Final report

Shasta River CRMP Coordinator, FY 1998

Cooperative Agreement #14-48-11333-97-J029
98-PC-03

Great Northern Corp.

December, 1999

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Abstract:

The Shasta CRMP has been engaged in fisheries habitat restoration work since 1991. 1998 included community outreach, assessment and repair of flood damage, ongoing meetings with landowners, work with developers of the KRIS program, pulsed flows, fish screen fabrication and testing, and the preparation and oversight of restoration projects.

In addition processes for acquisition of Conservation Easements by USFWS were started.

Introduction

The Shasta River Coordinated Resources Management and Planning group (CRMP) was started in mid-1991, through the combined efforts of several members of the ranching community, the Siskiyou RCD, and the Soil Conservation Service. At that time there was no similar organization in Siskiyou County, and the prospect of developing a good working relationship amongst the various landowners and agencies seemed unlikely.

Given the magnitude of the task undertaken—to restore the productivity of the Shasta, while maintaining a healthy local agricultural economy—it was clear that efforts beyond what a volunteer group was capable of were required. Recognizing this, the Klamath River Basin Fishery Task Force provided funding in FY 1992 for a part time Projects Coordinator to assist the CRMP in progressing from discussion, self-education and planning to project implementation, grant funding and community outreach.

That funding has been renewed at varying levels in FY 1993, 1995, 1996, 1997, 1998 and 1999.

Description of Study Area:

The Shasta River and its major tributaries total approximately 110 miles in length, and drain an area of approximately 800 square miles. It flows almost entirely through relatively small parcels of private ranch land. To be effective, any activity aimed at improving water quality for fish or human needs must be done with the active help and participation of a large number of individual owners whose needs, desires and financial conditions vary greatly.

Each of these ranchers has long-standing cultural practices, many of which depend on the river, including irrigation of pasture and hay fields, and grazing of riparian areas. All of these activities can have a substantial impact on water quantity and quality.

Historically the Shasta River was an important spawning and rearing area for Chinook and Coho Salmon, and Steelhead. Records of Fall Chinook spawners kept since the 1930's show a long decline, from over 80,000 in 1931 to as few as 530 in 1992. Steelhead and Coho are likewise no longer present in significant numbers, although actual counts are not available.

Over the last ten years there has been an extensive program of water testing in the Shasta. Results indicate significant problems for cold water fish resulting from high water temperatures and low levels of dissolved oxygen. Additional fieldwork indicates severe problems of fine sedimentation. Other observed but less well documented problems include: blockage of coarse sediment by dams, groundwater withdrawals capable of affecting surface flows, high nutrient levels and consequent turbidity caused by free-floating algae.

The Shasta CRMP has developed a variety of responses to these problems.

In the long run, it is essential to restore the functioning of the riparian zone. We are approaching this through a program of fencing to create non-grazed buffer strips the length of the river. We have replanted those protected areas with native riparian trees, which should both provide shade to help maintain lower water temperatures, and also reduce sedimentation from eroding banks. In addition, we are maximizing the longevity of the existing large trees along the river by wrapping them with 2" x 4" fencing to minimize losses to beavers.

We are also working on measures to capture and re-use irrigation tailwater, in order to reduce thermal and nutrient loading, and/or reduce water withdrawals from the river.

We also have ongoing programs including field projects with students, public presentations, newsletters, public meetings, and cooperative efforts with local organizations involved with farming and ranching.

This complex and varied program to reverse the fishery and water quality trends in the Shasta is all being done in the context of voluntary cooperation.

Methods and materials

Verbal and written communications were used throughout this project, as described in the contract: "The CRMP method of cooperation, education and planning will be used...". Materials utilized included paper and ink, binders, photographic film, photographic print paper, floppy disks, jaz disks, computer software (including MS Word, Excel, ArcView, Windows 95, and others), photocopies, telephones, and automobiles,

Results and discussion of accomplishments during project

Work completed in 1998:

Task 1—continue landowner contacts:

Throughout the 12-month period covered by this grant, contacts with landowners were maintained in a variety of ways, including newsletters and meeting agendas, which were mailed to all landowners bordering the Shasta or its tributaries, along with other interested parties, providing basic information on meetings, topics under discussion, and projects worked on. In addition, by the

end of the year, the mailing list was expanded to include members of all the irrigation districts, there-by effectively including all surface water users.

We maintained operation of Shasta telephone accessible river monitoring station (530-459-0416) for use by landowners in Shasta Valley and other interested parties.

Direct contact was concentrated on those individuals most interested in developing actual projects aimed at river improvements. Some of those projects will be discussed below.

Additional contacts with other landowners were made via telephone, individual letters and direct contact.

Task 2--Prepare work plans and secure funding for future restoration work:

Grant proposals were prepared for a variety of projects, including:

Klamath River Task Force:
- CRMP Coordinator
- Flow/temperature Model for Shasta River
- Reimbursement for direct costs of Pulsed Flows
- Weather Station
- Fiock Pump costs

Cal DFG
- CRMP Coordinator
- Salmon Outmigrant monitoring
- Willow matting bank stabilization on Kuck, Fiock, and Rice Properties.
- Aquatic invertebrate monitoring of water quality.
- Watershed Plan Update
- Pasture rental in Riparian zones for Meamber and Kuck Ranches
- Flood damage repair
- Gravel Budget development
- Fiock Pump costs

Ecosystem Restoration Office
- Generic riparian exclusion fences

319-H
- Omnibus proposal including fencing, bio-engineered bank protection, tailwater re-use, KRIS support, education

NMFS
- Costs associated with permanent removal of Fiock Dam.

Of these, funding was secured for CRMP coordinator, pulsed flows, 319(h) water quality related work, Fiock dam removal, Willow matting on Kuck and Fiock properties, and the weather station.

Task 3--Provide oversight of current year's work:

Project layout in the field, ongoing field inspections, final inspections and photo-point monitoring were all done via this funding. Projects included work on the Fiock, Dutra, Meamber and Rice Ranches (see attached map titled "Exclusion fence related field sites").

Task 4--Continue to support and use KRIS:

Many hours were dedicated to ongoing fine-tuning and troubleshooting the KRIS data, layouts and presentations with the KRIS developers. Beta versions of KRIS Maps were tested and written reports of findings produced (see attached report titled "Corrections to Shasta River Portion of KRIS").

Assistance was provided to two RCD employees in succession so they would be able to utilize the information in the KRIS computer residing in their office.

Monitoring data from the CRMP, DFG, and the schools was assembled and forwarded to the KRIS developers, along with photos. Existing photo captions were edited, and new captions created.

Task 5--Document projects and progress:

The bulk of this documentation came in the form of extensive photographic records of work in progress, and before and after shots of project sites. Other documentation came in the form of temperature data, and stream cross section profiles, GIS type mapping, and project related reports.

