

USDA NRCS
Pullman Plant Materials Center
Washington State Highway 195
Road Cut Plantings Summary
5/25/2006

During 1999 and 2000, five road cuts were planted each spring with mostly rhizomatous shrubs (except western clematis, a vine). The sites were mile 49.9, 54.1, 57.1, 58.7 and 60.3; all located between Steptoe, WA and the Colfax-Spokane Hwy 195 Rest Stop.

These road cuts generally were cut deeper into the original soil profile than the 60 inch maximum that a USDA soil survey describes. Therefore, soil survey information only gives a general idea as to what the soils in the cuts are like. Slopes range from approximately 20 degrees to 35 - 40 degrees on the steepest slope. Erosion increases with slope steepness and longer slope runs. Most of these slopes have both issues along with a less permeable clay soil, which combine to make soil erosion a constant issue. Some of the cuts between Pullman and the Rosalia area have been planted with what appears to be mainly Ponderosa pine, which seems to be doing reasonably well.

The following comments are based on observations and data collected on the five roadcut sites which were planted in 1999 and 2000. Data was collected from 1999 thru 2003.

One gallon size container plants achieved much higher survival rates compared to 10 cubic inch containers. 2003 survival for the 1 gallon materials was snowberry 98%, Woods rose 93% and ninebark 76%. Overall 1 gallon material survival was 89% after 5 growing seasons.

The 10 cubic inch container material had survival rates of 84% for snowberry, 16% for western clematis, 42% for ninebark and 51% overall survival after 4 growing seasons.

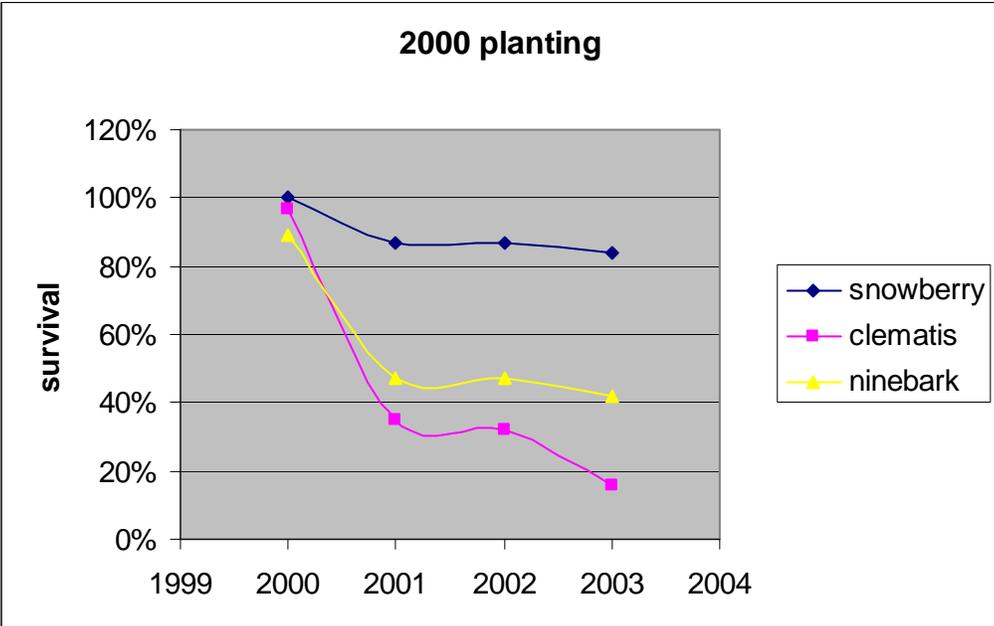
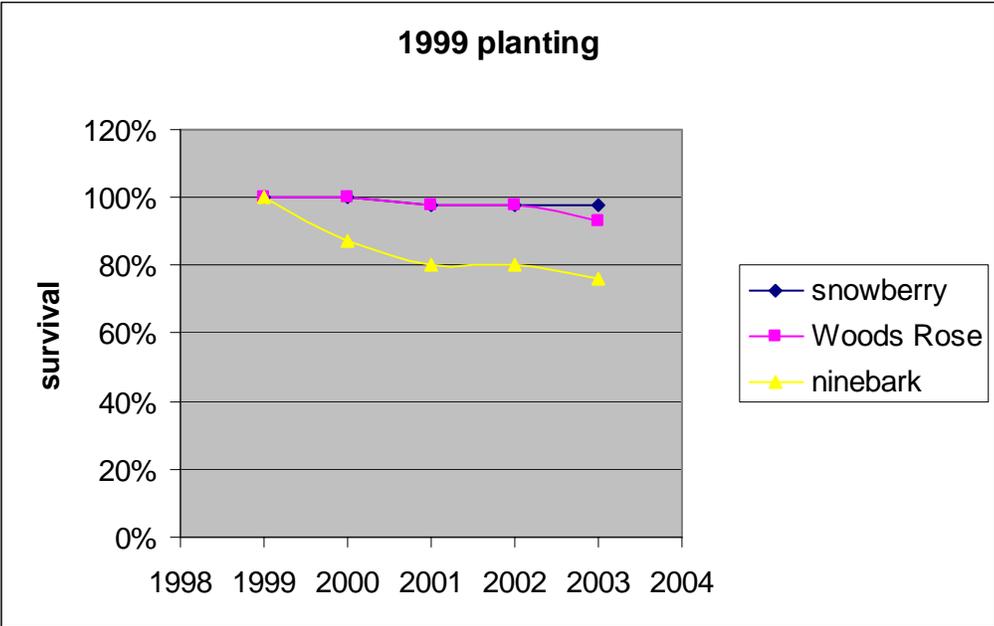
Soil tests from samples taken in September 2001 at each of the five sites indicated pH between 6.6 and 7.0. Nitrogen and organic matter, naturally, were very low. The WSU Fertility Specialist recommended 60 lbs/acre of phosphorus and potassium and whatever annual nitrogen we felt was warranted. Surface application of nitrogen may encourage the proliferation of annual weeds. Tree and shrub plantings should therefore be fertilized by applying the nitrogen in the planting hole rather than a surface application.

