

INTERAGENCY RIPARIAN/WETLAND PLANT DEVELOPMENT PROJECT

JULY, 1995 TO DECEMBER, 1995 SEMI-ANNUAL PROGRESS REPORT

Project Staff

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Introduction

This is the second semi-annual progress report of FY95. We received no feedback from the sponsors on whether the new semi-annual reports are meeting everyone's needs. I am assuming that we are! Please let me know if they are not. This progress report covers from July, 1995 through December, 1995.

Second Annual Newsletter

Our second issue of "View From A Wetland" will be completed in February. We will mail copies to cooperators, NRCS offices, and those on our mailing list throughout our service area. We hope it will be as successful as our last one was.

Spring Business Meeting

The Project normally holds the spring business meeting in April of every year. This year, however, we have been asked to hold it in March because of the busy spring field season. We are proposing the meeting be held on March 6 at 1:00pm in the small conference room at the NRCS (formally SCS) State Office, 3244 Elder Street, Boise, ID. We plan to discuss new publications, funding, progress, and Project direction. Please make a note on your calendar and try to be there.

Presentations (posters, papers, talks)

Project personnel presented a number of talks, papers, poster sessions, and workshops this past reporting period. Below is a list of our presentations.

Riparian Zone Ecology, Management, and Restoration Workshop, Pinedale, Wyoming. August, 1995 - 25 participants.

Hoag, J. Chris. 1995. *Establishment techniques for Woody Vegetation in Riparian Zones of the arid and semi-arid West*. 4th North American Agroforestry Conference, Annual Meeting, Boise, ID. July 23-28, 1995.

Hoag, J. Chris. 1995. *Using Dormant Pole Cuttings to Revegetate Riparian Areas*. Fifth International Rangeland Congress, Salt Lake City, Utah. July 23-28, 1995.

Colorado Riparian Association, annual meeting at Frisco, CO in October. Chris was invited to speak at the CRA meeting by Randy Mandel, former Manager of the Meeker PMC. He discussed the Project and its objectives along with progress toward plant release and planting methods. Interest was very high from the Association members and I provided the Association with

NOTE: We have developed 2 poster papers - 1 on Riparian Pole plantings and 1 on Constructed Wetland Systems. These would be available to the sponsors if they had a need for them.

Riparian Zone Ecology, Restoration, and Management Workshops

In April, 9 Riparian Zone Ecology workshops were conducted in Idaho for NRCS employees, other federal agencies, SCD's, state agencies, and private organizations in Idaho. We also offered 3 workshops in Bend, Oregon and 1 in Pullman, Washington.

In August, Chris conducted a workshop in Pinedale, WY for the Pinedale Management Team, which consisted of District Conservationists, Range Specialists, Engineering Technicians, and Soil Conservationists for most of western Wyoming. We spent 1 day in the classroom discussing

riparian ecology and hydrology. Then we went to the field and installed a series of vertical bundles, small tree and brush revetments, brush mattresses, willow wattles, and pole cuttings on a medium-sized perennial stream southwest of Boulder, WY.

This year, we hope to conduct riparian workshops in Utah and Montana. We are tentatively planning on conducting a couple more workshops in Idaho in 1996, one in Salmon and possibly one in Division VI.

We are also considering putting together a 1 or 2 day course on Wetland Ecology, Management, and Restoration. We could also conduct a field day and plant a wetland that is being constructed in Minidoka County or Gooding County. We need some input as to whether a course like this is needed or not. Please call and let us know how many in your agency would like to participate in another riparian workshop and /or a wetland workshop.

Corvallis PMC Wetland Coordinated Study

The Aberdeen/Corvallis *Eleocharis* study is continuing to provide us with excellent data. The plants were evaluated in September. The summer, 1994 planted plants have almost completely filled in making it very difficult to tell the accessions apart. The green house propagated plants are continuing to out produce the wild collected transplants in terms of ramets/unit area. The mean ramet density for the green house propagated plants is 313/0.08 m² and 213/0.08 m² for the wild collected.

Growth and spread was retarded in the fall, 1994 planted section due primarily to frost damage after planting, however, it seems to be recovering and we expect that the plants will completely fill in during the 1996 growing season. As of the September evaluation, the mean ramet densities and rhizome length were 59/0.08 m² and 27 cm for the greenhouse plants and 21/0.08 m² and 16 cm for the wild collected.

