

Soleduck Revegetation Project

By Nancy Dunkle

In early November 1986, construction began on approximately fourteen miles of the Soleduck Road between Highway 101 and the Soleduck Resort in Olympic National Park. Part of the reconstruction effort is a revegetation project, funded by the Federal Lands Highways Program (FLHP), that has been underway since July 1985. The revegetation project began as part of a more general effort to make the new Soleduck Road a model for western park roads designed under the 1984 park road standards.

Planning and preparation for revegetation at Soleduck has required careful balancing of visual and ecological goals with practical concerns like speed, efficiency, and cost. From the beginning, park management stressed the importance of restoring the visual qualities that are characteristic of the existing road (i.e., the variety, diversity, and random pattern of the native forest edge communities). Management also supported "hands on" experimentation aimed at developing efficient and practical methods of using native plants in revegetation. In addition, project planners were committed to approaching these goals in ways that help to protect the genetic diversity and integrity of the Soleduck Valley plant communities.

Although the long-term revegetation objective is reestablishment of native edge communities similar to the ones that occur on existing cuts and fills, this aim cannot be achieved in one or two years. Clearing and grading make environmental conditions on the reconstructed slopes less favorable to forest edge species than to native pioneers or weedy exotics. It is hoped that treating the newly graded slopes to make conditions more favorable for forest species and replanting natives to give them an advantage over weedy exotics will allow forest communities to reestablish quickly.

One method of slope preparation incorporated into the road construction contract specifications was to require the removal and stockpiling of 4,000 cubic yards of duff, litter, and woody debris from old growth forest stands within the project clearing limits. This material will be spread to a depth of six inches on selected reconstructed slopes adjacent to old growth forest stands. A planting medium of native duff, litter, and coarse woody debris not only alters environmental conditions to favor forest edge species, it also is a source of seed from local genetic stocks. Another benefit is the mulch effect which protects slopes from erosion. Finally, the texture and appearance of a slope treated with this material are more compatible with the visual characteristics of the adjoining forest than smooth newly graded slopes or hydroseeded grass.

Although replacement of duff and litter is the preferred approach in areas where aspect and narrowness of clearing limits will produce full or part shade, it does not work well in areas that receive full sun or are steeper than 1.5 to 1. Because it is also relatively expensive, duff and litter replacement is being reserved for old growth areas where it can be used to maximum effect.

A variation on hydroseeding (the most inexpensive slope preparation), developed by park botanist Ed Schreiner, is aimed at minimizing its negative effects. He proposed seeding with a mixture of fast-growing, short-lived annuals and cereals to provide initial erosion control. Since unfertilized hydroseeded grass mats are known to begin deteriorating after about two years in the Pacific Northwest environment (Dymess, 1975), it was hoped that these grasses would not persist at Soleduck. The deteriorating mat would then

provide organic matter and seedling establishment sites for natives.

A modification of Schreiner's approach currently being considered involves seeding a sterile wheat hybrid (*Triticum x Agropyron*) in combination with two native grasses. The sterile wheat establishes quickly like its cereal parent but it cannot reseed itself. The two native grasses (*Bromus vulgaris* and *Elymus glaucus*) have been collected from the Soleduck drainage. Negotiations have begun to have these seed stocks increased by growing them in isolation at the SCS Plant Materials Center in Corvallis, Oregon. Neither species is particularly competitive with woody natives.

In addition to site preparation, project plans include replanting over 20 acres of cut and fill slopes. To obtain local genetic stock for this effort, much of the 1986 field season was spent (1) salvaging native plants from areas scheduled to be cleared during construction, (2) collecting native seed, and (3) propagating native plants through hardwood and semi-hardwood cuttings. Because many of the reconstructed road shoulders will be drier and more open than the existing road, emphasis was placed on dry site species and natives with some degree of sun tolerance. Shade-loving dormants like western hemlock (*Tsuga heterophylla*) and shallow-rooted mat-forming herbs like *Oxalis oregana* can also be planted close to the forest edge or on areas where slope orientation and narrow clearing limits will produce adequate shade.

