

**OLYMPIC NATIONAL PARK**  
*Elwha River Ecosystem and Fisheries Restoration*

**2004 Annual Summary Report**  
Prepared by Amy Bartow

**NATURAL RESOURCES CONSERVATION SERVICE**  
**CORVALLIS PLANT MATERIALS CENTER**  
**CORVALLIS, OREGON**

**INTRODUCTION-** The Corvallis Plant Materials Center (PMC) entered into a new agreement with Olympic National Park in 2004 to provide native plant materials for the ecological restoration of drained lakebeds of Lake Mills and Lake Aldwell following the removal of two dams on the Elwha River. It was agreed that the PMC would propagate a minimum of 300 lbs (PLS) of seed and 60,000 containerized shrubs; 900 lbs (PLS) of seed and 46,000 containerized herbs and forbs; and 2,020 lbs (PLS) of grass, sedge, and rush seeds. A more detailed production list will be determined by PMC and NPS as restoration plans are finalized. Dam removal is scheduled to begin in 2008.

**ACCOMPLISHMENTS-** PMC and NPS staff and volunteers collected 12 lbs of clean seed of 19 species in 2004. Seed was cleaned and informal germination tests were performed on most of the seed lots prior to planting. Four grasses and two sedges were seeded into seed increase fields on September 29 and October 5, 2004 using a six-row Planet Jr. seeder. In late October, PMC staff traveled to the park to collect dormant hardwood cuttings of nine species of trees and shrubs. 2620 cuttings were collected in 61 person hours and subsequently planted into cone-tainers. Vegetative cutting blocks of three forbs were also established. 6340 transplants were grown from seed to expand or establish seed increase fields of 10 species in early spring of 2005.

**TECHNOLOGY DEVELOPMENTS-** Large quantities of fireweed seed had never been collected or cleaned by PMC staff. Harvest techniques were successful. When lowest capsule split open, entire racemes were cut from the plant, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. There was no decrease noted in seed viability with this collection technique, and it proved to be very efficient. After drying, bags were emptied into a large brush machine (using the smallest screen available, size #14). The down draft created by the spinning brushes drew the tiny seeds into the machine. Seeds and fluff fell that through the screen were collected and cleaned with an air-screen machine.

Experimental propagation of six species began in the fall of 2004. Results determined that Dewey's sedge, Bolander's rush, and common rush require at least five weeks of cold-moist stratification to break seed dormancy, whereas Henderson's sedge, goatsbeard, and small-flowered wood rush require at least 90 days of cold moist stratification. This information will help PMC staff determine optimum seeding times for these species. Plants that were produced in these trials will also be used as transplants to establish seed increase fields.

**THE 2004 OLYMPIC NATIONAL PARK ANNUAL REPORT:**  
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CORVALLIS PLANT MATERIALS CENTER  
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CORVALLIS, OREGON  
Amy Bartow

December 30, 2004

**I. Brief Background of Project** The Corvallis Plant Materials Center (PMC) entered into a new agreement with Olympic National Park in 2004 to provide native plant materials for the ecological restoration of drained lakebeds of Lake Mills and Lake Aldwell following the removal of two dams on the Elwha River. It was agreed that the PMC would propagate a minimum of 300 lbs (PLS) of seed and 60,000 containerized shrubs; 900 lbs (PLS) of seed and 46,000 containerized herbs and forbs; and 2,020 lbs (PLS) of grass, sedge, and rush seeds. A more detailed production list will be determined by PMC and NPS as restoration plans are finalized. Dam removal is scheduled to begin in 2008. Activities in 2004 included collecting and cleaning seed of nineteen species; establishing and maintaining seed production fields, including four grasses, two forbs, and two sedges; producing containerized stock, propagating five forbs and one shrub experimentally; and establishing cutting blocks of nine shrubs and one forb. Details are provided below.



Figure 1. Lake Mills, Olympic National Park, August 4, 2004.