Task 6--Provide notification of CRMP meetings, report to the CRMP working group at each meeting: this was done., as were updates to CRMP members at each meeting. CRMP meetings were held on 1/27, 2/18, 4/15, 8/12, 11/19, and 12/9

Task 7--CRMP employee met regularly with delegated TWG members to begin process of watershed plan review and improvement; involved Task Force in an ongoing discussion of the relative importance of format vs. content, ultimately agreeing that content should prevail.

This strategic planning process continued into the next year and beyond, although slowed by the quarterly meeting schedule of the TWG.

Task 8--Coordinate with other restoration efforts:

The Shasta CRMP Coordinator met, shared data and techniques, and engaged in planing with other sub-basin coordinators, agencies, tribes, the Task Force, Technical Work Group of the Task Force and the Klamath Fisheries Management Council. This occurred throughout the year.

In a related effort, the CRMP dedicates substantial time to providing written and verbal information and giving field tours to the contractor performing the 10-year review of the restoration program.

In addition to the regular public CRMP meetings, a special public meeting was held with Dee Sweringon as speaker, describing the decision path taken by the Anderson-Cottonwood Irrigation District, and their experiences living with the endangered Species Act and Winter Run Chinook in

the Sacramento River. This was to try to help defuse the fears generated by the coho listing, and included participation of persons from other watersheds.

Specific Work Products:

1. Arcview map showing restoration locations in the Shasta Valley--see sample map attached entitled "Shasta Valley Restoration Projects".

2. CRMP Newsletter: Six newsletters were produced in 1998.

3. Digital data for KRIS--described above, including temperature data and photographs, provided directly to the KRIS contractors.

4. Contacts were made and arrangements begun to construct livestock exclusion fences on the Rice, Meamber and Dutra ranches. Fences were built on the Fiock Ranch. See attached map titled "Exclusion fence related field sites".

5. Proposals to various grant-funding agencies--

Cal DFG
- CRMP Coordinator
- Salmon Outmigrant monitoring
- Willow matting bank stabilization on Kuck, Fiock, and Rice Properties.
- Aquatic invertebrate monitoring of water quality.
- Watershed Plan Update
- Pasture rental in riparian zones for Meamber and Kuck Ranches
- Flood damage repair
- Gravel budget development
- Fiock pump costs

Ecosystem Restoration Office
- Generic riparian exclusion fences

NMFS
- Costs associated with permanent removal of Fiock Dam.

DWR
- Salmon Outmigrant monitoring

6. Quarterly and final Reports: This report will be the final report produced under this grant.

Over the course of the year, 780 hours of volunteer hours is easily documented, valued at $15,530 See attached summary. Much more volunteer time cannot be readily documented.

This concludes the narrowly defined products of this grant. The more important results of this funding often cannot be predicted in advance, and sufficient flexibility was included in the funding request to allow responding to needs and opportunities as they arose. Some of the highlights of the year included:

1. Ongoing participation in a what became a failed process by Klamath Fisheries Management Council to either discern causes or take appropriate actions to address issues addressed in differential Harvest report provided to them by the Shasta CRMP in 1997. That report was included in our 1997 final report.

2. Continued testing (one test per year) of prototype tube screen and baffle system for use on the Meamber ranch and ultimately elsewhere. That process will be completed in 2000.

3. Participation in both private and public meetings with NMFS regarding the listing of coho under the ESA, and the subsequent proposals for critical habitat. Coho and critical habitat issues consumed a great deal of time. Focus of efforts were to allow very strong local opinions to be voiced without undermining the overall restoration process. CRMP comments made are attached, see letter of March 30, 1998 to NMFS.

4. Work with DFG to make modifications to the DFG counting weir on the Shasta to improve its efficiency while reducing adverse impacts to salmon. This included conversion to using video cameras for 85% of the counting, greatly reducing fish handling and resultant stress.

5. Initiate process to address TMDL needs in the Shasta in advance of court mandated deadline.

6. Continued reproduction and distribution of CRMP Watershed Restoration Plan, along with working with TWG sub-committee on improvements to plan.

7. Meetings with various groups including Cattlemen's Assoc., KARE, Scott CRMP, Siskiyou County, Rotary, State Water Resources Control Board, NMFS, and RWQCB.

8. Produce article on Pulsed Flow Program for State-wide RCD Newsletter. Article attached--see article titled "Cooperative Efforts Can Go a Long Way".

9. Travel to Red Bluff to inspect and discuss portable fish screen options with Cal Crawford, DFG.

10. Do short study of possible stratification of cold water at Shasta Water Association Dam to determine whether benefits would be gained by a bottom release. Results showed no stratification. Verbal report with data made to SWA board.

11. Participate in planning, budget development and training for work associated with Hardy Flow Study on Klamath River and Tribs.

12 Measure irrigation tailwater return volumes on one ranch prepatory to developing remedial measures.

13 Collect, copy and send historic Shasta River data to Tom Hardy as requested relative to the flow study.

14. Assemble and provide support to local review team to interview Dr. Hardy's references as necessary first step in endorsing project in Shasta sub-basin. Write summary for CRMP of findings. See attached: "Report on interviews with references of Dr Hardy".

15. Begin process of developing a prototype Conservation Reserve Enhancement Program to be added to ASCS/NRCS funded activities. Provide bulk of support for ongoing effort.

10. Meet with James Koch to de-brief him on Riparian Nursery Practices prior to his leaving for another job. Arrange for a volunteer to write summary. Summary attached; see: "Managing a Nursery of Woody Riparian Perennials".

11. Re-program telephone accessible monitoring station to include measurements of solar intensity; add solar panel to keep batteries charged.

12. Collect for later analysis aquatic invertebrate samples from 5 key locations in Shasta Valley, to be used for comparisons of water quality trends using similar historic data.

13. On a larger scale, in working with the owner of the Meamber Ranch, we discovered that there was no mechanism available for the creation of conservation easements. Calif. DFG made the topic basically unapproachable, NRCS could only establish conservation easements if they were adjacent to existing conservation easements, of which there were none, so nothing could start, and USFWS didn't have the Shasta valley classified as an area where acquisition of easements was allowed.

Even though the landowner wanted to seriously investigate the permanent creation of conservation easements on both the Shasta River and the Oregon Slough, that proved impossible, so 10-year livestock exclusion fences were planned instead. Meanwhile, the USFWS now apprised of the situation, began the process to allow the acquisition of easements and land.

Summary and Conclusions

Successful performance of this job continues to require a large array of skills, along with creativity and flexibility. Success often cannot be directly measured, especially in the short run. The protection and restoration of natural systems can only be realistically viewed as a process which will never be "done".

