CORVALLIS PLANT MATERIALS CENTER
NATURAL RESOURCES CONSERVATION SERVICE
CORVALLIS, OREGON
Amy Bartow

December 30, 2005

THE 2005 OLYMPIC NATIONAL PARK ANNUAL REPORT:

Elwha River Ecosystem and Fisheries Restoration

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 Lake Mills and Lake Aldwell following dam removal on the Elwha River. It was agreed that the PMC would propagate a minimum of 300 lbs (PLS) and 60,000 containers of shrubs; 900 lbs (PLS) and 46,000 containers of herbs and forbs; and 2,020 lbs of grasses, sedges, and rushes. A more detailed production list will be determined by PMC and NPS staff as restoration plans are finalized.

Activities in 2005 included collecting seed of 16 species; establishment and maintenance of seed production fields including five grasses, seven forbs, and two sedges; containerized stock production of eight species; maintenance of cutting blocks of nine shrubs and one forb. Details are provided below.

Figure 1. Elymus glaucus seed increase field, Corvallis Plant Materials Center, Corvallis Oregon, June 25, 2005.

II. Accessions Involved

Table1. Accessions involved and activities performed in 2005 for Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

Species	Common name	Symbol	Accession number	2005 Activity[1]
Achillea millefolium	common yarrow	ACMI2	9079349	Sfp
Agrostis exarata	spiked bentgrass	AGEX	9079401	Sfp Col
Anaphalis margaritacea	pearly everlasting	ANMA	9079350	Sfp Col
Artemisia suksdorfii	coastal wormwood	ARSU4	9079400	Sfp Col
Aruncus dioicus	goatsbeard	ARDI8	9079370	Pxn
Bromus complex	Brome complex	BR sp	9079332	Sfp Col
Bromus vulgaris	Columbia brome	BRVU	9079333	Sfp Col
Carex deweyana	dewey sedge	CADE9	9079330	Sfp Pxn Col
Carex hendersonii	Henderson's sedge	CAHE7	9079331	Pxn Col
Carex pachystachya	thick-headed sedge	CAPA14	9079329	Sfp Pxn Col
Ceanothus sanguineus	redstem ceanothus	CESA	9079342	Trl
Deschampsia elongata	slender hairgrass	DEEL	9079335	Sfp Col
Elymus glaucus	blue wildrye	ELGL	9079334	Sfp Col
Epilobium angustifolium	tall fireweed	EPAN	9079345	Sfp Col
Epilobium ciliatum	fringed willowherb	EPCI	9079346	Sfp
Eriophyllum lanatum	wooly sunflower	ERLA	9079441	Pxn Col
Fragaria virginiana	woodland strawberry	FRVI	9079354	Pxn
Gaultheria shallon	salal	GASH	9079340	Pxn
Juncus bolanderi	Bolander's rush	JUBO	9079371	Pxn Col
Juncus effusus	common rush	JUEF	9079348	Pxn
Lonicera ciliosa	orange honeysuckle	LOCI3	9079364	Cb
Lonicera involucrata	honeysuckle	LOIN	9079363	Cb
Lupinus latifolius var. latifolius	broadleaf lupine	LULA4	9079336	Pxn Col
Luzula comosa	Pacific woodrush	LUCO	9079444	Pxn, Col
Luzula parviflora	smallflowered woodrush	LUPA4	9079337	Pxn Col
Petasites frigidus var.palmatus	Arctic sweet coltsfoot	PEFRP	9079344	Pxn Col
Populus balsamifera ssp. trichocarpa	black cottowood	POBAT	9079369	Cb
Ribes divaricatum	spreading gooseberry	RIDI	9079365	Cb
Ribes lacustre	prickly currant	RILA	9079366	Cb
Rosa nutkana	nutka rose	RONU	9079338	Cb Trl

Table1 (Con't). Accessions involved and activities performed in 2005 for Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

