

After 1997 New Year's Day Flood - Stream and Riparian Restoration: South Fork of Little Butte Creek

Susan J. Maiyo

Editor's note : Last year, "Stream and Riparian Restoration: South Fork of Little Butte Creek" was a feature article in the first issue of Streamline; Vol. 1 No. 1. This year we provide a follow-up of this location following a dramatic flood event. The abstract of this update appears on page 14A of the insert.

On New Year's Day of 1997 a rain-on-snow storm of a 25 year recurrence interval caused severe landslides and debris flows in the upper watershed of South Fork of Little Butte Creek on National Forest lands. Debris flows in facing tributaries and the main channel caused road and bridge failures at stream crossings and channel changes in the response reaches of South Fork of Little Butte Creek. This watershed is 88,000 acres (35,613 ha) in size and is a tributary of the Rogue River Basin. It is designated a key watershed under the Northwest Forest Plan. Coho salmon and steelhead trout reside within the watershed and have been listed and proposed for listing respectively, under the Endangered Species Act. Spring chinook, rainbow and cutthroat trout are the other native salmonids instream; eastern brook trout have been introduced in the upper reaches.

Before the 1997 flood, about seven years of instream and riparian restoration were completed from RM11.5 to RM13.5 within a channel straightened by heavy equipment after previous floods. This stream segment is unconfined, alluvial in nature and has a valley gradient of about one percent. In the channel and on adjacent floodplain/terraces, trees and downed wood were salvaged. The principal objective of restoration work was to create quality pools and side channels, culture a riparian forest and increase future wood recruitment. The work within channel was considered a short-term solution until natural recovery stabilized the stream channel and floodplain. Past evidence of major channel shifts during severe winter storms was found from historic air photos and anecdotal sources. Emphasis in the Pacific Northwest on restoration of salmonid habitat justified work in the simplified stream conditions in South Fork of Little Butte Creek. Re-establishment of channel meander patterns with heavy equipment was considered during project planning, but this type of work was considered experimental

and extreme at the time by the public, cooperating specialists and agencies.

The flood in South Fork of Little Butte Creek changed most of this riparian and short-term channel work by relocating and creating a new channel, floodplains, terraces and side channel habitat. Stream morphology was monitored and post-flood measurements showed width to depth ratio decreases and quality side channel habitat created in a mature forest area. The pool/riffle system established by the flood created longer lateral scour pools and decreased riffle habitat. Natural wood counts significantly increased within the reach. Most wood placed for restoration was displaced to terraces (80%), moved downstream from National Forest lands (10%), or moved into the new stream channel (10%). Large wood and boulder features placed on floodplains and terraces during restoration provided protection to gravel bars and riparian vegetation. Most hardwood and conifer plantings planted without these protective features were displaced by the flood. Wolman pebble counts before and after the flood show, at most sites, apparent reductions in the average size of substrate particles. The substrate was dominated by large cobble before the flood. Presently there appears to be more suitable spawning gravel and a greater diversity of substrate sizes. Water temperatures (high 7 day average maximum) did not appreciably change. Coho salmon were observed spawning in good numbers in fall 1996 (pre-flood) and steelhead salmon post-flood. Monitoring of instream projects and control areas in the South Fork of Little Butte Creek this past season revealed a significant decrease in juvenile coho salmon (2 observed) and no apparent change in steelhead utilizing microhabitat throughout South Fork of Little Butte Creek.

South Fork of Little Butte Creek, within the response reach described above, has a considerably different channel pattern after the 1997 flood. Sinuosity has greatly increased; monitoring of the bed elevation and meanders will determine if the downcutting prevalent before the flood continues with this changed morphology. It is suspected that side channels created during the past winter may prove more stable. Future local riparian planting on terraces and some instream and side channel enhancement work may also have better prospects of success with these present conditions. It should be noted in closing that two bridges in this reach were damaged by the storm. In several places,

Feature

stream meander changes have redirected the flow against fillslope of sections of a valley bottom road, County Road 1000. The ultimate recovery of the stream channel, riparian forest, and resultant fish habitat in the South Fork of Little Butte Creek depends on long term decisions made in the next few years. Homes, pastures, roads, bridges, future timber harvest, and other human activities within the

floodplain of this and other reaches downstream, will most affect the successful recovery of fish habitat and water quality in the South Fork of Little Butte Creek.

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Technical Tips

Revegetating Roads and Landings Using The Stihl Backpack Blower

Bob Cuthbert

The Stihl Backpack Blower models BR320 (Table 1) and BR400 are backpack gasoline-powered blower units designed primarily as leaf blowers. Either model can be converted for use as a grass-seeding unit by installing a spray kit and a granular spreading kit. The North Coast Forest District located at Prince Rupert has done an informal evaluation of the BR320, comparing the performance of Cyclone spreaders to the hydroseeding process (Table 2). Although the BR400 is more powerful, it is unlikely that it would broadcast the seed any further than the BR320 due to the physical properties of the seed.



Figure 1. Revegetating Crow Lagoon Forest Service Road.

The basic BR320 blower unit costs \$599, the sprayer conversion kit costs \$129, and the granular spreading kit costs \$169, totalling \$887 per unit before taxes and shipping. These are off-the-shelf costs, however, and it may be possible to negotiate lower costs through bulk purchases. Characteristics of the BR320 used in the evaluation are listed in Table 1.

The unit in use is shown in Figure 1.

Using a backpack blower to seed is less expensive than hydroseeding and is especially useful on the rugged north coast where many areas are difficult or impossible to access with hydroseeding equipment. Cyclone spreaders wear out with constant use, the bag is difficult to load, and since the broadcast distance is small, they are labour intensive. A comparison based on the North Coast District evaluation (Sloan, 1996) is set out in Table 2.

Table 1. Characteristics of the BR320

Item	Specifications	Comment
Stihl BR320	2.7 bhp	Light weight
Hopper Size	12 liters or 6.25 kg	Mix of seed and fertilizer
Fuel Capacity	1.5 liters	Will do about 10 loads
Air Flow Rate	740 m ³ /hour	Spreads seed up to 7 m, fertilizer up to 9 m
Weight Empty (Full)	10.9 kg (17.3 kg)	Easy to carry
Seed	Prince Rupert Erosion Mix	Costs \$79.00 / 25 kg
Fertilizer	Pro 18-18-18	Costs \$18.20 / 25 kg