INNOVATIVE PLANTING TECHNIQUE FOR RIPARIAN AND WETLAND SITES[1]

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Abstract. Restoration of riparian and wetland sites is critical for improving water quality and healthy fisheries. Woody riparian plants provide bank stability, shade for temperature moderation and woody debris for fish habitat. Most degraded streams have conditions that are difficult for successful establishment of riparian plants. Some have high banks that can be dry during part of the year. Many streams have very rocky soils with few fine sediments. Current restoration techniques include the planting of cuttings, salvaged riparian shrubs and nursery grown plants. Each technique has limited success under the difficult conditions common to most stream revegetation projects. A new technology for the installation of cuttings and deep container grown riparian plants was utilized on a stream re-location project near Yellow Pine (the abandoned mining town of Stibnite), Idaho. A section of Meadow Creek was re-located and constructed to move it away from water borne tailings and to restore salmon and trout spawning habitat. Willow cuttings were collected on the site and used to grow 10,000 plants in containers 76 millimeters in diameter and 355 millimeters deep. An additional 2,000 (approx. 1.3 meters in length) willow cuttings were collected just prior to installation. The containerized plants were installed with a rotary planter mounted on an excavator arm. This planter, which is the property of Salish-Kootenaii Ecological Restoration with whom Bitterroot Restoration, Inc. has an exclusive use agreement, has a magazine capable of holding 50 plants and can plant up to 50 plants in 6 minutes. This magazine has three rings that can be accessed by the operator thus allowing for the selective planting of three separate species. The cuttings were planted using an excavator mounted "stinger". Most of the plants and cuttings were installed through fiber encapsulated soil lifts and rocky soils. The cuttings were installed in the stream banks at least 1 meter deep. Installation of both plants and cuttings was complete in less than five days with a crew of five. This innovative technology provides cost effective installation of superior riparian plant material under difficult site conditions.

Additional Key Words: mine reclamation, salmon recovery, mine tailings, Stibnite Mine.

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Introduction

The Stibnite Mine is located along the East Fork of the South Fork of the Salmon River, 14 miles from Yellow Pine Idaho. Active mining for antimony and gold occurred from the early 1900's until the late 1990's. The site is approximately 3,000 acres with waste rock, and mine tailings over approximately fifty percent of the area. The Stibnite/Yellow Pine Mining Area (Stibnite) site was proposed to the U.S Environmental Protections Agency's (EPA) National Priority List on September 13, 2001. A dam constructed on the East Fork of Meadow Creek (now called Blowout Creek) to supply hydroelectric power for milling operations, failed in 1965. This resulted in the deposition of large volumes of tailings into Meadow Creek.

Lower Meadow Creek Project

In 2004, URS Corporation was contracted by the US Forest Service to construct a new 1,200 foot channel for Meadow Creek to the south of the existing stream. All tailings were removed to a repository and when the new channel was completed, the old channel was backfilled. Bitterroot Restoration, Inc., (BRI) was hired by URS to conduct the revegetation work consisting of: salvage and planting of 200 large willow clumps; growing and planting 10,000 willows from cuttings collected on the site; installation and planting of containerized plants and an additional 2,000 willow cuttings; spreading compost and hydroseeding.

Because of the short growing season, harsh conditions at the site, and the moisture requirements of the species used, it was critical to utilize plant materials with a large deep root mass (76 mm in diameter and 355 mm deep). This provides the plants with the ability to establish quickly and reach ground water. Cuttings used on the project were planted at least 1 meter deep to ensure establishment and survival. Because of the large plant material, and the extremely rocky nature of the soils, it was necessary to utilize mechanized planting methods.

BRI utilized patented equipment mounted on an excavator arm to plant both the rooted plants and the cuttings. We were able to access the site by walking the excavator down the new stream channel before the old channel was abandoned. With the reach of the excavator, we were able to plant both sides of the stream without damaging the constructed banks. Plants were delivered to the planting equipment with a small tractor and all terrain vehicles. The operation included an excavator operator, one to two people supplying plants and two people loading plants into the rotary planter and cuttings into the expandable stinger. (See Fig. 1 and Fig. 2)

We also followed up both the plant and cutting installation to ensure that the planting holes were completely backfilled. After planting, the cuttings were cut off to leave a 10-15 centimeter length above ground. This was done to temporarily limit the above ground growth until the cuttings could develop good root systems and become well established.

Figure 1. Planting container plants.

Figure 2. Loading cutting for planting.

Conclusions

The use of the mechanical planter attachments for installing both cuttings and containerized plants was cost effective. The cost on a similar project utilizing a "Bobcat" mounted auger to drill holes and hand planting of similar size container plants was three times the cost of the using the mechanized planter. Likewise, installing cuttings using an excavator with stinger to pilot holes then installing cuttings by hand was about three times as costly as installation using the excavator mounted, expandable stinger.

Many streambanks and riparian areas have extremely rocky substrates that may effectively prevent the proper installation of rooted plants or cuttings using common installation techniques. The mechanized equipment is a tool that provides successful installation on difficult sites. It facilitates fast project completion using a small labor force and should result in high survival of cuttings and plants.