Rubus spectabilis	salmonberry	RUSPS	9079362	Cb
Salix lucida var. lasiandra	Pacific willow	SALUL	9079368	Cb
Salix sitchensis	Sitka willow	SASI2	9079361	Cb
Sambucus racemosa	red elderberry	SARA2	9079367	Cb
Stachys chamissonis var. colleyae	Mexican hedgenettle	STME	9079343	Pxn
Symphoricarpos albus	common snowberry	SYAL	9079339	Cb
Vicia americana	American vetch	VIAM	9079341	Pxn Col

1- sfp= seed increase, trl= production research trial, pxn= plant production, col= collected plant materials from park, cb= cutting block

III. Native Seed and Plant Collections

Four separate trips were conducted in July and August 2005; approximately 246 person hours were recorded as actual collection time. Seed collections were performed all over the Elwha watershed (below 1000ft elevation) throughout the growing season. A total of 19 lbs of clean seed of sixteen species were collected in 2005.

Optimum collection times for sedge seeds were late June through early August depending on sun exposure. Grasses displayed a wide collection window, also mainly depending on sun exposure, peak collection occurred in late July through mid August. Forbs were mostly collected in August. Lupines were an exception; they were collected in mid to late July.

Table 2. Native Seed and Plant Collection in the Elwha Watershed in 2005 for Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

Species	Symbol	Accession number	Collection dates	Amt collected
Forbs				
Anaphalis margaritacea	ANMA	9079350	8/22/05- 8/31/05	25g
Epilobium angustifolium	EPAN	9079345	8/22/04- 8/30/05	65g
Lupinus latifolius var. latifolius	LULA4	9079336	7/18/05- 8/04/05	30g
Petasites frigidus var.palmatus	PEFRP	9079344	6/20/05- 7/10/05	10g
Vicia americana	VIAM	9079341	8/1/05- 8/10/05	23g
Eriophyllum lanatum	ERLA	9079441	8/30/05-9/15/05	2g
Grasses, sedge, and rushes				
Agrostis exerata	AGEX	9079401	7/18/05-8/4/05	167g
Bromus complex	BR sp	9079332	7/18/05-8/4/05	1099g

Table 2 (Con't). Native Seed and Plant Collection in the Elwha Watershed in 2005 for Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis Plant Materials Center.

Bromus vulgaris	BRVU	9079333	7/18/05- 8/11/05	2831g
Carex deweyana	CADE9	9079330	7/18/05-8/4/05	135g
Carex hendersonii	CAHE7	9079331	7/18/04- 7/21/04	3g
Carex pachystachya	CAPA14	9079329	7/18/05-8/4/05	358g
Deschampsia elongata	DEEL	9079335	7/18/05-8/4/05	336g
Elymus glaucus	ELGL	9079334	7/18/05- 8/11/05	3310
Juncus bolanderi	JUBO	9079371	8/10/05-9/13/05	12g
Luzula parviflora	LUPA4	9079337	7/18/05-8/4/05	3g

IV. Experimental Propagation

Most species involved in this project have been propagated successfully at the PMC for previous park service agreements or other projects. A handful of species were new in 2004 and informal propagation trials were performed. Seeds of ARDI8, LUPA, CAHE, CADE, CESA, JUEF, JUBO were placed in plastic germination boxes on moistened germination paper and stored in a walk-in cooler for 45 and 90 days each. One "control" box of seeds was left in a greenhouse set at fall temperatures (60 degree days, 50 degree nights). Not all results were available for the 2004 report. Final data is reported below.

Table 3. Results of Experimental Propagation Trials Performed at the Corvallis PMC in 2004/2005 for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement.

	Germination after treatment		
Species	**Control**	**45 days**	**90 days**
ARDI8	0	0	85%
CADE	0	77%	75%
CAHE	0	0	63%
JUBO	0	72%	73%
JUEF	0	88%	79%
LUPA	0	0%	81%

Cuttings of RIDI, RILA, RONU, were also taken experimentally in the fall of 2004. They were cut into 12" sections containing at least two nodes (one above the soil and one below) and stuck into long conetainers 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. In February of 2005, conetainers were brought into a greenhouse set at moderate temperatures (65° days/50° nights). Both *Ribes sp* exhibited excellent rooting and filled

the conetainers within 6 weeks. At planting time, the RONU cuttings were divided into four treatments: no treatment, dipped in rooting hormone, scarred, and scarred and dipped in rooting hormone. No differences were observed in cuttings that were dipped in rooting hormone vs no hormones. There was however, a noteable difference in cuttings that were scarred vs unscarred. Cuttings that had received scarring before planting were 50% more likely to root and exhibited much higher vigor.