Often times outside events (as the listing of an endangered species) can create a temporary setback, as people draw in and resist the changes likely to result. Over time an acclimatization process occurs, and restoration progress can continue.

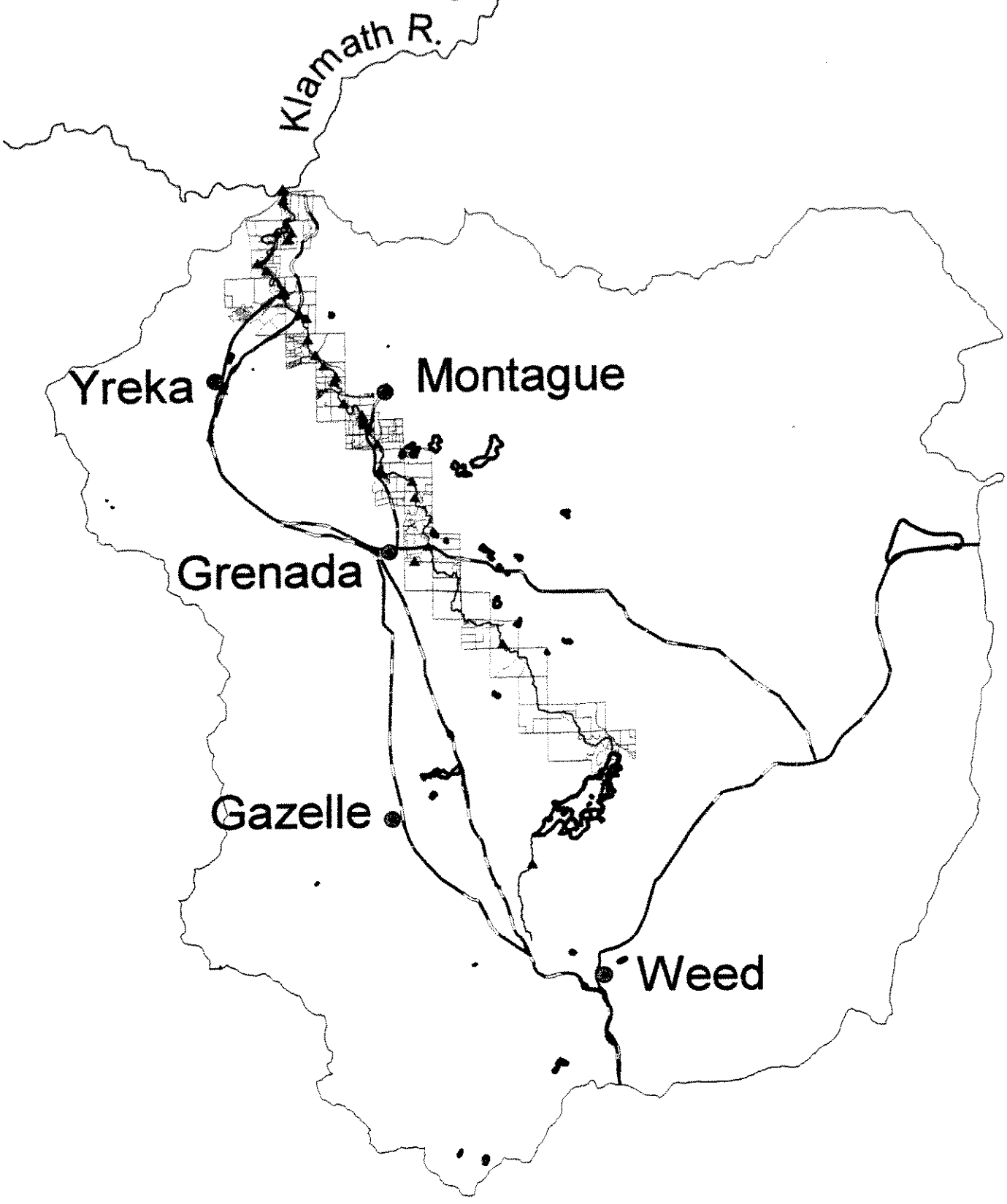
1988 was a year in which people in the Shasta Valley and elsewhere felt a need to draw in and see what was going to happen. In that environment, merely continuing to function should be viewed as a successful year. We were able to go far beyond that, as the record of tasks accomplished shows.

Summary of Expenditures:

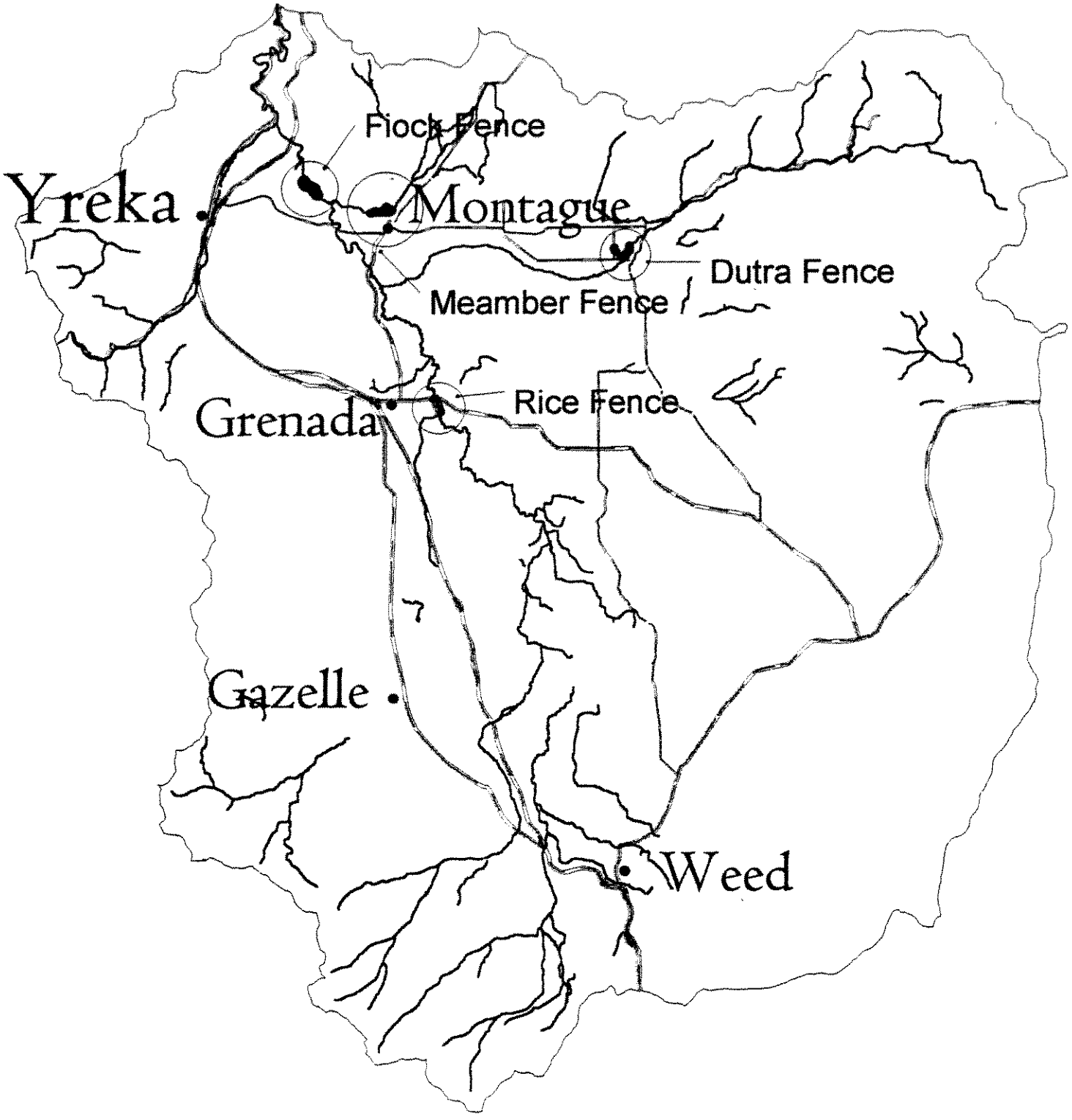
Salaries(incl benefits)	$22,505
Expendable Equip/Mtrls	$ 6,400
G/A Ext	$ 4,086
Total	$32,991
Matching funds: Operations & Maint	$ 3,180
Total Project Cost	$36,171