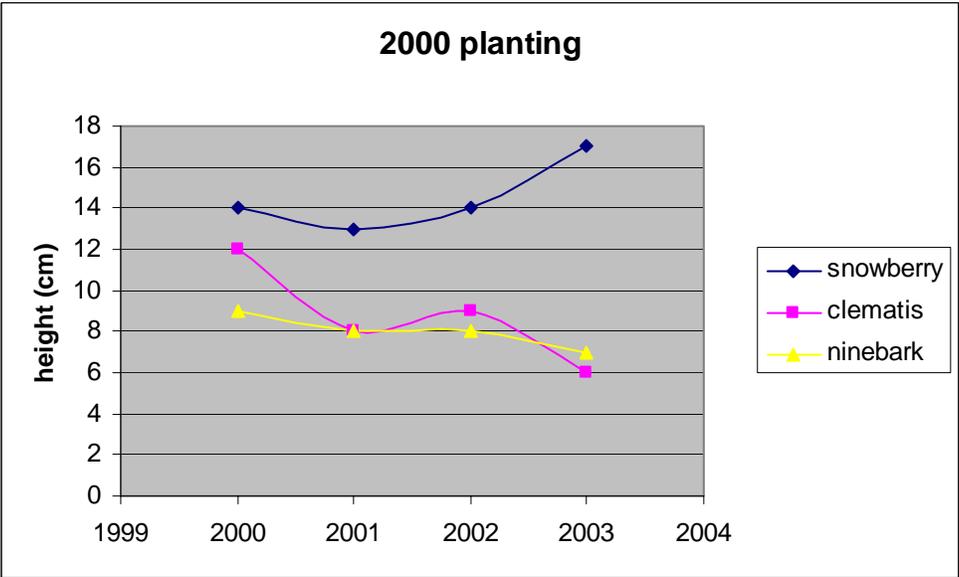
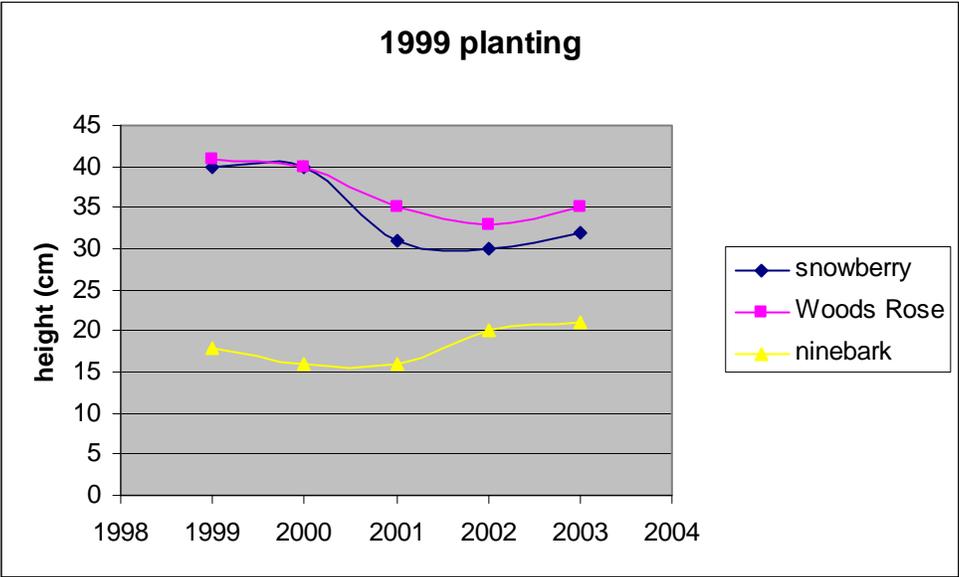
Following are some graphs showing survival and height growth from 1999 or 2000 through 2003. Following the graphs is the 12/5/2001 summary with 2002 and 2003 data added.