## II. Accessions Involved

Table1. Accessions Involved in the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

Species	Common name	Symbol	Accession number
<i>Achillea millefolium</i>	common yarrow	ACMI2	9079349
<i>Alnus viridis ssp. Sinuata</i>	Sitka Alder	ALVIS	
<i>Amelanchier alnifolia</i>	Saskatoon serviceberry	AMAL2	
<i>Anaphalis margaritacea</i>	pearly everlasting	ANMA	9079350
<i>Artemisia suksdorfii</i>	coastal wormwood	ARSU4	
<i>Aruncus dioicus</i>	goatsbeard	ARDI8	9079370
<i>Bromus complex<sup>1</sup></i>	Brome complex	BR sp	9079332
<i>Bromus vulgaris</i>	Columbia brome	BRVU	9079333
<i>Carex deweyana</i>	dewey sedge	CADE9	9079330
<i>Carex hendersonii</i>	Henderson's sedge	CAHE7	9079331
<i>Carex pachystachya</i>	chamisso sedge	CAPA14	9079329
<i>Ceanothus sanguineus</i>	redstem ceanothus	CESA	9079342
<i>Deschampsia elongata</i>	slender hairgrass	DEEL	9079335
<i>Elymus glaucus</i>	blue wildrye	ELGL	9079334
<i>Epilobium angustifolium</i>	tall fireweed	EPAN	9079345
<i>Epilobium ciliatum</i>	fringed willowherb	EPCI	9079346
<i>Epilobium glaberrimum</i>	glaucus willowherb	EPGL	9079347
<i>Fragaria virginiana</i>	woodland strawberry	FRVI	9079354
<i>Gaultheria shallon</i>	salal	GASH	9079340
<i>Holodiscus discolor</i>	oceanspray	HODI	
<i>Juncus bolanderi</i>	Bolander's rush	JUBO	9079371
<i>Juncus effusus</i>	common rush	JUEF	9079348
<i>Lonicera ciliosa</i>	orange honeysuckle	LOCI3	9079364
<i>Lonicera involucrata</i>	honeysuckle	LOIN	9079363
<i>Lupinus latifolius var. latifolius</i>	broadleaf lupine	LULA4	9079336
<i>Luzula parviflora</i>	smallflowered woodrush	LUPA4	9079337
<i>Mahonia aquifolium</i>	holleyleaved barberry	MAAQ2	
<i>Petasites frigidus var. palmatus</i>	Arctic sweet coltsfoot	PEFRP	9079344
<i>Populus balsamifera ssp. trichocarpa</i>	black cottonwood	POBAT	9079369
<i>Ribes divaricatum</i>	spreading gooseberry	RIDI	9079365
<i>Ribes lacustre</i>	prickly currant	RILA	9079366
<i>Rosa nutkana</i>	nutka rose	RONU	9079338
<i>Rubus parviflorus var. parviflorus</i>	thimbleberry	RUPAP2	

Table1 (Con't). Accessions Involved in the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

<b>Species</b>	<b>Common name</b>	<b>Symbol</b>	<b>Accession number</b>
<i>Rubus spectabilis</i>	salmonberry	RUSPS	9079362
<i>Rubus ursinus ssp. Macropetalus</i>	California blackberry	RUURM	
<i>Salix lucida var. lasiandra</i>	Pacific willow	SALUL	9079368
<i>Salix scouleriana</i>	Scouler's willow	SASC	
<i>Salix sitchensis</i>	Sitka willow	SASI2	9079361
<i>Sambucus racemosa</i>	red elderberry	SARA2	9079367
<i>Stachys chamissonis var. colleyae</i>	Mexican hedgenettle	STME	9079343
<i>Symphoricarpos albus</i>	common snowberry	SYAL	9079339
<i>Vicia americana</i>	American vetch	VIAM	9079341

1= *Brome sitchensis*, *Bromus carinatus*, and *Bromus pacificus* occur in the Elwha watershed and were all chosen as restoration grasses in this project. Field identification of these species is very difficult. They were bulked and treated as one accession and designated "Brome complex" for collection and seed increase purposes.

### III. Native Seed and Plant Collections

PMC staff was responsible for native seed collections. Because of the large variety of species to be collected, six scouting and collection trips were required in 2004. Park staff field-scouted and reported seed maturity conditions to PMC staff. They also collected many of the early-season and late-season species when it was not feasible for PMC staff to travel to the park. This collaborative effort resulted in abundant and diverse collections. Seed collections were performed in over 20 locations in the Elwha watershed between river mile 19 and the mouth of the Elwha (below 1000ft elevation). Approximately 350 hours were recorded as actual collection time. A total of 12 lbs of clean seed of eighteen species was collected in 2004.

