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Salmon River Seed Collection and Germination

Abstract

Fish habitat surveys conducted in 1989 and 1990 on the South Fork of the Salmon River (West et al 1990) indicated a lack of shade providing riparian plants along certain reaches. West recommended planting riparian species along the channel to increase the shade component in critical reaches of the South Fork Salmon. This habitat is critical for spring run chinook (*Oncorhynchus tshawytscha*) and summer steelhead (*Oncorhynchus mykiss*), both USDA Forest Service listed "sensitive" species.

The maintenance of the genetic integrity of current plant communities would improve the success of a planting program. The collection of seeds from native species was proposed.

Introduction

Native plant seeds were collected to enhance the existing riparian zone on the upper South Fork of the Salmon River. This reach includes critical spawning and rearing habitat for spring run chinook (*Oncorhynchus tshawytscha*) and summer steelhead (*Oncorhynchus mykiss*).

The USDA Forest Service proposed to collect seeds from native riparian plants that would enhance and improve the existing shade and complexity components of upper South Fork of the Salmon River. Enough seeds to produce 3,000 of the following species were to be collected and germinated.

Table 1 Proposed Species List

Common Name	*Scientific Name*
Big Leaf Maple	*Acer macrophyllum*
White Alder	*Alnus rhombifolia*
Cottonwood	*Populus trichocarpa*
Willow	*Salix* spp.
Sedge	*Juncus* spp.

The proposal included the collection and germination of seeds to produce 12,000 seedlings for planting in the spring of 1992. An agreement between the U.S. Forest Service and the California Department of Fish and Game to plant the seedlings exists. Seedlings will be planted in the fall of 1992 when conditions conducive to survival exist.

The Study Area

The Upper South Fork of the Salmon River, upstream from the confluence of the East Fork of the Salmon River, is a drainage of approximately 51,000 acres (20639.7 ha) which includes approximately 39,000 acres (15783.3 ha) of the Trinity Alps Wilderness Area. Elevations range from 8880 feet (ft) (2706.6 m) in the Thompson Peak area to 2400 ft (731.5 m) at the confluence with the East Fork of the Salmon River. The tributary flows north and northwest from the headwaters which is Salmon Lake at 7150 ft (2179.3 m) in elevation.

The river provides critical spawning and rearing habitat for spring run Chinook and summer run steelhead. Historic mining operations and flood events have severly altered the Salmon River drainage. The riparian trees in the study area are limited to 30 year old alder and willow. Some older cottonwood survive on higher banks that were not scoured during the last major flood in 1964.

Since 1982, habitat enhancement work has been accomplished by the USDA Forest Service in cooperation with the California Department of Fish and Game. The enhancements have ranged from in-stream manipulation using large boulder groups and weirs to large woody debris structures placed to enhance overwintering habitat.

Surveys conducted in 1989 indicate a lack of noon shade in the study area (West et al). Improving the riparian canopy was recommended in the analysis of the data.

Methods and Materials

Seeds were collected for big leaf maple and alder. Seed collection from willow and cottonwood was not feasible as a result of the seeds being extremely small and wind blown. As an alternative to seed collection, cuttings from cottonwood and willow were rooted. Sedge plants were monitored for seed production, however, seeds were not collected as a result of a poor seed year. As an alternative, sedge clumps were taken to Cal Forest Nursery for root cuttings to be made for propagation. Sedge plugs were taken and transplanted in the project area. Other native vegetation that is growing on gravel bars is being identified and some seeds (*Eupatorium* spp.) were collected on a trial basis for germination by Cal Forest.

Ten thousand maple seeds were collected in the fall of 1991 by placing cheesecloth bags on limbs to collect seeds. Ten thousand alder seeds were collected in late winter 1992 by collecting cones by hand. Eighty percent of the maple and sixty percent of the alder seeds germinated.

The willow and cottonwood cuttings were rooted and placed in a growing medium of bark mulch. Straw bales were placed as a confinement for the mulch. Several other large containers were also used.

Results

There are currently 7,000 maple and 6,000 alder seedlings available for planting. The Forest Service has contracted with the California Department of Fish and Game to plant 12,000 seedlings. These will be planted in the fall of 1992. The trees will be planted after the ground moisture is sufficient and when the plants become dormant.

The area in which the cottonwood and willow cuttings were placed froze during the winter of 1991. Only two to three hundred cuttings were viable in the spring. The willow and cottonwood rooted easily, however, obtaining cuttings and rooting them did not produce the necessary number of plants. The obvious reason for failure was the freeze, however, overcrowding of the rooting medium was also a problem and may have contributed to the loss of saplings.

Sedge seed collection failed due to a small seed crop. Crews monitored the plants for seed production but were unable to collect any seeds. In an attempt to produce plants for outplanting, a few sedge were harvested and the local nursery attempted to separate the clumps to produce a number of individual plants. The attempt failed with only a few plants surviving. Field crews took 20 to 30 plugs of sedge from a nearby stream (Crawford Creek) that contains a healthy population of sedge. The plugs were taken from a few large plants that were divided into pieces of approximately 3 inches by 3 inches. The plugs were then planted along the river channel. Most of those plugs survived the transplant.

Summary and Conclusions

The collection of seeds from alder and maple is simple. A crew can collect thousand of seeds in a few days. The cheesecloth bags on the maples worked well. Germination of the seeds was highly successful with the nursery reporting better than average success for both species. Thirteen thousand trees are available for planting.

The willow and cottonwood rooted easily and grew well in the bark mulch medium. Overcrowding and the problem of freezing need to be addressed. The direct planting of willow and cottonwood cuttings works well in areas that are wet for extended periods of time because the cuttings need time to develop a root system. On streams like the Salmon, where spring flows drop dramatically, the plants have to be placed in areas that are at risk from being washed out in order for them to survive. It would be beneficial if these plants can be rooted and placed slightly higher on the banks. For the short term however, it appears that the planting of cuttings for these species is more practical than rooting the cuttings and then outplanting.

The sedge seed crop was poor. The attempt to take a large sedge plant and divide it into hundreds of nursery plants to be grown for outplanting failed. The nursery claims that this process should work. The field crews that took a large sedge plant and divided it into twenty transplantable plants were successful. It appears that the later method is more efficient.

The seeds from the *Eupatorium* spp. were not sown by Cal Forest. The seeds are still available and may be sown in the spring of 1993.

Summary of Expenditures

Expenditures

Temporary Employee Salary	$2,584.00
Nursery Contract	$2,400.00
Misc Supplies	$ 83.00
Vehicles	$ 123.00
TOTAL	$5,190.00