Appended Information

Shasta Valley Restoration Projects



Exclusion fence related field sites



Restoration related volunteer hours:

CRMP meetings: 1/27: 10 people, 4/98 24 people, 12/9--14 people 11/19/98--10 people all 3 hours missing 2 meetings--assume 12 people, 3 hours each. Total 82 people times 3 = 246 person hours valued at $20/hr = $4920

DWR meeting 11/17--15 people, 3 hours = 45 person hours at $20/hr. = $900

KFMC meetings:--300 miles, 16 person hours, plus $90 cash = $400

Koch nursery Don Flickinger--6-hrs interview, 16 hours write. 22 person hours at $25/hr = $550

Aquatic inverts--Dave LaPlante-- 8 hours @ $20/hr = $160

CREP meeting--10 people, 1 meeting, 3 hours 30 person hours @ $20/hr = $600

Fish screen work--20 hours @ $35/hr = $700

Adjust Meamber xs levels--Velarde 4 hrs. @ $25/hr = $100

NMFS meetings--15 people, 3 meetings, 3 hours each=135 person hours @ $20/hr = $2700

Stream Cross sections--Velarde--8 students, 4 hours. O'Connor 6 students 8 hours. = 80 person hours @ $5/hr = $400 plus two teachers @ $25/hr = $200

Jim Cook--1 hr per wk=52 person hours @ $ 25/hr = $1300

Dave Webb 2 hours/wk =104 person hours @ $25/hr = $2600

Total volunteer contribution easily accounted for: $15,530

Corrections to Shasta River Portion of KRIS

1. Topic: Adult migration vs temperature--I believe that existing data indicates that the fall run in the Shasta started in late August. Call me for verification if you want to change it.

The photo associated with this topic has no relationship to it. The photo is of the confluence of Parks Creek with the Shasta, along with one small spring creek. The Louie Road Bridge is barely visible in the upper right corner.

In info links, many years data is listed as preliminary. I believe Pisano and Chesney may have finished going over hard copies of field data sheets, and have probably arrived at the best available number.

2. Chinook Populations 1930-1996--Problem with text describing the two colors used in graph--words unintelligible. Photo--i256 is of the Meamber fence, probably following the high water of 1995. It has nothing to do with the topic as far as I know. Source table goes to 1978-1996; chart table goes to 1930-1996. It looks like the chart table and the source table should be the same (ie as is shown as chart table) This table has a lot of data in it. Any chance of re-naming the columns to something that would be more understandable to most people?

3. Chinook/Wk, 88-92--use of Julian Week is useless to most people. Try to convert to calendar day or week. Picture is of relatively non-descript stretch of Shasta Canyon, and is rather dark. It either is in the wrong place, or needs some caption to explain it, and should be lightened up.

4. **Chinook/Wk, 93/96**--More understandable than 88-92 coverage, but duplicates it. Should it be consolidated? Same comment on Julian Week Same comments on picture as above. Attempting to go to source table repeatedly caused general protection fault and crashed system. System crashed when trying to move up page to find data that should have been there but wasn't visible. Once crashed, warm boot would close KRIS, but trying to re-open KRIS would disable the mouse.

5. Same problems appear to exist on Chinook/wk 94/95.

6. Coho at Shasta Racks 1930-96--Photo i256.jpeg is the Don Meamber Fence upstream of the Montague Grenada Rd, probably following the high water of 1995. Source Table looks like it will also crash system, so I didn't try.

7. Juv Chin vs Flow 81--photo img0026.tif is of the confluence of Parks Creek and the Shasta River described above. Text box below source table stops in mid sentence. Heading on source table has temperature mis-spelled. Source table looks like attempting to move on it will again crash system.

8. **Juv Chin vs temp 81**--same picture as above. Doesn't belong here. Source table looks like it will crash system, chart table looks like it should be source table.

9. **Juv Chin vs Thyroxin**--same problem with picture, source and chart tables. No explanation of what thyroxin is.

10. Juv chin migrants 81-88--photo used (imgsh269.tif)is of high school students trapping fish for first pulsed flow in 1993. Also, students pictured are probably not from Discovery High School. Probably should call them High School Students from Yreka. Same problems with source and chart tables.

11. Juv chin migrants86,87,89--Light blue color on chart doesn't work well. Try red. Photo is same one of Don Meamber's fence in 1996. Source table looks like it will crash system. Chart table looks like source table.

12. Steelhead 1930-96--Same picture as above. Should probably be picture of shasta Racks. Same problem with source and chart tables.

13. Flow 1934-93. Photo (sh287)is of Ordway Ranch, showing gravel upstream of Dwinnell Dam. The Flow treatment is difficult to use. It seems like creating a box where a person could enter either water year(s) or calendar year(s) would be better than having to scroll through 70 years data.. If a box with water year is used, then water year should be explained.

14. April-Oct mean flow, 1989--same picture as above.

15. Aug Mean Daily34-89--same photo as above.

16. Flow, Av Daily, May 89--same photo as above.

17. No. Of days <40cfs--This treatment needs to be re-worked. It could show some interesting flow relationships, but doesn't because it covers too broad a time period. Re-do it showing the number of days in April, May and June (critical temperature,predation,rearing, outmigration period). Graph each month separately for each year. Try to show 1934-present on one page. X axis should be 1934-present, y axis should be zero to 35. Many years will have no entries for April and may, some will have no entries for June either. Others will have flows impaired for all three months. Same problems with photo as above.