V. Cutting Block Establishment.

Cuttings that were planted into conetainers in fall of 2004 were overwintered outdoors in a lathhouse. In February 2005, they were moved to a greenhouse set at moderate spring temperatures (65˚ days/50˚ nights). They were watered overhead daily and monitored for pests and diseases. SYAL shoots were infested with aphids in March. They were sprayed twice weekly with a soap & oil solution for three weeks. Roots filled the conetainers by early May and plants were transplanted out into fields on May 10, 2005. LOIN, LOCI, RILA, and RIDI were transplanted into 3'wide strips of weed fabric. SYAL, RONU, and RUSP were transplanted into existing sod. Blocks were watered with sprinklers for 4-hour sets at 2-week intervals throughout the growing season. All species except RUSP had high survival. RUSP transplants were sensitive to sun exposure and experience high levels of die-back. Plants will be re-evaluated in spring to assess survival.

Figure 2 . *Lonicera involucrata* un-rooted cuttings at the Corvallis Plant Material Center, October 24, 2005.

Salix lucida var. lasiandra, Salix sitchensis, Sambucus racemosa, and *Populus balsamifera ssp. Trichocarpa* that were planted in fall of 2004 exhibited very high survival rates and vigor throughout the growing season of 2005. All species had 95-100% survival except SARA (55%). Mice were a considerable pest in the cutting blocks covered with weed fabric and as a result, many trees were girdled. Aluminum foil was

wrapped around the bases of the trees in early October. Willows experienced the heaviest damage from girdling, possibly losing 20% of trees. Any losses will be replaced with cuttings from existing trees within the blocks. Lower survival rates of SARA were expected and 100 cuttings from 2004 were planted into tall treepots and cared for throughout 2005 in a lathhouse. These cuttings had a survival rate of 85%.

Figure 3. *Salix sitchensis* un-rooted cuttings at the Corvallis Plant Material Center, October 24, 2005.

Figure 4. *Sambucus racemosa* un-rooted cuttings at the Corvallis Plant Material Center, October 24, 2005.

VI. Field Production Activities

Containerize plants that were produced in the fall of 2004 were transplanted into fields in January 2005. When possible, they were planted next to rows of seedlings that had been sown in the fall. This provided a comparison between fields produced from transplants versus direct seeding. Transplants performed better in both sedge fields and ANMA. All other species showed no difference in establishment methods.

Figure 5. Field of CAPA showing fall-seeded plants (rows to the left) versus spring transplanted plants (row at right).

Plants of CAHA, LUPA, LULA and ARDI were not vigorous enough in early spring to be transplanted out into fields. It was decided to keep these plants in containers throughout the 2005 growing season and transplant them out into fields in the fall. VICA was transplanted into rows of weed fabric in early spring. Plants slowly went dormant but re-emerged in late June. Plants looked weak and survival will be assessed in spring of 2006.

Spring seeding:

Forb seed that was collected in the summer of 2004 was sown using a single-row Planet Jr walk-behind planter in early February 2005. Seed was thinned using horticulture grade vermiculite. Settings on the planter were adjusted to surface sow the seed. 2ft wide strips of weed fabric were tacked down between the rows to control weeds and to act as a passive seed collector. ACMI was sown using a six-row Planet Jr. seeder towed behind a tractor. Most seedlings emerged within 2-3 weeks after planting, and stand establishment and vigor was rated high for all species, except ANMA. ANMA seedlings were slow to establish and rows were spotty.

Table 4. Establishment information for new seed increase fields for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis PMC in February 2005.

