flow, which allows the water to warm up in the heat of summer. The dams also create a pond-like environment, rich in nutrients, where algae bloom in abundance. In the daytime as the algae release oxygen through photosynthesis the water may become super-saturated with oxygen. At night, photosynthesis stops but respiration continues. The algae now use the oxygen, leaving little for the fish.

From the KRIS bibliography

For more information about water quality in the Shasta River:

Investigation of Water Quality Conditions in the Shasta River, Siskiyou County. California Regional Water Quality Control Board. September 1993.

Shasta/Klamath Rivers Water Quality Study. Department of Water Resources, Northwest District. February 1986.

Shasta River Guided Tour

Contents

Water Quality Topics:

Introduction

Water Temperature

Dissolved Oxygen

Other Topics:

Guided Tour Introduction

Fisheries

Geology

Hydrology

Economy

Restoration



KRIS Klamath Resource Information System



Shasta River Basin
California Rivers Assessment