18. Flow comparisons 1974, 83,...--Source table should probably be eliminated, and chart table made source table, with new chart table?

19 Tour--BLM--Attempting to move the slider on the source table crashes the system. I assume this will be the case with all tour photos, and I will not mention it again on them.

20. Tour--Marion Ranch--No photos.

21. Tour--Parker Ranch--Change text top read that I-5 goes through the center of the project. Also, Terry has since sold part or all of his property. It may be better to just call it the Parker Project, although the new owners are probably going to stick.

22. WQ--CRMP conductivity95--One photo is of Shasta Racks about 1995 or 6, other photo is of Ordway Ranch showing fence and gravel. This might be an appropriate place to mention the

monitoring station and its phone number (530-459-0416) I am thinking of removing it for the winter months, and having it active March through November. That way it won't be flooded out.

23. WQ--CRMP conductivity96--same comments as above.

24. **WQ--CRMP conductivity Max/Av 96**--same comments as above.

25.WQ-DO max/av at seven locations--Grenada is mis-spelled in the text box below the chart.l Also Anderson Grade. Ager/Beswick road should be the Yreka-Ager Rd. Photos need to be completely re-worked. Photos 1 and 2 are from the Ekstrom Ranch, Photo 3 is apparently from some other drainage, probably the Scott, Photo 4 is of the Shasta Racks, Photo 7 is Ordway, and photo 8 is taken at the Montague-Grenada Rd Bridge, but is the one described above showing the fence. There ought to be a better one showing the site.

27. WQ DO Nocturnal/Diurnal--Photos are of Webb Planting and Ekstrom fence.

28. WQ DO at 4 locations--Anderson Grade Rd misspelled in text box under chart. Picture is of Shasta Racks.

29. WQ Temp at 10 sites--Info Links--CRMP organized pulsed flows started in 1993. Anderson Grade Rd misspelled. Ager-Beswick Rd should read Yreka Ager Rd.

30. WQ Temp Av/max @CRMP station--colors on chart do not match text below x axis. Photo is of Ekstrom Ranch. CRMP station should be described as being located at the Montague-Grenada Road Crossing (RM15.71). Info Links: ERROR--Parks Creek, Big Springs Creek, and in many years Little Shasta River all flow year around, although at a much reduced rate than if water were not being removed. That does not mean that stretches of both Parks Creek and Little Shasta are not de watered completely.

31. WQ temp max/av at 7 locations--see above comment about which streams flow year around.

32. WQ at 263--photo is of Ekstrom Ranch.

33. WQ TEMP Max at 3 stations--color of lines does not match text below x axis. I suspect that there is an error in the data, and that the hobo may have been out of the water at the Anderson Grade Rd. You should check with Whelan. The peak temperature occurred later at Anderson Grade than at the other two locations, suggesting that something is amiss.

34. WQ temp max at 10 stations in 1995--same comments as above.

35. WQ Temp max at 4 sites in 1996--Photo is of Ekstrom Ranch.

36. WQ Total Dissolved Solids at 7 stations--Text box below chart has same problems with Anderson Grade and Ager-Beswick Rd. Photo 1 is of Shasta Racks, and Photo 2 will not come up.

Note: The comments below refer to the tour accisible from the Area/Topics page, which appears to be a remnant of an early effort at putting together a tour. It should probably be scrapped, and the radio button tied to the other tour which is part of the KRIS introductory page and the web site.

37. Shasta Tour: At bottom of page, there are a number of inapropriate links, apparently left over from constructing the page. Most of the other links don't work. The Kamath Basin Map doesn't do justice to the rest of your efforts. Does HSU have a color map of the basin? The roster of KRBFTF members is out of date. Chapter 1 of Long Range Plan doesn't come up when you click on its link.

Fish life cycle doesn't ahve any way to get out and back to the main screen to look at other topics.

Water Temperature section of tour has no chart as described.

Graph of days per year less than 40cfs should be changed as described above in item 17.

In the Agriculture part of economy/community section, the picture of cows has no text, and the cows look half starved. You should get another photo of cows. Tourism has no picture, and Forestry has a picture of a tree but no text.

The links to the TOC and Home pages at the bottom of the Bibliography don't work.
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ON the KRIS intorductory Shasta River Tout, the text is on top of the photo on the part describing Big Springs.

On the monitoring section of the Shasta Tour, the Shasta Crmp is not correctly identified. The Correct name is the Shasta River Coordinated ResourcesManagement and Planning group

On the water use section, the description of the pulsed flow needs to be corrected. We started in 1993; the duration is generally 2 days, two times per summer, usually in May and June.

The dam that was replaced with a pump **was not** the Grenada Irrigation District Dam. It belonged to the Fiock Ranch, owned at the time by Everett Fiock (since deceased), and now owned by his wife and two sons. The first pump installed was loaned by the DFG. The Task Force provided funds to purchase a better, more permanent pump (yet to be purchased or installed).

Cooperative Efforts Can Go A Long Way!

The Shasta River Coordinated Resources Management and Planning group (CRMP) has been working on improving conditions for salmon in the Shasta River since 1991. One of their more remarkable accomplishments has been their program of "Unimpaired Flows" designed to stimulate salmon outmigration before water temperatures in the Shasta River become lethal.

In the early 1990's, Fall Chinook numbers in the Shasta River dropped to as low as 530 fish returning from the ocean to spawn. This is in comparison to the 1930's, when the numbers had been over 80,000. Concerns about the imminent loss of the entire run prompted the Shasta Valley RCD to mobilize key landowners to form a pro-active sub-committee (the Shasta CRMP) to work specifically on that issue. The initial group consisted of representatives from the ranching and farming community, irrigation districts, along with key state and federal agencies. Their goal was to protect the existing agricultural uses of the Shasta Valley by restoring the salmon and steelhead runs in the Shasta River.

In 1992, fieldworkers of the DFG and CRMP, while floating the river, noted hundreds of small salmon jumping over many miles of the Shasta River. This feeding activity continued for many weeks, until several hot, clear days drove river temperatures above 77 degrees Fahrenheit. Suddenly there were no salmon to be found anywhere.

Recognizing that a significant amount of salmon production was being lost when river temperatures reached lethal levels, the CRMP group began wide-ranging discussions of what might be done. Out of those discussions came the suggestion by long time rancher Norman Fiock that "...if everyone on the river could just quit irrigating for a few days, and pull out their flashboard dams, a lot of those fish would find their way downstream..." into the cooler Klamath River.