Optimum collection time for sedge seed collection was late June through early August depending on sun exposure. Grass seed displayed a wide collection window, also mainly depending on sun exposure, peak seed collection occurred in late July through mid August. Forb seed was mostly collected in August, except lupine and vetch seeds were collected in mid to late July. During the seed collection trips vegetative propagules of FRVI, STCHC, and PRFRP were also collected. Rhizomes or stolons were dug out of seeps and sand bars.

In late October, PMC staff collected dormant hardwood cuttings of trees and shrubs from the park, as leaves were beginning to senesce. Target cuttings were from current year's growth, at least pencil thick in diameter, and disease-free. Three-foot sections were cut in the field, leaves were stripped, and cuttings were placed in plastic bags with wet burlap sacs for transport back to the PMC. Approximately, 61 collection hours were recorded and a total of 2620 cuttings of nine species were collected.

Table 2. Native Seed and Plant Collection in the Elwha Watershed in 2004 for Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

Species	Symbol	Accession number	Collection dates	Amt collected
<b>Forbs</b>				
<i>Achillea millefolium</i>	ACMI2	9079349	8/4/04- 8/31/04	958g
<i>Anaphalis margaritacea</i>	ANMA	9079350	8/11/04- 8/31/04	97g
<i>Aruncus dioicus</i>	ARDI8	9079370	8/2/04- 8/11/04	81g
<i>Epilobium angustifolium</i>	EPAN	9079345	7/29/04- 8/20/04	237g
<i>Epilobium ciliatum</i>	EPCI	9079346	7/29/04- 8/20/04	94g
<i>Fragaria virginiana</i>	FRVI	9079354	8/4/04- 8/30/04	500 props
<i>Lupinus latifolius var. latifolius</i>	LULA4	9079336	7/20/04- 8/04/04	12g
<i>Petasites frigidus var. palmatus</i>	PEFRP	9079344	8/4/04- 8/30/04	300 props
<i>Stachys chamissonis var. colleyae</i>	STME	9079343	8/4/04- 8/30/04	500 props
<i>Vicia americana</i>	VIAM	9079341	7/20/04- 12/04	15g
<b>Grasses, sedge, and rushes</b>				
<i>Bromus complex</i>	BR sp	9079332	7/22/04-8/5//04	494g
<i>Bromus vulgaris</i>	BRVU	9079333	7/22/04- 8/15/04	874g
<i>Carex deweyana</i>	CADE9	9079330	7/19/04- 8/4/04	152g
<i>Carex hendersonii</i>	CAHE7	9079331	7/19/04- 8/4/04	6g
<i>Carex pachystachya</i>	CAPA14	9079329	7/1/04- 8/4/04	335g
<i>Deschampsia elongata</i>	DEEL	9079335	7/20/04- 8/4/04	210g
<i>Elymus glaucus</i>	ELGL	9079334	7/20/04- 8/14/04	1607g
<i>Juncus bolanderi</i>	JUBO	9079371	8/31/04- 9/9/04	13g
<i>Juncus effusus</i>	JUEF	9079348	8/4/04- 9/1/04	135g
<i>Luzula parviflora</i>	LUPA4	9079337	7/20/04- 8/4/04	4g
<b>Trees and shrubs</b>				
<i>Ceanothus sanguineus</i>	CEVE	9079342	7/20/04- 8/12/04	5g
<i>Gaultheria shallon</i>	GASH	9079340	received 8/4/04	300 props
<i>Lonicera ciliosa</i>	LOCI3	9079364	10/20/2004	75 props
<i>Lonicera involucrata</i>	LONIC	9709363	10/20/2004	200props
<i>Populus balsamifera ssp. trichocarpa</i>	POBAT	9079369	10/20/2004	75 props
<i>Ribes divaricatum</i>	RIDI	9079365	10/20/2004	140 props
<i>Ribes lacustre</i>	RILA	9079366	10/20/2004	175 props
<i>Rosa nutkana</i>	RONU	9079338	10/20/2004	240 props
<i>Rubus spectabilis</i>	RUSPS	9079362	10/20/2004	540 props
<i>Salix lucida var. lasiandra</i>	SALUL	9079368	10/20/2004	75 props
<i>Salix sitchensis</i>	SASI2	9079361	10/20/2004	500 props
<i>Sambucus racemosa</i>	SARA2	9079367	10/20/2004	220 props
<i>Symphoricarpos albus</i>	SYAL	9079339	10/20/2004	430 props