Recommendations for future plantings on existing road cuts

Shrubs: snowberry, Wood's rose, Douglas hawthorn, chokecherry, possibly rabbitbrush and sagebrush.

Trees: Rocky mountain juniper, Ponderosa pine, Austrian pine, Scotch pine, blue spruce.





**REPORT ON WASHINGTON HIGHWAY 195 ROAD CUTS
SHRUB PLANTINGS MADE IN 1999 AND 2000**

(12/5/2001)
(Revised 5/30/06)

PROBLEM: Many of the road cuts and fills along Eastern Washington and North Idaho roads are steep (1:1, 2:1 typical slopes) and subject to soil sloughing and erosion. Such eroded areas leave soil exposed which is prone to colonization by invasive weeds. Soil must also be repeatedly removed from road drainages by road crews, which is time consuming and expensive.

OBJECTIVE: Determine if low growing shrubs including Pullman Plant Materials Center (PMC) selections of Okanogan origin snowberry, western clematis and Lind ninebark are adapted to this environment and if they can protect road cuts. Other considerations are attraction of wildlife and use of herbicides on roadsides.

STUDY DESIGN: Species/accessions: (Low growing shrubs) Okanogan origin snowberry, Lind ninebark, western clematis, native snowberry (Plants of the Wild), Wild rose (*R. woodsii*) (Plants of the Wild), ninebark(Plants of the Wild).

Plantings: 5 sites using 9 plants per site of each species on 3' centers

Establishment: Containerized materials, minimal ground preparation, plant around April 15, protect plants from rodent predation

Evaluations: Survival, vigor, growth, etc., soil sloughing in area of plantings, pictures from established point.

PROGRESS: 1999: Site selection was made, primarily based on accessibility and potential weed problems. Therefore, all sites are on road cuts, not on fills.