Out of that suggestion was developed the program of unimpaired flows—two periods of two days each when everyone using irrigation water from the Shasta River shuts down their pumps, removes the flashboards from their dams, and lets the river run "unimpaired" long enough for any salmon interested in leaving to find their way downstream.

Starting in 1993, and every year since then, the Shasta CRMP Coordinator, assisted by personnel from the DFG, contacts each of three irrigation district boards, along with numerous individual and group irrigators, to ask their assistance and voluntary cooperation in the effort.

We really weren't sure what would happen that first year" (1993) says Dave Webb, CRMP Coordinator, "There were dire warnings of flooding, houses washing away, and things like that, but we knew there wasn't nearly that much water available. The river itself is only 25-30 feet wide, and the five flashboard dams are less than 6 feet high. We just pulled the boards out slowly, starting at the upstream end, and built a long pulse, rather than trying to make a wall of water."

As it turned out, that was enough. When the salmon that left that spring returned as three-year-old adults, there were over 10,000, from a parent run of only 530 in the fall of 1992.

Since then the process has been repeated each year, starting with making the rounds asking for voluntary participation, then watching and waiting for the right times. Says Webb "some years, you go through all the effort to get everything set up, then it turns out like this year, when the river is so high that its out of its banks at the end of May, and the water is still cool. If it looks like doing an unimpaired flow won't make any difference, we just cancel it and thank everyone for being willing. Then I tell them I'll be back next year".

"This was one of those things that everyone said couldn't be done." Says Webb " We decided to try anyway, and kind of surprised ourselves. As far as I know, the only thing similar is being where there are huge, federally regulated dams. They can turn out a lot of water without anyone missing it. Here, everyone shuts down at a time when they need to irrigate the most."

Program Information:

The Shasta River CRMP Coordinator has been funded through a series of half-time grants from the US Fish and Wildlife Service through the Klamath River Basin Fishery Task Force. He can be reached at (530) 926-2460.

Shasta River CRMP
P.O. Box 459
Montague, CA 96064

National Marine Fisheries Service,
Protected Resources Division
525 NE Oregon St., Suite 500
Portland, OR 97232-2737

March 30, 1998

National Marine Fisheries Service:

The Shasta River Coordinated Resource Management Plan committee (CRMP) is a group of all landowners in the Shasta Valley, along with representatives of the California Department of Fish and Game, Natural Resources Conservation Service, Bureau of Land Management, and the Klamath River Basin Fishery Task Force. As a group, we are committed to helping landowners voluntarily take actions that will result in increased survival of anadromous fish in the Shasta River, while sustaining agricultural uses of the land. We have attached a list of projects to date on the 40 miles of river accessible to anadromous fish.

This letter is in response to the NMFS' Designated Critical Habitat: Central California Coast and Southern Oregon Coast/Northern California Coast Coho Salmon, as published in the Federal Register/Vol.62, No. 227/Tuesday, November 25, 1997.

In your analysis, you state that the economic impact of designating the critical habitat is insignificant over the range of the Coho salmon because there are no specific regulations regarding land management practices outside of already existing laws, statutes and federal policy. While this may meet the absolute minimum requirements of the law in terms of financial impact analysis, it has not proven to be adequate locally to meet the spirit of the law.

Many of those existing laws, statutes and policies are not currently being met, and are often part of a ramping process of bringing people into gradual compliance. The designation of critical habitat has served to focus concerns that that ramping process will no longer be acceptable, and we will instead be faced ESA generated demands of instant compliance. Since your success (and ours) depends on the informed and willing participation of a number of individual landowners, from our perspective a full discussion of the total costs of actual compliance is an essential part of this process, if success is a goal. That has not been done, but clearly needs to be done.

In conjunction with the above, there seems to be room to question whether critical habitat considerations will in fact involve only federal actions. Ultimately, recovery plans will have to be developed for each watershed, and presumably be approved by NMFS. If the described

habitat protections are deemed to be critical for federal actions, one has to assume that they will likewise be deemed critical for private actions, albeit via different mechanisms. As such, the current critical habitat designation will probably serve as a defacto model for protective measures on private land. In recognition of this, we have worked with Siskiyou County to develop an initial estimate of the probable costs of full protection of a 300 foot zone on each side of the Shasta River, and would like to incorporate that portion of their comments dealing with the Shasta Valley by reference into our own.

Finally, we find it incomprehensible that no areas in the ocean are designated as critical habitat. Our very clear observation has been that on a year-to-year basis, conditions in the ocean are far more critical to the health and survival of anadromous fish, than are conditions inland, which are more long-term in nature. Since the majority of mortality, growth and lifespan of these fish occurs in the ocean, and since we don't apparently have a clear idea what all the factors responsible for their declines are, it is imperative that the ocean be included in the mix.

Please respond to the Shasta River CRMP with the following information:

- 1) Exactly how will the designated habitat be measured and located on the ground, since location of river-center, bank and riparian areas are subject to change?
- 2) What criteria were used to make the determination that 300 feet is indeed critical habitat? We would like you to consider site-specific conditions such as slope, stability, past and current land uses, erosiveness of the soil, and vegetation-type rather than a broad definition that may be excessive in some places (i.e., not actually critical).
- 3) What quantifiable criteria was used for determining the status of the Coho salmon for listing and what criteria (quantifiable) will be used to determine that the species has recovered enough for de-listing in the Shasta River?
- 4) Why is no habitat in the ocean critical for Coho?
- 5) What water and/or habitat conditions in the Shasta River or its tributaries will trigger further regulation within the designated critical habitat in the Shasta Valley?
- 6) What new land management requirements would regulate landowners in the Shasta Valley, should any of these conditions exist?
- 7) What is the process for proposal, public comment, and implementation of new regulations for private landowners where habitat conditions are found to be out of compliance with the requirements of the ESA?
- 8) The Shasta CRMP submitted three copies of its current watershed plan to three offices of NMFS in California several months ago. We have gotten no acknowledgement of their receipt, nor do we know who will be reviewing them. When will we receive a preliminary response? Who will be assigned to act as a liaison in the Shasta Valley?

Sincerely,

Blair Hart
President, Shasta River CRMP

Report on interviews with references of Dr. Hardy

On December 2, Pete Scala, Richard Peters, Bruce Fiock, Ayn Perry and Dave Webb (along with Bill Peters for a part of the time) called four selected references form the list provided by Dr. Hardy.

Results:

1. Ron Thompson, Attorney and general manager of the Washington County Water Conservation District. Water district involved in reservoir operations, domestic drinking water, and irrigation water supply. Used Hardy for modeling studies for ESA issues involving riparian habitat, fish habitat, and IFIM.

Felt a land grant university based operation would be less likely to be biased, and would deliver sound science. Was definite that that was what he got from Dr. Hardy.