## Seed collection notes for 2004- Individual species

ACMI2 *Achillea millefolium* 9079349

Entire inflorescences were clipped when flowers turned brown and seeds readily separated from the plant when shaken. Seedheads were placed in paper sacks or cloth bags and placed in an open greenhouse to dry. After drying, seedheads were “hand threshed” in a large garbage barrel. Stems and chaff were scalped off by hand, and seeds were cleaned easily in an air-screen machine.

ANMA *Anaphalis margaritacea* 90793850

Seeds were mature when the pappus began to fall away from the receptacle. Firm brown seeds should be attached to the pappus. Flowers were significantly infested with weevils, making good seed difficult to find. Good seed heads appeared very brown with pappus being released evenly across the inflorescence. Plants that had a mix of seedheads with tight, yellowish pappus and some brown “fluffy” pappus were usually infested with weevils and were not collected. Seedheads were placed in paper sacks or cloth bags and placed in an open greenhouse to dry. After drying, bags were emptied into a large brush machine (using the smallest screen available- #14). Seeds and fluff that fell through the screen was collected and cleaned with an air-screen machine.

ARDI8 *Aruncus dioicus* 9079370

Male inflorescences can be mistaken for ripe seedheads in late summer. Only female inflorescences contain seeds, and these turn a deep red-brown when ripe. Seeds fall easily from plants when they are mature. Seedheads were placed in paper sacks or cloth bags and placed in an open greenhouse to dry. After drying, seedheads were “hand threshed” in a large garbage barrel. Stems, chaff and other trash was scalped off by hand, and seeds were cleaned easily in an air-screen machine.

EPAN & EPCI *Epilobium* sp. 9079345 & 9079346

When lowest capsule split open, entire racemes were cut from the plant, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. After drying, bags were emptied into a large brush machine (using the smallest screen available- #14). Seeds and fluff fell that through the screen were collected and cleaned with an air-screen machine.

LULA4 *Lupinus latifolius* var. *latifolius* 9079366

Lupine plants were difficult to find below the 1000ft elevation line. Most were found along the river in areas of recent soil deposition. Seedheads were collected when brown to black, before pods split. One large lupine patch was difficult to access, therefore, multiple collections were not possible. Inflorescences were “bagged” with nylons and secured at the bottom with twist ties. They were collected at the end of the growing season. The nylons may have trapped moisture and delayed maturation. These collections contained a higher percentage of shriveled and immature seeds. Most pods shattered while drying, and a hammermill was used to break up the pods that were still closed. Seed was further cleaned using an air-screen machine.

VIAM *Vicia americana* 9079341

American vetch was prevalent in the park, especially in areas that had been burned in the past five years. However viable seeds, were difficult to locate. Flower and seed production was generally poor, and what little seed had been produced was consumed by weevils. Pods were hand collected and placed in paper bags to dry. Most pods shattered while drying, and a hammermill was used to break up the pods that were still closed. Seed was further cleaned using an air-screen machine.

BRsp *Brome complex* 9079332

The three bromes in the complex *Bromus pacificus*, *B. sitchensis*, and *B. carinatus*, were collected as seed began to shatter. Seeds and seedheads turned a light straw color when mature. Seeds were easily hand-stripped, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. A lab-sized brush machine was used to break off awns, then seed was further cleaned using an air-screen machine.

BRVU *Bromus vulgaris* 9079333

The seed of this grass does not shatter as easily as many others, so it can be collected well after it has matured on the plant. Seeds were hand-stripped when they turned a reddish yellow, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. A lab-sized brush machine was used to break off awns, then seed was further cleaned using an air-screen machine.