Species/Ac	Amt seeded	Germ	Approximate seeding rate	Seeds/lb
EPCI 0.05 acres or 12 176' rows 24" btwn rows	94g	78%	4.1lbs/acre (bulk) 1.7lbs/acre (PLS) 428 PLS/ft-row	8,440,000
EPAN 0.05 acres or 11 176' rows 24" btwn rows	237g	60%	10 lbs/acre (bulk) 1.9lbs/acre (PLS) 412 PLS/ft-row	10,869,000
ANMA 0.02 acres or 4 176' rows 24" btwn rows	97g	30%	10lbs/acre (bulk) 0.6lbs/acre (PLS) 231 PLS/ft-row	12,954,000
ACMI 0.5 acres or 121 180' rows 12" btwn rows	493g	58%	2.8lbs/acre (bulk) 1.6lbs/acre (PLS) 116 PLS/ft-row	3,117,200

Field Production Notes for 2005:

Weed control in grass fields was primarily performed by hand (mainly to remove exotic perennial grasses) and spraying borders and spot-spraying with glyphosate. Broadleaf herbicides (2,4-D and Banvel) were applied to grass fields in February and May. *Poa annua* plants in the BRVU field were smothering the crop, consequently the field was sprayed with glyphosate in between the rows using a shielded back-pack sprayer.

EPCI, EPAN, and ANMA fields were hand weeded monthly through May. ACMI field was sprayed with glyphosate in between the rows using a shielded back-pack sprayer. All forb fields grew vigorously and flowered in the summer. Fields were rouged before harvest to remove any seed-bearing weeds.

Both Carex fields were sprayed with glyphosate in late February before Carex seedlings had emerged. CAPA field was hand hoed in late May. CADE field had <1% emergence and was sprayed out. A new CADE field will be established from transplants in spring of 2006.

Harvest Notes for 2005:

Seed was harvested from established stands of *Carex deweyana, Carex pachystachya, Deschampsia elongata, Elymus glaucus, Bromus* complex, and *Bromus vulgaris*. Fields were harvested by hand with rice knives or swathing and combining. Experimental harvesting was investigated for *Deschampsia elongata*. The field was swathed and one quarter of the field was pitch-forked onto tarps and moved to a drying shed. After two

Figure 6. Swathing and pitchforking DEEL field at Corvallis Plant Material Center, June 20, 2005.

weeks of drying, material was pitch-forked into a stationary combine. Swaths that were left to dry on the field were combined two weeks after swathing. Seed loss was considerable with both harvest methods. The extra labor required to remove swathed material off the field makes it a very inefficient method, yet seed yields are higher. Further trials will be conducted using Palisade (a growth regulator that blocks ethylene action to slow abscission layer development and keep the seed attached to the plant) to prevent high losses from shattering during swathing and drying time before combining.

Harvesting forb fields were all experimental in 2005. EPCI field grew and flowered profusely. Weed fabric had been placed in between the rows to prevent weed growth, but it also became a very effective tool for harvesting. Seeds fell onto the fabric and collected in large, fluffy piles. A leaf-blower, used in reverse as a vacuum, was maneuvered down the rows of weed fabric. It removed and compacted the material into sac attached to the leaf-blower. The sac was emptied into large poly bags and placed in an open greenhouse to dry. This method was extremely effective and efficient. It also made cleaning the seed very simple. Most harvest methods collect a large amount of plant material along with the seed. Vacuuming left the plants fully intact on the field and the harvested seed was relatively free of plant material. Vacuumed material was emptied into a brush machine to rub the hairs off the seed. An air screen machine was used to sift the seed and blow out any remaining hairs.

EPAN field was heavily contaminated with EPCI (staff is assuming that seed collection bags were mislabeled or mixed?). Racemes of EPAN plants were cut off individually as they matured and placed in poly bags to dry in an open greenhouse. The rest of the field was treated as an EPCI field and vacuumed with a leaf blower. EPAN plants will be dug out and used to establish a new field. The existing EPAN field will then be treated as

another EPCI field. After harvest, fields were mowed with a sickle-bar mower and residue was raked and pitch-forked from the field.

Figures 7,8 & 9. Fireweed seeds collecting on weedfabric (above). Fireweed pods splitting (below, left). Vacuuming up fireweed seeds with leaf-blower (below, right).