The Little Hole (on American Falls Reservoir, southeastern Idaho) accession continues to be the best spreader in both the summer and fall planted trials. The greenhouse propagated plants produced ramet densities of 760/0.08 m² for the summer planting, and 140/0.08 m² for the fall planted. The wild collected plants have produced ramet densities of 499/0.08 m² for the summer planted, and 66/0.08 m² for the fall planted.

Nature Conservancy Constructed Wetland System, Hagerman, ID

The Nature Conservancy Constructed Wetland System was built in early 1995 and planted in the spring and summer of 1995. The system covers approximately 15 acres. The design is a modification of the Maine system that better fits our needs in an arid and semi-arid climate that uses mostly irrigation water for crop production. The primary filter was split in half and one side planted with Garrison Creeping Foxtail (*Alopecurus arundinaceus*) and the other half with Baltic Rush (*Juncus balticus*, JUBA), Nebraska Sedge (*Carex nebrascensis*, CANE2), and Creeping Spikerush (*Eleocharis palustris*, ELPA3). The Garrison far exceeded our wildest expectations in terms of growth, erosion control and nitrogen uptake. The three wetland plants were planted as plugs and have filled in nicely, but not as fast nor as thoroughly as the Garrison. We hope to have nutrient samples from each species analyzed this winter to determine nutrient uptake. We are still having trouble with the shallow wetland. It is too deep and will not drain properly into the deep water pond. We will have a meeting with the Nature Conservancy and the Northside Canal Company this winter to work on lowering the structure between the shallow wetland and the deep water pond. We are also looking for sources of cattail and bulrush to plant

in the shallow wetland after the flow problem has been fixed. The rest of the system seems to be working. This next growing season should have better water control because the bypass overflow is now installed and can be used extensively.

C-6 Drain CWS, Minidoka, ID

After extensive investigations into appropriate sites, we found a site located on C-6 Drain just west of Minidoka. The C-6 Drain CWS located just west of Minidoka has been designed and submitted to the USBR and A & B Irrigation District. Mike spent a lot of time developing the design according to the criteria that we put together during the first meeting in Twin Falls. We are hoping that this system will be constructed before March, 1996.

Cedar Draw Water Quality Research and Demonstration Site

The **Cedar Draw Water Quality Research and Demonstration Site** consists of 6 abandoned fish raceways with 2 bays each that are 16 feet wide and 125 feet long. We planted 10 bays with 10 species of wetland plants. Water quality samples have been taken by UofI before the water goes into the bay and after it comes out. Forage samples will be taken at the end of each growing season to determine uptake. In addition, a large constructed wetland area adjacent to the raceways has been built and planted to our specifications to test the 5 component design and a 4 component design we are developing. In both of these test areas, we will use the accessions we are developing for release.

In August, 1995, we planted 6 bays to different species, about 1000 plants of each species, with volunteers from Boise (thanks to Mary Dudley, IF&G) and volunteers from Jerome and Twin Falls (thanks to Dave Parrish, IF&G). We also planted approximately 9000 plants in Primary Filter of the 4 component CWS. The Twin Falls Canal Co. provided heavy equipment and operators to plant large clumps of cattails and bulrush in the shallow wetland components of the CWSs. In September, volunteers from Pocatello helped plant about 1000 plugs of Common Reed (*Phragmites australis*) in one of the bays. In October, 2 volunteers from Pocatello helped to plant Coyote Willow cuttings in one of the bays to finish out all the plantings that we had scheduled.

In October, the best growth and establishment occurred with the Hardstem Bulrush (SCAC), Threesquare Bulrush (SCPU3), and the Baltic Rush (JUBA). Cattail had the poorest establishment. This was a surprise because of our experience with cattails and their weedy nature as a whole. Most of the cattail plugs had not sprouted as of October. We expect significant sprouting to occur next spring, but we are not clear as to why they had not sprouted after planting. We may have planted them late in the optimum planting window.