On March 24, 1999, the mile 49.9 site was planted. Mile 58.7 and 60.3 were planted on March 25. On April 1, 1999 mile 54.1 and 57.1 were planted. The Woods rose had 8 plants instead of 9 planted on 57.1 because of lack of plants. Plants were in 6 inch pots (170 cubic inches). Sites were planted using a generator, electric drill and soil auger.

All five sites were evaluated on July 20, 1999. Plants seemed to be doing well, except for ninebark which appeared to be moisture stressed, exhibited by browning or reddish colored leaves.

2000 On May 5, 2000, the 49.9, 54.1 and 57.1 sites were planted. On May 8, 2000 the 58.7 and 60.3 sites were planted. Plants used were PMC materials: Okanogan source snowberry, Trillium clematis and Lind source ninebark. Two snowberry plants were filled in due to a shortage of clematis plants in plots 8 and 9 on the 49.9 site. Three snowberry plants were filled in for clematis in plots 7, 8 and 9 in the remaining locations. Plants were grown in 10 cubic inch Ray Leach cone-tainers.

An additional trial was initiated in fall 2000 to see if Woods rose (*Rosa woodsii*) could be successfully established from seed on these sites. Fresh hips were collected on September 19, 2000 from native plants 1.1 miles south east of Steptoe, WA. The seeded plots were approximately 12" x 8" and were flagged at each corner. One rose hip per hole was planted with 12 hips per plot. Each hip had several seeds. Hips were planted approximately ½" deep in an area that was hoed prior to planting to break up soil crust and provide a seedbed.

2001 The sites were visited on May 13, 2001. The following sites had seeded rose emerged: site 54.1 had 2 emerged rose plants in the one plot. 60.3 had 1 rose plant emerged. No other plots had seeded rose emerged for the growing season.

On June 20, 2001 all five sites were evaluated and measurements were taken. Since this was a dry year, growth after this date was not significant.

In the 1999 plantings, snowberry (98% survival) and wild rose (95% survival) had the best survival through the 2001 season. Ninebark survival was 80 %. Survival was probably linked to size of rootball/pot size.

In the 2000 planting, snowberry had the best survival. All sites appeared to be deficient in nitrogen.

All sites were evaluated again on September 11, 2001.

All five sites had soil samples taken in September, 2001 and sent to the lab for analysis. Results are pending.

See the following figure and tables for layout and data summary.

Figure 1. Study 1-98A Layout. Roadcuts: typical layout of species and plot numbers(view from road when looking at the planting)

| | | | | | | | | | |
|----------------------|------------------------|---|---|--------------------------|---|---|----------------------------|---|---|
| 2000 Planting | Snowberry ¹ | | | Clematis ¹ | | | Lind Ninebark ¹ | | |
| | 7 | 8 | 9 | 7 | 8 | 9 | 7 | 8 | 9 |
| | 6 | 5 | 4 | 6 | 5 | 4 | 6 | 5 | 4 |
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |
| 1999 Planting | Snowberry ² | | | Wood's Rose ² | | | Ninebark ² | | |
| | 7 | 8 | 9 | 7 | 8 | 9 | 7 | 8 | 9 |
| | 6 | 5 | 4 | 6 | 5 | 4 | 6 | 5 | 4 |
| | 1 | 2 | 3 | 1 | 2 | 3 | 1 | 2 | 3 |

¹ Source Pullman Plant Materials Center

² Source: Plants of the Wild, Tekoa, WA

Table 1. 1999 Data Summary

| | Snowberry | | | Wood's Rose | | | Ninebark | | |
|------|-----------|-------------|-------|-------------|-------------|-------|----------|-------------|-------|
| | Survival | Height (cm) | Vigor | Survival | Height (cm) | Vigor | Survival | Height (cm) | Vigor |
| mean | 100% | 40.1 | 3.1 | 100% | 40.6 | 2.9 | 100% | 17.7 | 3.4 |

Vigor rated 1 – 9 with 1 best.

Table 2. Study 1-98a. Summary of 2000 data for 1999 and 2000 plantings.