ANMA plants grew rapidly in July and flowered in August. Heads were cut off as they matured and placed in poly bags in an open greenhouse to dry. Seed weevils were

present and damaged 25% of the seed. This is lower than damage observed in the wild, but pesticides may be considered for use in seed increase fields to prevent further losses.

Plants in the ACMI field did not go dormant as seed was maturing. This eliminated direct combining as a harvest option. The decision was made to swath the field, let it dry, then combine. ACMI shatters very easily and much of the seed fell out of the plants as they were swathed. Seed was retained more than expected while the swathed material was drying. However, more seed was again lost in the combining process. In spite of losing at least 60% of the seed in the harvest process, nine 30-gallon barrels of seed and chaff were recovered off the combine. Flail-vac harvesters and swathing material onto rolls of paper will be attempted next year. Swathing and combining yarrow was successful, but a large percent of seed was lost. Also, many low-growing weeds were present in the field at harvest time and combining cannot select out these weeds. Flail-vac harvesters are very adjustable in height and can be set to harvest seed off the plants at 1ft off the ground, preventing low-growing weeds from being harvested. After harvest, plants continued to flower. Field was mowed in early November to cease flowering.

Figure 10. ACMI field two-weeks prior to harvest at the Corvallis Plant Materials Center, August 29, 2005.

LULA and JUBO plants flowered in containers and seed was hand harvested from these plants as they matured. Only CADE and CAPA transplants flowered and produced seed in 2005, the fall-seeded plants did not.

Table 5. Seed harvest in 2005 for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis PMC.

Species	Acres	Date(s)	Method	Yield	Lbs/ac	Comments
ACMI	0.5	9/13	Swathed	70lbs	140	Excellent stand, high vigor
ANMA	0.02	8/15-9/18	Hand	61g	N/A	Good stand, fair vigor, transplants look excellent
BR sp.	0.1	6/28	Hand	38lbs	380	Excellent stand, high vigor
BRVU	0.1	7/15	Hand	6lbs	60	Good stand, fair vigor
CADE	0.02	7/07	Hand	35g	N/A	poor stand, low vigor, transplants look excellent
CAPA	0.085	6/30	Hand	376g	80	poor stand, low vigor, transplants look excellent
DEEL	0.25	6/30	Swathed	82lbs	328	Excellent stand, high vigor
ELGL	0.05	7/17	Hand	10.5lbs	200	Excellent stand, high vigor
EPAN	0.05	8/12	Hand	2g	N/A	Invested with EPCI
EPCI	0.05	8/5-9/13	Vacuum	26lbs	260	Excellent stand, high vigor
JUBO	800 plants	8/23	Hand	5g	N/A	Plants flowered in containers
LULA	75 plants	6/15	Hand	12g	N/A	Plants flowered in containers

Fall 2005 Establishment of Seed Increase Fields:

All seed collected in 2005 was cleaned and informal germination tests were performed on most of the seed lots prior to planting. Only grasses, one sedge, and one forb were selected for fall seeding, other forbs will be seeded in the spring of 2006 after spring germinating weeds have been sprayed out of the fields. The other sedge fields will be established using transplants. Fields were sown on October 2 and 11, 2005 using a six-row Planet Jr. seeder equipped with a carbon banding unit. Fields were sprayed with Diuron after seeding. Most seedlings emerged within 2-3 weeks after planting, and stand establishment and vigor was rated high for all species, except ARSU. The ARSU planting had no emergence two months after planting. It may have been sown too deeply. Diuron provided fair weed control. Banvel was applied in November to grass fields to control broadleaves. Glyphosate was applied over sedge field in November to control all weeds (sedges will not emerge until late winter).

ARDI plants that were produced in the spring of 2005 were transplanted out into a field on December 21, 2005. Weed fabric was stapled over the ground next to a willow planting. The willows will create a shadier site for the Aruncus.

Table 6. Establishment information for new seed increase fields for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement at the Corvallis PMC in 2005.