USBR H-Drain Project, Paul, ID

The H-Drain Constructed Wetland System is in cooperation with the Snake River Area - East, USBR, Burley, Idaho. We are continuing to collect information on establishment procedures, competition, community dynamics, water quality, and survival. We have received money from the USBR for plant establishment trends and nutrient uptake monitoring. The whole planting looks great. The different species are spreading rapidly from where we originally planted them. We have noted a die off of coyote willow where the water is deeper in the center of the site. The wetland vegetation at the H-Drain Constructed Wetland System is filling in beautifully. The first pond, *Scirpus maritimus* (SCMA) plantings have formed 10 major stands which have an average spread of 19 m² with ramet densities of 56/m². There is one major stand of *Scirpus pungens* (SCPU3) which covers about 11 m² and has 200 ramets/m². *Eleocharis palustris* has formed about 6 major and 5 smaller stands with an average coverage of 3.5 m² and densities of 2600 ramets/m². *Juncus balticus* has formed about 12 small clumps (0.04 m² each). *Carex nebrascensis* has spread into 5 areas with the largest stand covering about 6 m² and has a density

of 450 ramets/m². The 40 *Scirpus acutus* (SCAC) plugs which we planted have spread and now cover about 42 m² and has a shoot density of about 200/m². With the exception of CANE2, all species are flowering and setting seed.

The willows which were planted near the outlet of the first pond had a 67% survival rate and an average leader length of 0.8 m. Of the 1000 *Salix exigua* planted in the center of the pond, 800 are surviving and doing well. Some of the rhizomes have spread up to 2.5 m.

SCAC, SCMA, SCPU3, ELPA3, CANE2, and JUBA are all establishing well in the pumping pond.

Wetland plants are also establishing well in overflow ponds 1 and 2, although more slowly than in the pumping pond. This may be due to higher weed competition in these areas.

All in all we are very pleased with the quantity and quality of our plantings in the H-Drain CWS System. These ponds should continue to fill in next spring and summer.

Scarrow Dairy Animal Waste CWS

We have been looking for a long time for a site to install an animal waste CWS. We thought that we had one located in Logan, UT, but it has apparently fallen through because of funding and some concern by the landowner of whether the system would work or not. We were recently contacted by Steve Thompson, District Conservationist in Gooding about a dairy owner who was very interested in installing a CWS and had already installed two large lagoons and a solid waste bunker. Jim Scarrow is convinced that this technology can work and can benefit the Dairy business. We have met twice and are developing a design to fit the landforms on the site. We certainly hope this one that is built. We have agreed to help Jim plant the various components as soon as they are built to test our wetland plant materials under animal wastewater conditions.

Arimo Ranch (Marsh Creek)

The Arimo Ranch Research and Demonstration Site located on Marsh Creek south of Pocatello is proceeding on schedule. This demo site is design to test a planned grazing system versus total exclusion and planting (accelerated revegetation) versus no planting (natural revegetation). Starting in 1995, we have been planting woody riparian species using various bioengineering techniques, and developing new bioengineering methods in grazed and ungrazed (excluded) sections. Some methods were used in the spring and some, reported below, were used this fall. Additional planting will be made this coming spring.

Last Spring, with the help of volunteers, we planted over 500 dormant unrooted cuttings of willows and cottonwoods in the test sections of Arimo Ranch. The plantings in the excluded sections are establishing better due to the absence of cattle grazing pressure. An evaluation this fall has shown that overall survival was 69% for Coyote Willow (SAEX), 58% for Yellow Willow (SALU), and 20% for Black Cottonwood (POTR). Of the total 500 cuttings planted, 45% of the SAEX, 27% of the SALU, and 60 % of the POTR had been eaten by beaver. We won't know until next summer how many of the cuttings were destroyed and how many will sprout. Of the 15 cottonwood cuttings planted, only 20% had sprouted. This is because the cottonwoods were selected by the beaver and eaten off before they had a chance to sprout. Any additional cottonwood cuttings planted in the test sections will have to be protected with wire screens or beaver-proof cages. Art Shoemaker has recommended that we install revetments over the cuttings to help protect their bases from erosive streamflows, and to help protect them from beaver.