CADE9, CAHE7 & CAPA14 *Carex sp.* 9079330, 9079331 & 9079329

All seed of carex species was collected when they fell from the plant upon handling. Seeds should be checked for maturity by pinching the seed between two thumbnails. If any liquid or paste comes out (“milk” to “soft-dough stage”), the seed is not mature and should not be collected. The earliest seed should be collected is at the “hard-dough” stage. Ideally, seeds were not collected until fully mature, when the seeds could not be crushed between to thumbnails. Seeds were hand-stripped, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. Seed was cleaned using an air-screen machine.

DEEL *Deshampsia elongata* 9079335

This grass was found in disturbed or waste areas. It is one of the more difficult grasses to collect. Due to its low stature, grass was intermixed with many other low grasses and forbs. Seeds and seedheads turned a light straw color when mature. Seeds were easily hand-stripped, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. A lab-sized brush machine was used to remove hairs, then seed was further cleaned using an air-screen machine.

ELGL *Elymus glaucus* 9079334

Determining maturation on this species can be difficult. Seeds will easily fall from the plant when pulled even when the florets are very green. It is best to wait until the seedheads turn a silvery yellow color to harvest blue wildrye. This species was throughout the watershed as a component of most plant communities and large amounts could be collected in a relatively small period of time. Entire seedheads were hand picked

off stems, placed in paper sacks or cloth bags, and left in an open greenhouse to dry. A brush machine was used to break off awns, then seed was further cleaned using an air-screen machine.

JUBO & JUEF *Juncus sp.* 9079371 & 9079348

Seeds were mature when capsules turned deep brown and just began to split. A hand sickle or rice knife was used to cut off a handful of inflorescences. They were placed in cloth bags, and left in an open greenhouse to dry. They were not put in paper bags because the tiny seeds can slip out the bottom. After drying, material was “hand threshed” in a large garbage barrel. Stems, chaff, and other trash was scalped off by hand, and seeds were cleaned easily in an air-screen machine.

LUPA4 *Luzula parviflora* 9079337

Seeds were mature when capsules turned deep brown and just began to split. Capsules were hand-stripped, placed in paper bags, and left in an open greenhouse to dry. After drying, they were rubbed in a rubbing trough, and air-screen machine was used to further clean the seeds.

### III. Experimental Propagation

Most species involved in this project have been propagated successfully at the PMC for previous National Park Service agreements or other projects. However, some species were new and informal propagation trials were performed. Seeds of ARDI8, LUPA, CAHE, CADE, CESA, JUEF, and JUBO were placed in plastic germination boxes on moistened germination paper and stored in a growth chamber set at 8°(C) days and 4°(C) nights with 8 hours of light for 45 and 90 days each. One “control” box of seeds was left in a greenhouse set at fall temperatures (16° day/ 10° night).

Table 3. Results of Experimental Propagation Trials Performed at the Corvallis PMC in 2004 for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement.

Species	Germination after treatment		
	Control	45 days	90 days
ARDI8	0	5	60
CADE	0	77%	75%
CAHE	0	3	85
CESA	0	Not available	
JUBO	0	72%	73%
JUEF	0	88%	79%
LUPA	0	0	35

LOIN, RUSPS, SYLA, SARA and *Salix sp* are known to root easily from dormant hardwood cuttings. Cuttings of RIDI, RILA, RONU, were also taken experimentally. They were cut into 12” sections containing at least two nodes (one above the soil and one below) and inserted into 7” cone-tainers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced



slow-release fertilizer. Conetainers were left outdoors in a lathhouse to overwinter. They will be evaluated in the spring of 2005.

#### IV. Field Seed Increase

All seed collected in 2004 was cleaned and informal germination tests were performed on most of the seed lots prior to planting. Only grasses and sedges were selected for fall seeding; forbs will be seeded in the spring of 2005 after spring germinating weeds have been sprayed out of the fields. Grasses and sedges were seeded into fields on September 29 and October 5, 2004 using a six-row Plantet Jr. seeder. Rows in all fields, except the brome complex were carbon banded using a backpack sprayer then sprayed with Diuron (a soil applied herbicide used to control pre-emergent grass and other weed seed). Fall rains began the day after seeding and spraying were completed so no fall irrigation was needed.