Species/Ac	amt seeded	germ	approximate seeding rate	seeds/lb
ELGL 0.51 acres or 120 184' rows 12" btwn rows	2280g	80%	10lbs/acre(bulk) 8lbs/acre (PLS) 22 PSL/ft-row	120,000
BRVU 0.56 acres or 132 180' rows 12" btwn rows	2756g	86%	11lbs/ac (bulk) 9lbs/acre (PLS) 20PLS/ft-row	88,250
DEEL 0.18 acres or 42 181' rows 12" btwn rows	325g	83%	4 lbs/acre (bulk) lbs/acre (PLS) PLS/ft-row	2,670,000
CAPA 0.13 acres or 30 176' rows 12" btwn rows	210g	65%	4 lbs/acre (bulk) lbs/acre (PLS) PLS/ft-row	790,000
BR sp. 0.31 acres or 72 184' rows 12"btwn rows	959g	94%	7lbs/acre (bulk) 6.4lbs/acre(PLS) 9PLS/ft-row	56,000
ARSU 0.25 acres or 60 180' rows 12" btwn rows	79g	45%	0.7lbs/acre(bulk)	4,623,000
AGEX 0.45 acres or 108 180' rows 12" btwn rows	148g	75%	0.7lbs/acre(bulk) 0.5lbs/acre(PLS) 90 PLS/ft-row	7,153,000

Field Production for 2006:

Most fields that were planted in the fall of 2004 will produce seed in 2006. *Deschampsia elongata* and *Bromus vulgaris* fields look less vigorous in fall of 2005 than they did in fall of 2004. These fields may have decreased production on year two and may need to be treated as annuals. Most other fields will have higher yields in 2006 than in 2005. Sedge, rush, and legume fields did not produce seed the first year (except sedge transplants), these fields should flower and set seed in 2006.

Table 7. Acres in Production Per Species at the Corvallis Plant Materials Center for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement in 2005.

Species	Acres planted in 04	Acres planted in 05	Total acres
BR sp.	0.1	0.31	0.42
BRVU	0.1	0.56	0.66
CADE	0.02	0.22	0.25
CAPA	0.085	0.13	0.22
DEEL	0.25	0.18	0.43
ELGL	0.05	0.51	0.56
JUBO	0	0.03	0.03
JUEF	0	0.03	0.03
		total	2.6

Species	Acres planted in 04	Acres planted in 05	Total acres
ACMI	0.5	0	0.5
ANMA	0.02	0.08	0.1
EPAN	0	0.1	0.1
EPCI	0.1	0	0.1
LULA	0	0.1	0.1
VIAM	0.01	0.1	0.1
		total	1

VII. Container Plant Production

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.

Figure 11. PMC greenhouse, May 20, 2005.

Table 7. Container Plant Production in 2005 at the Corvallis PMC for the Elwha River Ecosystem and Fisheries Restoration Cooperative Agreement.

Species	Code	amt seeded	number produced	treatment
Anaphalis margaritacea	ANMA	1 g	500	none
Eriophyllum lanatum	ERLA	2 g	500	10 weeks cold-moist stratification
Epilobium angustifolium	EPAN	3 g	200	none
Carex deweyana	CADE9	15g	2000	5 weeks cold-moist stratification
Carex hendersonii	CAHE7	3g	45	12 weeks cold-moist stratification
Luzula comosa	LUCO	3g	200	4-weeks cold-moist stratification
Luzula parviflora	LUPA4	2g	500	5-weeks cold-moist stratification
Lupinus latifolius var. latifolius	LULA4	7g	800	scarification
Vicia americana	VIAM	5g	350	soaked in hot water 24 hours

VIII. Seed Test Results/Delivery of Plant Materials

All lots of seed that were produced at the Corvallis PMC were sent to the Oregon State University seed lab for germination and purity tests. Tests were conducted in December of 2005. Results are listed below.

Species	Bulk Amt	Purity	Germination	PLS Amt
ACMI	70lbs	82.56%	93%	54lbs
BR sp.	38lbs	99.70%	93%	35lbs
BRVU	6lbs	99.69%	80%	5lbs
DEEL	82lbs	95.02%	83%	65lbs
ELGL	10.5lbs	99.19%	91%	9.5lbs
EPCI	26lbs	93.50%	71%	17lbs
			total	185.5lbs

No deliveries were made in 2005. All seed is being held at the PMC in cold storage until requested.