Worked with Hardy to develop a mitigation bank program to allow trading mitigation on one site for development on another.

Ultimately have become the authority on the biology of the Virgin River; maintain own data base of 30 years of studies relevant to basin. Have spent est $2 million over last 15 years on various studies.

Unqualified recommendation of Dr. Hardy.

2. Tom Birmingham--Water Rights Attorney. Normally represents water users of all sorts, including the City of Los Angeles. Felt Dr. Hardy was a leading authority on IFIM; felt that he did not bring a personal bias into his work--stuck to the facts as they presented themselves, good or bad.

Found him to be occasionally impatient with uninformed questions as expert witness, but mostly very credible and good at explaining complex topics. He had been helpful in reaching out-of-court settlements on water issues. Both sides tended to develop confidence in his opinion as sound science, not emotion of biased testimony.

Biggest problem was that he was very busy and occasionally difficult to contact.

Strongly recommended Dr. Hardy. Would not hesitate to use him himself in future.

3. Ken Winder--General manager of the Moon Lake Electrical Cooperative, which operates two reservoirs with small Hydroelectric generators. Had to go through re-licensing with FERC, including the re-opening of an already issued license with bypass requirements that made power generation uneconomical.

Hired Dr. Hardy to do studies of bypass flow requirements and affect on fish habitat. Hardy did an IFIM on the de-watered stretch of river, developed model, verified model by field capture of target fish. Results of studies accepted by all sides, license modified. Part of ongoing operations involved installation of multiple gauging stations to maintain long term flow data.

Involved all parties in model field verification--improved confidence in his findings.

Since then, the power company is proceeding on its own, meeting record keeping requirements of license, but not involved in further studies.

Found hardy to come in on time and below budgeted cost. All work was done professionally and in a timely fashion. Developed a reputation for fairness and honesty. Did not hesitate to recommend Hardy.

4. Mike Miner Manager, Weber River Basin Water Conservancy District. Operates 21 reservoirs on Weber and Ogden Rivers. Involved in both irrigation and domestic water, recreation, power generation. Worked with Dr. Hardy over 7 year period. Used fish habitat and flow models to assure maintenance of fish habitat and the meeting of downstream water rights. Monitored at 35 locations t develop models.

Part of ongoing effort to gather data in advance of absolute need; expected to be very useful in meeting EPA clean water regs in future.

Had some environmental group interest in basin, including Sierra Club, and fishing groups. Found it best to stay well ahead of problems, rather than fight.

Also unqualified recommendation of Hardy.

WATER BIRCH

Monitor birch trees frequently in October as their "cones" are drying and turning brown, but still attached to tree branches. Collect the "cones" before the first autumn storm knocks them from the trees. Good seed trees can be found along Parks, Edgewood, and Shasta creeks. Place these small seeds in paper bags and refrigerate them quickly, to prevent them from drying (they will rot in plastic bags). Keep the seeds cool and moist in storage. Pass the seeds through a mesh screen to remove their scales before planting them. Prepare flats of sterile soil mix or closely-spaced planting tubes. Using a pint jar like a salt-shaker, shake birch seeds over the flats or shake 4-5 birch seeds into each tube. Thin sprouts as needed later.

BIG LEAF MAPLE

By October or early November maple trees will be laden with ripe seeds. Collect these seeds before the first big autumn storm knocks the samaras from their branches. Avoid maples growing near box elders, as cross-fertilization occurs between these species. Use gloves during seed collection to avoid discomfort from barbs. Use masks when cleaning seeds. Four gallons of uncleaned seed yield 2 gallons of cleaned seed. Place cleaned seeds in bags and refrigerate.

In December remove 2/3 of the seeds from refrigeration and soak 24-48 hours in a 5-gallon bucket of water (save the other seeds for subsequent germination, if the first effort fails). Remove seeds from water and spread out on a flat surface so they are not soggy. Slightly moisten sterile soil mix and combine this with the seeds - 2 parts soil mix to 1 part seeds. Place this mix in sealed plastic bags and refrigerate. Maple seeds need to be stratified to approximately 40o F and remain moist to germinate. Germination success of about 60 percent is normal. Check the refrigerated bags in February and discard them if there is no germination activity...then stratify/germinate the remaining 1/3 of the seeds as described above. When germination is observed, tease out the seedlings and plant them in large, thin, plastic bags.

BOX ELDER

Box elder is not native to Siskiyou County, but grows well in riparian areas. Box elder seeds can be stratified using different methods: they can be soaked for 2 weeks in cold running water, then refrigerated for 1 month, then warmed up to 55o F for 1 month, then refrigerated for 1 month, then soaked for 24 hours at ambient temperature, then sown; OR seeds can be exposed to boiling water that is allowed to cool, then soaked in this water for 24 hours, then bagged and refrigerated, then soaked for 24 hours at ambient temperature, then sown.

WHITE OAK

Gather white oak acorns in October, whenever viable-looking acorns are encountered during any seed collection activity. Plant these acorns in milk carton-like waxed paper square "tubes" that are 2" long on each side, and without bottoms. Transplant established seedlings into 10" tall, biodegradable tubes to allow their roots growing space. Oaks require frequent post-germination watering, but not after establishment in the field.

(Jerry Mosier has planted oaks using 18" tall black plastic pots near Happy Camp. He should be contacted for comments about the success of this method.)

BLACK WALNUT

Black walnut is not native to Siskiyou County. This species can germinate and grow without much special care. Soak a gunny-sack full of walnuts in water for 1 week. Remove the walnuts with gloved hands from the fulsome liquid, and germinate in a manner similar to acorns.

BLACK COTTONWOOD & WILLOWS - USING CUTTINGS

From November until the end of January cut 5'- 6' long "whips" from cottonwood and willow stem material that is 12-24 months old. Tie the whips into large bundles. Place the proximal (lower) ends of these "whips" into creek water or into large garbage cans, the bottoms of which have been filled with water. In the plant processing laboratory, cut these whips into standard lengths of 18" and bundle them together - 10 to 20 stems per bundle.

Place the proximal ends of these stem bundles into sterile soil mix in plastic garbage cans that have drain holes in their bottoms. Place layers of soil with stem bundles inserted into them on top of each other in the garbage cans, forming a "layer cake" of soil mix with inserted stem bundles in them. Place these garbage cans on a greenhouse hotbed to keep the stem bundles from freezing during the winter months.

When all of the cuttings are stored in garbage cans and ready for planting, place 1 or 2 viable-looking cuttings in a 4 in^2 waxed paper "tube", and place 36 of these "tubes" in a rack on the greenhouse hotbed. Continue this until all cuttings have been planted in "tubes".