1999 Planting

| | PW¹ snowberry | | | PW¹ Woods Rose | | | PW¹ Ninebark | | |
|-------|---------------------------------|----------------|---------------|----------------------------------|----------------|---------------|--------------------------------|----------------|---------------|
| | surv. | height (cm) | width (cm) | surv. | height (cm) | width (cm) | surv. | height (cm) | width (cm) |
| total | 45/45 | | | 44/44 | | | 39/45 | | |
| mean | 100% | 40.4 | 16.8 | 100% | 39.2 | 23.1 | 87% | 16.4 | 13.4 |

2000 Planting

| | Okanogan snowberry² | | | Trailer clematis² | | | Lind Ninebark³ | | | Okanogan snowberry (extras) | | |
|---------|---------------------------------------|----------------|---------------|-------------------------------------|----------------|---------------|----------------------------------|----------------|---------------|------------------------------------|----------------|---------------|
| | surv. | height (cm) | width (cm) | surv. | height (cm) | width (cm) | surv. | height (cm) | width (cm) | surv. | height (cm) | width (cm) |
| total | 45/45 | | | 30/31 | | | 40/45 | | 115/121 | 14/14 | | |
| percent | 100% | | | 97% | | | 89% | | 95% | 100% | | |
| mean | | 14.1 | 11.6 | | 11.7 | 7.4 | | 9.2 | 4.7 | | 10.4 | 8.1 |

¹ PW = Plants of the Wild source stock

² Pullman PMC released material

³ Pullman PMC selection from Lind, WA planting

Table 3. Study 1-98a. Summary of 2001 data for 1999 and 2000 plantings.

1999 Planting

| | PW ¹ snowberry | | | | PW ¹ Woods Rose | | | | PW ¹ Ninebark | | | | | | |
|-------|---------------------------|----------|-------|-------------|----------------------------|-------|-----------|-------|--------------------------|------------|-------|-----------|-------|-------------|------------|
| | surv. | no. rhiz | vigor | height (cm) | width (cm) | surv. | no. rhiz. | vigor | height (cm) | width (cm) | surv. | no. rhiz. | vigor | height (cm) | width (cm) |
| total | 44/45 | 35 | | | | 42/44 | 52 | | | | 36/45 | 18 | | | |
| % | 98% | | | | | 95% | | | | | 80% | | | | |
| mean | | | 2.4 | 31.3 | 19.6 | | | 2.1 | 34.6 | 23.0 | | | 2.1 | 16.3 | 13.6 |

2000 Planting

| | Okanogan snowberry ² | | | | | Trailer clematis ² | | | | Lind Ninebark ³ | | | | | Okanogan snowberry (extras) | | | | |
|-------|---------------------------------|----------|-------|-------------|------------|-------------------------------|-------|-------------|------------|----------------------------|-----------|-------|-------------|------------|-----------------------------|-----------|-------|-------------|------------|
| | surv. | no. rhiz | vigor | height (cm) | width (cm) | surv. | vigor | height (cm) | width (cm) | surv. | no. rhiz. | vigor | height (cm) | width (cm) | surv. | no. rhiz. | vigor | height (cm) | width (cm) |
| Total | 39/45 | 0 | | | | 11/31 | | | | 21/45 | 0 | | | | 11/14 | 0 | | | |
| % | 87% | | | | | 35% | | | | 47% | 0 | | | | 79% | | | | |
| Mean | | | 3.3 | 13.4 | 9.1 | | 5.0 | 7.8 | 6.3 | | | 4.6 | 8.4 | 7.1 | | | 4.4 | 11.4 | 10.4 |

- ¹ PW = Plants of the Wild source stock
- ² Pullman PMC released material
- ³ Pullman PMC selection from Lind, WA

Abbreviations:

- surv. survival
- pltd planted
- no. number
- rhiz. rhizome stems

Table 4. Study 1-98a. Summary of 2002 data for 1999 and 2000 plantings.