During the Fall, 1995, small tree and shrub revetments in addition to vertical bundles were installed on the grazed and excluded sections. On October 13, 26 Fish and Game volunteers cut a truck load of willows along the Portneuf River near Lava Hot Springs, transported them to Pocatello for storage in the cooler of a local distributor. On November 1, the stored willows were moved to the planting site with the help of two Fish and Game volunteers. On November 2nd and 3rd, we evaluated and selected sites for bioengineering work. On the 9th, Mike Sellers and Jim Mende (Id F&G) harvested hawthorns, chokecherry, and aspen trees for use as revetment materials. On the 13th, we met on site with the Idaho Fish and Game to determine the logistics of coordinating volunteer crews. On the 14th and 15th, we began the actual bioengineering work with the help of 59 Highland High School students, their teacher (Dick Jeppson), 5 volunteers, and 4 Fish and Game personnel. We constructed one revetment (75 feet long) in the grazed section, and one in the excluded section (150 feet long). We also assembled five vertical bundles and placed them on a site in the grazed section. A news crew from Channel 6 (Pocatello) came out on the 14th and interviewed Dick Scully (ID F&G), Mike Sellers, and a few of the high school students. The interview aired on the 5:30 pm and 10:00 pm news, and gave the project some excellent publicity. On December 12th and 18th, 3 volunteers helped place 12 vertical bundles in two selected sites in the excluded section to be compared with the vertical bundles installed in the grazed section. The revetments will be upgraded this spring to handle high stream flows.

This demo project and the three field exercise demo sites are being used to help develop new specifications for the NRCS Technical Guides. Art Shoemaker, Idaho NRCS State Engineer, and Bob Leaman, NRCS Division Engineer, are both watching the performance of these test sections and planning to upgrade the Technical Guide to include the easy, inexpensive, and effective bioengineering techniques.

The landowner is very excited about the changes he is seeing with the stream even though the testing is only in the very early stages. The hardest part of this grazing study is the ranch manager. There have been three different managers since this project started so the grazing management has not been very consistent. We need to do a lot more educating of the managers in terms of riparian grazing systems before we have a true test of grazing versus exclusion.

Trout Creek Off-Center Advanced Test Site

One of the Riparian workshop field exercise demo sites was located in the Trout Creek enclosure in Northeastern Nevada. In April, the workshop participants installed dormant pole plantings, vertical bundles, brush mattress, and a willow fascine on a large cutbank at an actively eroding curve of the creek. This particular site was the best one for willow survival of the three sites. The vertical bundles had sprouted about 40-90 cm as of October. The brush mattress also sprouted up and down the entire length of the cuttings and had completely covered all the wire that was used to hold the mattress to the bank. The pole cutting had a sprouting success of 95%.

One problem that was observed was with the fascime and the lower ends of the vertical bundles. The fascime is placed at the base of the brush mattress (in this particular design) and covered with soil. The bottoms of the vertical bundles were also covered with moist soil. This is apparently the problem. The entire fascime was covered and none of it had sprouted as of October. The parts of the vertical bundles that had been covered with more than 1 inch of soil also had not sprouted. It is important to ensure that after staking the fascines, cover only 3/4 of the bundle with soil and leave at least 1/4 to 1/3 of the bundle uncovered. The same is true of the vertical bundles. If they are completely covered with more than 1 inch of soil, they will not sprout. We will have to wait until next summer to see if they were able to push through the soil covering or if settling of the soil will allow future sprouting.

We plan to write a Tech Note or Info Series paper on the procedures, techniques, and evaluations of all three of the Riparian Workshops field exercise demo sites this winter and we will send them to the course participants and interested parties.

Bioengineering Streambank Erosion Control Techniques Manual

We are working with Art Shoemaker, Idaho NRCS State Engineer and Sharon Norris, Public Affairs Specialist on an illustrated How-to-do-it guide with line drawings and color photos of 10 different Bioengineering Techniques. Slides and line drawings will be targeted and specifications will be developed for each technique this summer and the final product will be put together in the winter of 1997. We hope to include the following Streambank Erosion Control Measures:

- 1 - Dormant Pole or Post Planting
- 2 - Willow Clump Plantings
- 3 - Fiber rolls
- 4 - Erosion Control Blankets
 - a - Alone or with pole plantings
 - b - Planted with herbaceous vegetation
- 5 - Willow Fascines (Wattling)
- 6 - Brush Mattressing
- 7 - Brush Layering
- 8 - Vertical Bundles
- 9 - Brush Trenching
- 10 - Small brush or tree revetments

We are also working on a video of the installation of the various techniques. Portions of the video will be taken during the workshops this summer. Michigan has developed one that is used extensively in the Northeast.