Move all the racks of cuttings off the greenhouse hotbed in April, and put seed-derived nursery stock on the hotbed in their place. Keep the greenhouse air cool to postpone the opening of vegetative buds along the cuttings, until all hard freezes have passed.

Grade sprouted cuttings by size occasionally, transplant fast-growing cuttings to larger "tubes" during dormant months when necessary, and outplant the cuttings along creeks 1 or 2 years after their establishment.

Willow cuttings are more hardy than black cottonwood cuttings. Cottonwood roots prefer well-drained soil media (e.g. perlite), and may require the application of rooting hormone. Also, cottonwoods do not tolerate transplantation well, so they should be left in their 10" tall biodegradable tubes until they are outplanted.

CHOKECHERRY

Chokecherries grow best from root cuttings. Chop viable root sections into 5 - 6 inch lengths and place in 2 gallon containers of sterile soil mix (experiments should be done to determine if shorter lengths of root can perform acceptably). Place these containers on the greenhouse hotbed, and occasionally inspect roots for vegetative growth.

To encourage the vegetative growth of root cuttings apply fish emulsion, followed by Osmokote 14-14-14 (time release gelatin-like pebbles) over a 4 month period.

QUESTIONS TO GUIDE FUTURE NURSERY EFFORTS

Do longer cuttings of sandbar willow (i.e. 4-5 ft long) survive and grow as well or better than the shorter cuttings currently being grown?

Can sandbar willow be propagated from root cuttings?

Can black cottonwood be propagated from seed?

PART II - SCHEDULE OF NURSERY ACTIVITIES

AUGUST

SEPTEMBER

Oregon ash seed collection (collect seeds after they dry naturally, in September or early October).

OCTOBER

Big leaf maple seed collection (collect seeds when trees are laden with many ripe samaras, before the first big autumn storm knocks them off their branches).

Water birch seed collection (collect seeds when the "cones" are brown and dried, but before the first big autumn storm knocks them off their branches).

White oak seed collection (gather these acorns when encountered, while collecting other seeds. Acorns can be germinated in 10" tubes as soon as is convenient.)

Black walnut seed collection (gather these seeds during mast years in late October or November).

NOVEMBER

Begin collecting whips for cuttings (start as early as Thanksgiving, if possible, and continue through January).

DECEMBER

White alder seed collection (collect seeds before Christmas from easily accessible "cones" that dry and release seeds after being stored indoors).

Hydrate big leaf maple seeds and then refrigerate them in bags of moistened, sterile soil mix.

Collect whips for cuttings.

JANUARY

Seeds of all species should be bagged and in refrigeration by the end of January.

Plant white alder seeds in tubes, as time permits, after the new year. Frequently water white alder seedlings.

Finish collecting whips for cuttings, begin planting the cuttings in square waxed paper "tubes", and place 36 "tubes" in each rack on the greenhouse hotbed.

FEBRUARY

Continue the planting of cuttings in square waxed paper "tubes", and place 36 "tubes" in each rack on the greenhouse hotbed.

Check bagged big leaf maple seeds for germination activity, tease them out, and transplant into plastic bags.

MARCH

Plant Oregon ash seeds in flats of sterile soil mix.

Finish planting cuttings in square waxed paper "tubes", and placing them in racks on the greenhouse hotbed.

APRIL

Move cuttings off nursery hotbed by April, and put seed-derived seedlings on the hotbed in their place.

MAY

JUNE and JULY

RESOURCES

PEOPLE

Tom Jobson, Calforest Nursery, Scott Valley (white alder)
Marla Knight, Salmon River Ranger District (grasses and perennials)
Dick Simmons, Shasta Wildlife Refuge (sandbar willow propagation)
Leslie Tift, Jefferson High School, Mt. Shasta, Siskiyou Co.
Dave Webb, Great Northern Corporation and the Shasta CRMP
Jim Whelan, California Division of Fish and Game, Yreka Office

COMPANIES

CCC Nursery (white alder propagation), Santa Rosa (707) 253-7783.
Forest Farm, OR
Skylark Nursery, (707) 539-1565.
Teufel Nursery, Inc. Portland, OR.
A Supply source for nursery soil conditioners (e.g. Sunshine Soil Mix in 4 cubic ft. bails for cuttings) and nursery equipment.
Ya-Ka-Ama, (707) 887-1586.
Yerba Buena, (415) 851-1668

BOOKS

Forest Trees of the Pacific Slope, by George B. Sudworth. Dover Publications.
Handbook on Propagation, from the Brooklyn Botanical Garden Record.
Secrets of Plant Propagation, Ch. 5 (Cuttings), by Louis Hill. Garden Way Publications.
Western Forestry Nursery Association, Native Plant Propagation, 1993 Proceedings.
USDA-FS Rocky Mtn Forest/Range Experiment Station, Ft. Collins, CO.

MANAGING A NURSERY OF WOODY PERENNIALS
A Review of James Koch's Plant Nursery Activities for the Yreka, CA Public Schools

PART I

Woody perennial species that have been successfully propagated in the plant nursery established by James Koch include: white alder, Oregon ash, water birch, box elder, big leaf maple, white oak, black walnut, arroyo willow, Jim Fitzgerald or stream willow, red willow, sandbar willow, black cottonwood, and chokecherry.

Sterile soil media is necessary to insure successful germination and growth of nursery stock. Investment in commercially available sterile potting soil protects nursery stock from fungal pathogens, such as Botritis sp.

WHITE ALDER

Collect white alder "cones" in December before Christmas vacation along Yreka Creek, and along Fairlane Road near the mobile home park. Four to 5 garbage bags of "cones" yield about 1 quart jar of tiny, cleaned seed. Break off the "cones" using gloves, store them indoors, and the seeds will fall from them as the dried "cones" are tapped. Place the seeds in paper bags while they are still moist and refrigerate ("cones" can also be refrigerated if there is enough space for them). After December 31, as time permits, shake seeds into tubes of sterile soil mix and water frequently, once or more each day (note: white alder seeds won't grow properly unless they are exposed to soil taken from beneath established white alders, or watered with a slurry derived from such white alder soil). If germinated seedlings dry out from infrequent watering, they usually recover with renewed watering.

(The CCC Nursery soaks collected white alder seeds for 24 hours, then plants them directly.)

OREGON ASH

Collect Oregon ash seeds in September through early October, when they have dried. Remove and discard seeds that have visible, pin-sized weevil holes in them (seeds usually sustain high levels of weevil attack in 2 of every 6 years). Collect 2-3 garbage bags, or 3-4 gallons of uncleaned seed. Allow the seeds to thoroughly dry in either cloth or paper bags. Place the bags of selected, dried seed in refrigeration until March. Plant the seeds in flats of sterile soil mix in March. Transfer seedlings to Forest Service 2" diameter tubes when roots are well-established (2" long).