Table 4. Establishment information for new seed increase fields for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis PMC in 2004.

Species/Ac	amt seeded	germ	approximate seeding rate	establishment rate	seeds/lb
ELGL 0.15 acres or 35 184' rows 12" btwn rows	1606g	10%	24lbs/acre (bulk) 2.4lbs/acre (PLS) 8 PSL/ft-row	<1 seedlings/ft	140,000
BRVU 0.10 acres or 22 180' rows 12" btwn rows	1200g	30%	27lbs/ac (bulk) 8lbs/acre- (PLS) 25 PLS/ft-row	22 seedlings/ft	117,000
DEEL 0.25 acres or 60 181' rows 12" btwn rows	200g thinned with scoopable cat litter	70%	2 lbs/acre (bulk) 1.3lbs/acre (PLS) 425 PLS/ft-row	200 seedlings/ft	1,429,000
CAPA .085 acres or 20 176' rows 12" btwn rows	334g	67%	8.7lbs/acre (bulk) 5.8lbs/acre (PLS) 110 PLS/ft-row	Not available at this time	819,000
CADE .02 acres or 4 176' rows 12" btwn rows	150g	77%	17lbs/acre (bulk) 13lbs/acre (PLS) 220 PLS/ft-row	Not available at this time	760,000
BR sp. 0.10 acres or 22 184' rows 12" btwn rows	494g	95%	11lbs/acre (bulk) 10lbs/acre (PLS) 16 PLS/ft-row	13 seedlings/ft	60,000

Most seedlings emerged within 2-3 weeks after planting, and stand establishment and vigor was rated high for all species, except ELGL. Diuron provided fair weed control.

2,4-D was applied in November to grass fields to control broadleaves. Glyphosate was applied over sedge fields in November to control all weeds (sedges will not emerge until late winter).

The ELGL field was planted on September 7, 2004 by a larger seven-row seed drill equipped with a carbon-banding unit. Germination tests had not been completed on this seed lot prior to planting. Post planting germination tests showed the seed lot to be in



very poor shape, approximately 10% of the seeds germinated. Seeds may have been damaged during the de-bearding (awn removal) process. Emergence in the field was less than 10%. The PMC decided to spray out the few seedlings that had emerged and start over with plugs grown from leftover seed.

Figure 3. Carbon banding of ELGL field at Corvallis Plant Materials Center, September 9, 2004.

### **Cutting block establishment- Individual species 2004**

FRVI *Fragaria virginiana* 9079354

Seed increase of strawberries would not be efficient or productive, so it was decided that a stolon cutting block would be established. Stolons were harvested in early August and planted into 6" stubby containers filled with moist media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer, and placed in a lathhouse. They quickly rooted and stabilized the media in the containers. Cones were "dibbled" into existing sod on November 10, 2004.

PEFRP *Petasites frigidus* var. *palmatus* 9079344

Rhizomes were harvested from the Elwha and divided in early August when leaves began to senesce. They were planted into 2 1/2" square pots filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax)

and a balanced slow-release fertilizer, and placed in a lathhouse. On November 15, 2004, they were transplanted into a 50'X50' "experimental pond" on 2'X2' spacing. This site was chosen because it has simple irrigation controls for early summer watering and dewatering, the structure will limit rhizomes from spreading to adjoining areas, and rhizomes can easily be harvested from the sandy media.

STCHC *Stachys chamissonis* var. *colleyae* 9079343

Rhizomes were harvested from the Elwha in early August. They were trimmed and planted into 6" stubby cone-tainers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer, and placed in a lathhouse. On November 15, 2004, they were transplanted into a 50'X50' "experimental pond" on 1'X2' spacing.

LOCI & LOIN *Lonicera* sp. 9079364 & 9079363

Dormant hardwood cuttings were trimmed into 12" sections containing at least two nodes (one above the soil and one below) and inserted into 7" cone-tainers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer. Cone-tainers were left outdoors in a lathhouse to overwinter. They will be transplanted into the field in spring of 2005 when roots have filled the cone-tainers.