1999 Planting

| Mile Mark | PW ¹ snowberry | | | | | PW ¹ Woods Rose | | | | | PW ¹ Ninebark | | | | | site survival |
|--------------|---------------------------|----------------------|-------|----------------|---------------|----------------------------|----------------------|-------|----------------|---------------|--------------------------|----------------------|-------|----------------|---------------|------------------|
| | surv. | no. rhiz stems | vigor | height (cm) | width (cm) | surv. | no. rhiz stems | vigor | height (cm) | width (cm) | surv. | no. rhiz stems | vigor | height (cm) | width (cm) | |
| total | 44/45 | 42 | | | | 43/44 | 66 | | | | 36/45 | 3 | | | | 123/134 |
| % | 98% | | | | | 98% | | | | | 80% | | | | | 92% |
| mean | | | 2.3 | 29.2 | 21.2 | | | 2.7 | 33.4 | 24.8 | | | 2.7 | 19.7 | 15.9 | |

2000 Planting

| Mile Mark | Okanogan snowberry ² | | | | | Trailer clematis ² | | | | | Lind Ninebark ³ | | | | | site survival | Okanogan snowberry (extras) | | | |
|--------------|---------------------------------|----------------------|-------|----------------|---------------|-------------------------------|----------------------|-------|----------------|---------------|----------------------------|----------------------|-------|----------------|---------------|------------------|-----------------------------|-------|----------------|---------------|
| | surv. | no. rhiz stems | vigor | height (cm) | width (cm) | surv. | no. rhiz stems | vigor | height (cm) | width (cm) | surv. | no. rhiz stems | vigor | height (cm) | width (cm) | | surv. | vigor | height (cm) | width (cm) |
| Total | 39/45 | 3 | | | | 10/31 | | | | | 21/45 | 0 | | | | 70/121 | 10/14 | | | |
| % | 87% | | | | | 32% | | | | | 47% | | | | | 58% | 71% | | | |
| Mean | | | 4.5 | 14.1 | 7.8 | | | 7.2 | 8.5 | 4.8 | | | 6.3 | 7.7 | 6.1 | | 6.5 | 10.2 | 4.3 | |

¹ PW = Plants of the Wild source stock

² Pullman PMC released material

³ Pullman PMC selection from Lind, WA

Table 5. Study 1-98a. Summary of 2003 data for 1999 and 2000 plantings.

1999 Planting

| Mile Mark | PW¹ snowberry | | | PW¹ Woods Rose | | | PW¹ Ninebark | | | site survival |
|------------------|---------------------------------|-------|------------------------|----------------------------------|-------|------------------------|--------------------------------|-------|------------------------|---------------|
| | surv. | vigor | height width (cm) (cm) | surv. | vigor | height width (cm) (cm) | surv. | vigor | height width (cm) (cm) | |
| total | 44/45 | | | 41/44 | | | 34/45 | | | 119/134 |
| % | 98% | | | 93% | | | 76% | | | 89% |
| mean | | 2.2 | 31.6 21.2 | | 2.3 | 35.0 31.8 | | 3.0 | 21.2 16.4 | |

2000 Planting

| Mile Mark | Okanogan snowberry² | | | Trailer clematis² | | | Lind Ninebark³ | | | site survival | Okanogan snowberry (extras) | | |
|------------------|---------------------------------------|-------|------------------------|-------------------------------------|-------|------------------------|----------------------------------|-------|------------------------|---------------|------------------------------------|-------|------------------------|
| | surv. | vigor | height width (cm) (cm) | surv. | vigor | height width (cm) (cm) | surv. | vigor | height width (cm) (cm) | | surv. | vigor | height width (cm) (cm) |
| Total | 38/45 | | | 5/31 | | | 19/45 | | | 62/121 | 9/14 | | |
| % | 84% | | | 16% | | | 42% | | | 51% | 64% | | |
| Mean | | 5.2 | 16.9 9.5 | | 8.3 | 6.3 4.0 | | 6.7 | 7.1 5.9 | | | 7.3 | 9.1 4.5 |

- 1 PW = Plants of the Wild source stock
- 2 Pullman PMC released material
- 3 Pullman PMC selection from Lind, WA