Seagull Bay BOR Woody Nursery

The new nursery planted at Seagull Bay on the American Falls Reservoir this spring responded well to last summer's rainfall and heat. A total of 150 trees and shrubs were planted. The species planted along with the number alive over the number planted included: Laurel Willow (*Salix pentandra*) 22 alive/25 planted, Black Cottonwood (*Populus trichocarpa*) 16/25, Golden Willow (*S. aureum*) 22/25, Brittle Willow (*S. fragilis*) 22/25, Yellow Willow (*S. lutea*) 20/25, and Peachleaf Willow (*S. amygdaloides*) 5/25. Of the 150 cuttings planted, 107 were alive as of August 1 and had leader lengths that ranged from 50 cm to more than 90 cm.

As part of the American Falls Reservoir Erosion Control Study with the USBR, the dead cuttings will be replaced in the spring of 1996. We will select the best accessions of Peachleaf Willow to replace the dead cuttings with.

College of Southern Idaho CWS

We were asked to provide assistance to Ross Spackman and Jim Wilson of CSI on the design of a Constructed Wetland System that would be placed on CSI ground and be used to treat irrigation wastewater from Perrine Coolee that is mixed with geothermal water that was used to heat building on the college campus. We have had several meetings with Ross and Jim how to fit a 5 component system on the site. Construction of the system started in November and is progressing. We plan to conduct plant collections and assist with planting in the Spring.

Nebraska Sedge (*Carex nebrascensis*) Germination Study

Over the past several months we have been searching for faster methods of getting Nebraska Sedge (CANE2) seed to germinate. The following treatments were investigated using three

accessions of CANE2: 1) perigynia intact , no stratification; 2) perigynia removed, no stratification; 3) perigynia removed, seed scarified, no stratification; 4) perigynia not removed, seed scarified, no stratification; 5) perigynia intact, seeds stratified for 30 days in distilled water; 6) scarified, stratified for 30 days in distilled water; 7) perigynia intact, stratified for 30 days in sphagnum and distilled water; 8) scarified, stratified for 30 days in sphagnum and distilled water; 9) perigynia intact, stratified for 30 days in activated charcoal and distilled water; 10) scarified, stratified for 30 days in activated charcoal and distilled water. All seeds were placed in petri dishes and monitored for 30 days. Treatments 1 through 4 consisted of 4 reps of 60 seeds for each accession. Treatments 5 through 10 had 5 reps of 50 seeds for each accession.

Seeds which germinated were counted and removed from the petri dish. Pure live seed (PLS) was determined for each accession by setting the treatment with the highest germination rate equal to 100%. Total germination for the 30 day period and the number of days to get at least 50% germination are reported in this paper. For the purpose of this report, data for the three accessions were averaged together.

Table 1: Based on PLS, the mean total germination rate for the seeds in each treatment was as follows:

<p>Treatment 1 reached 40.5 % after 30 days. Treatment 2 reached 59% at 22 days and 75% after 30 days. Treatment 3 reached 53% at 23 days and 68% after 30 days. Treatment 4 reached 56% at 21 days and 70% after 30 days. Treatment 5 reached 56% at 12 days and 73% after 30 days. Treatment 6 reached 60% at 8 days and 87% after 30 days. Treatment 7 reached 67% at 12 days and 82% after 30 days. Treatment 8 reached 57% at 7 days and 100% after 30 days. Treatment 9 reached 61% at 13 days and 75% after 30 days. Treatment 10 reached 58% at 8 days and 86% after 30 days.</p>
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From these data, it is clear that three things seem to be important in increasing the CANE2 germination rate: 1) Removal of the perigynia and light scarification of the seed coat, 2) 30 day stratification period in water with the seed wrapped in sphagnum moss.

This information will save us a lot of time, not to mention heart burn, during planting time. Several cooperators and growers have been very excited about these data.

The Interagency Riparian/Wetland Plant Development Project is sponsored and funded by: USDA Natural Resources Conservation Service (Idaho & Utah), USDI Bureau of Land Management, USDI Bureau of Reclamation, US Fish and Wildlife Service, US Forest Service, Idaho Fish and Game, Idaho Transportation Dept., and Idaho Power Co.

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