RONU *Rosa nutkana* 9079338

The Park gave the PMC small potted RONU plants in the spring of 2004. These were transplanted into 1 gallon pots in the summer, and on November 20, 2004, they were transplanted into existing sod at the PMC farm.

RUSPS *Rubus spectabilis* 9079362

Dormant hardwood cuttings were trimmed into 12" sections containing at least two nodes (one above the soil and one below) and inserted into 7" cone-tainers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer. Cone-tainers were left outdoors in a lathhouse to overwinter. They will be transplanted into the field in spring of 2005 when roots have filled the cone-tainers.

SALUL *Salix lucida* var. *lasiandra* 9079368

Dormant hardwood cuttings were trimmed into 12" sections containing at least two nodes (one above the soil and one below) and inserted into 7" cone-tainers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer. Cone-tainers were left outdoors in a lathhouse to overwinter. They will be transplanted into the field in spring of 2005 when roots have filled the cone-tainers.

SASI2 *Salix sitchensis* 9079361

A 3' X 170' strip of sod was sprayed with glyphosate and weed fabric was laid down over the strip. 2 ½' deep "pilot holes" were made into the weed fabric and soil every three feet. Two offset rows were created one foot apart in each strip of weed fabric.

Dormant hardwood cuttings were trimmed into 3' sections and pushed into the pilot holes leaving about 6" above the ground.

SARA2 *Sambucus racemosa* 9079367

3' X 170" strips of sod were sprayed with glyphosate and weed fabric was laid down over the strip. 2 ½' deep "pilot holes" were made into the weed fabric and soil every three feet. Two offset rows were created one foot apart in each strip of weed fabric. Dormant hardwood cuttings were trimmed into 3' sections and pushed into the pilot holes leaving about 6" above the ground. Cuttings had at least two nodes in the ground and one node above the ground.

SYAL *Symphoricarpos albus* 9079339

The Park gave the PMC small potted SYAL plants in the spring of 2004. These were transplanted into 1 gallon pots in the summer, and on November 20, 2004, they were transplanted into existing sod at the PMC farm. Dormant hardwood cuttings collected by PMC staff were trimmed into 12" sections containing at least two nodes (one above the soil and one below) and inserted into 7" cone-tainers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer. Cone-tainers were left outdoors in a lathouse to overwinter. They will be transplanted into the field in spring of 2005 when roots have filled the cone-tainers.

## **V. Container Plant Production**

Seed that was leftover from mechanical seeding was sown into 6" cone-tainers and will be transplanted as plugs to fill in thin spots in the field or to expand the field.

Some of the seed lots collected from the Elwha watershed were too small or valuable to be seeded with machines. These seeds were planted into containers filled with moistened media (Sunshine #1, a peat-based soil-less media) amended with micronutrients (MicroMax) and a balanced slow-release fertilizer and will be transplanted into a field when appropriate.

## **VI. Delivery of Plant Materials**

No deliveries were made in 2004.

Table 5. Container Plant Production in 2004 at the Corvallis PMC in 2004 for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement.

Species	Code	Accession number	amt seeded (g)	number produced	treatment
<i>Aruncus diocicus</i>	ARDI8	9079370	1	490	12 weeks cold-moist stratification
<i>Bromus complex</i>	BR sp	9079332	7	490	none
<i>Carex deweyana</i>	CADE9	9079330	<1	250	5 weeks cold-moist stratification
<i>Carex hendersonii</i>	CAHE7	9079331	5	450	12 weeks cold-moist stratification
<i>Carex pachystachya</i>	CAPA14	9079329	1	650	5 weeks cold-moist stratification
<i>Deschampsia elongata</i>	DEEL	9079335	1	490	none
<i>Elymus glaucus</i>	ELGL	9079334	20	2200	none
<i>Juncus bolanderi</i>	JUBO	9079371	<1	400	5 weeks cold-moist stratification
<i>Juncus effusus</i>	JUEF	9079348	1	800	5 weeks cold-moist stratification
<i>Luzula parviflora</i>	LUPA4	9079337	4	400	12 weeks cold-moist stratification
<i>Lupinus latifolius var. latifolius</i>	LULA4	9079336	12	200	scarification
<i>Vicia americana</i>	VIAM	9079341	15	400	soaked in hot water 24 hours