Between June and August 31, 1986, a six-person revegetation crew assisted by nine YCCs removed over 11,000 plants from within the construction clearing limits. Most species were moved as individual transplants, but, in some areas, shallow-rooted mats containing several species could be cut and rolled like sod. All plants were heeled in trenches at 33 nursery areas located from 10 to 50 feet behind the



Reveg crew member Dick Hadley collecting *Anaphalis*.

clearing limits. These sites were watered about once a week during July and August. In mid August, when plants began to show signs of transplant shock, salvaging stopped. Mid-September mortality data showed over 95 percent of the transplants were still living.

Thirty species were represented. Sword fern (*Polystichum munitum*), western hemlock (*Tsuga heterophylla*), and pearly everlasting (*Anaphalis margaritacea*) accounted for over 70 percent of the collection. In selecting species to transplant, the crew tried to salvage in proportion to what would be needed in revegetating and to preserve the diversity of species along the road. They also concentrated on plants that transplanted well, particularly community dominants like sword fern and hemlock. Also emphasized were dry site species such as pearly everlasting, salal (*Gaultheria shallon*), and Douglas fir (*Pseudotsuga menziesii*); mats of shallow-rooted herbs, especially aggressively rhizomatous species,



Close up of shallow-rooted mats of Oregon oxalis (*Oxalis oregana*) with interspersed foam flower (*Tiarella trifoliata*) in salvage site nursery.

and slow-growing, usually woody species that cannot easily be propagated by seed. To increase diversity, the crew attempted to transplant any species not previously encountered.

In August, the emphasis began shifting from plant salvage to seed collection. Seed from 24 species was collected and cleaned. Because maximum diversity was desired, an effort was made to collect each species from a variety of locations and habitat types. Early and late ripening fruits of the same species were collected. Seed from tall and short individuals of the same species was sought.

The collected seed will be propagated in a number of ways. A contract is being negotiated to have 8,500 salal plants and seedlings of other species grown from Soleduck Valley seed by a commercial nursery. Three species will be tested and grown for production by a local high school horticulture class. Ten species are being used in field germination test plots on cut slopes on the neighboring forest service road. The project staff will use the remainder for additional germination tests and fall-sowing for production.

Propagation from cuttings has also been attempted. In April 1986, hardwood cuttings were taken from 10 woody species. They were planted and are being cared for under contract by Diversified Industries, a local sheltered workshop. Species that rooted and showed over 50 percent survival include flowering currant (*Ribes spp.*), Snowberry (*Symphoricarpos albus*), and dogwood (*Cornus stolonifera*). Over 20 percent of Thimbleberry (*Rubus parviflorus*) and Salmonberry (*Rubus spectabilis*) cuttings survived. In August, more than 2,100 semi-hardwood cuttings representing six species were collected and are being cared for under mist in polypropylene tents.

As work progressed, records were kept on the time and costs needed to salvage or propagate native genetic stock. In the case of sword fern, an important community dominant, salvage appears to be clearly cost effective. Sword fern purchased for visitor center plantings cost \$9 per two gallon container for plants in excellent condition. The cost of salvaging a large sword fern with a good root ball was between \$.85 and \$.39 a plant. Even if the cost of a container were added, this would still be a considerable saving. As previously noted, transplant survival is at least 95 percent and all plants are from the Soleduck gene pools. Preliminary figures suggest that, for a number of species, salvaging local genetic stock can save money, if a particular species transplants easily. The cost of growing natives from seed is also reasonable. Year-old containerized evergreen seedlings can be grown by contract for around \$125 per thousand. Year-old woody shrub seedlings such as salal in 4 to 10 cubic inch containers are estimated to cost about \$.62 per plant not including the cost of collecting local seed. Whatever method is selected, the importance of adequate time for planning and preparing a revegetation project is critical. Although some species can be contract grown in a year's time, at least two years lead time is recommended.

During the 1986 field season, work with slope preparation and native plant materials laid the ground work for achieving the project's visual quality goals. The staff found that much of this work could be done in ways that consider the genetic integrity of the ecosystem, but do not generate excessive additional costs. As work proceeds and more results are available, we hope that the standards we test will be useful to future road projects in the National Park system and beyond.

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