

# **Alaska Plant Materials Center**

**Annual Report  
1995**

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Alaska Department of Natural Resources - Division of Agriculture



## EXECUTIVE SUMMARY

### ALASKA PLANT MATERIALS CENTER 1995 ANNUAL REPORT

The Plant Materials Center's 1995 Annual Report describes the work of the Center staff during calendar year 1995.

- Revegetation work focused on three activities; 1) development and implementation of streambank stabilization and fishery habitat restoration techniques for the Kenai Peninsula; 2) collection of seed from select native species from the Aleutian islands, salt marshes near Girdwood and the Interior from Tok to Nome; and, 3) evaluating the suitability of various plant species for revegetation projects through monitoring test plots statewide. Revegetation staff worked cooperatively with numerous private and public entities including Fort Knox Gold Company, Alyeska Pipeline Company, the U.S. Navy, Chugach Electric Association and the Alaska Department of Fish and Game.
- The Foundation Seed program continued to maintain the breeder seed of revegetation grasses and produce foundation class seed of the grasses, grains and forbs. This seed is sold to growers who produce certified seed sold to mining, petroleum and other Alaskan industries in need of quality revegetation materials.
- The Forest Nursery completed its third production year in its new facility. On December 15, 1995 the facility was closed due to lack of funding. Other potential uses for the facility are being explored. The facility will have another use by July 1, 1996 or it will be transferred or leased to another entity.
- Horticulture efforts focused on providing assistance for continued expansion of Alaskans horticulture industry. These efforts included evaluating the performance of small fruit varieties for commercial fruit production, and landscape plant species in off-site trial plots.
- The Potato Program expanded in 1995. Staff produced 10,000 disease-tested plants of 69 potato varieties; these in turn were grown out in greenhouses to produce tubers for sale to commercial producers. Staff also inspected 210 seed lots for certification, a four-fold increase over 1993. A number of new potato varieties were evaluated and introduced to growers for trials in Kodiak, McGrath, Juneau, Copper Center, Fairbanks, Mat-Su Valley.

All Plant Materials Center staff continue to present professional papers, provide individualized technical assistance for private and public projects, and serve as guest lecturers for local school and college classes upon request.

This year, the annual PMC Open House will occur on August 3, 1996.

# **ALASKA PLANT MATERIALS CENTER**

## **1995 ANNUAL REPORT**

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From the Director:

The Alaska Plant Materials Lab was established to collect from sub-arctic areas worldwide, materials that could be propagated and distributed primarily within Alaska for agricultural, ornamental, and soil stabilization projects.

The basic concept is to collect what now exists at these latitudes, to test and develop locally, and to pass the successfully reproduced plant materials on to growers.

Early on, the federal government refused to develop a sub-arctic Plant Materials Center, so we did it ourselves with modest early staffing assistance from federal sources. The modern Alaskan Plant Materials Center is a state facility with very limited state funding and contract revenues. We are unique in the nation.

Sincerely,



Jay Kerttula  
Director

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## Introduction

The Alaska Plant Materials Center (PMC) is a section of the Division of Agriculture within the Department of Natural Resources. The Plant Materials Center's work advances applied plant research for northern latitudes through three major programs: Revegetation and Seed Production, Vegetable and Landscape Crop Improvement, and Tree Seedling Production. Each of these programs will be addressed in this report.

Every year in late July or early August, the Plant Materials Center hosts an open house. The PMC staff is available to answer questions about the projects and give tours of the facilities. Over 300 people attended the open house on August 5, 1995.

Funding for the Plant Materials Center comes from the state's general fund. Additionally, the center brings in small amounts of revenue through cooperative projects with other agencies, the private sector and through the sale of plant materials. All funds derived from outside sources can be used for direct operations of the Plant Materials Center.

1988, the PMC began producing annual reports in this format. Budgets restrictions may preclude annual production of this type of report in the future. It is anticipated that the 1996 report will be a listing of projects and expenditures without narration. More detailed information will be presented in a 1997/1998 report of activities similar to the 1995 report format.





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## History

Early attempts to establish a federal Plant Materials Center in Alaska were unsuccessful because the U. S. Department of Agriculture believed that the centers at Pullman, Washington and Corvallis, Oregon could serve the needs of Alaska.

The Alaska Legislature was not discouraged, and, at the urging of the University of Alaska, conservation groups and farmers, prepared legislation that would establish the Alaska Plant Materials Center.

In 1972, Governor Bill Egan signed into law a bill creating the Alaska Plant Materials Center. This legislation directed the Plant Materials Center to fulfill several traditional agricultural responsibilities and to develop plant varieties and techniques for revegetation and erosion control and provide technical reclamation assistance to industry.

Soon after the Plant Materials Center bill was enacted, a 285-acre tract near Palmer was selected for the center's site. An additional 120-acre parcel adjacent to the PMC was acquired through a land exchange with the Matanuska-Susitna Borough in 1982. This gave the PMC a total of 405 acres to accomplish its mandated duties which now included revegetation work, horticultural development, foundation seed production and disease-free potato seed stock production.

In 1987, the PMC's programs were consolidated into the two programs; the North Latitude Revegetation and Seed Production Project and the North Latitude Vegetable and Landscape Crop Improvement Project. To further streamline state operations, Forest Nursery operations were transferred to the Plant Materials Center from the Division of Forestry in 1993.

In 1994, the PMC assumed responsibility for the maintenance and production of breeder class seed of all University of Alaska developed grass. The transfer of responsibility has placed the PMC in the position of being the repository and maintainer for Alaska developed germplasm.

Continuing budget reductions have forced the PMC to drop programs. On December 15, 1995, the chronically under-funded Forest Nursery was closed. Prior to closure, seedlings produced in 1995 were shipped or placed in protective storage.



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## **North Latitude Revegetation & Seed Production Program**

The Revegetation and Seed Production Program's products and methods are used to encourage a healthy seed industry and develop new plant materials and methods for land reclamation and erosion control. These two functions are complementary and are intended to promote an instate seed industry while providing state-of-the-art revegetation and erosion control information to the public.

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## **Revegetation & Reclamation Efforts**

The construction of the Trans Alaska Pipeline in the 70s triggered the current reclamation research activity in Alaska, however, since the pipeline, ideas associated with revegetation have changed. Continued oil development, renewed interest in surface and placer mining, as well as new federal, state and local regulations have caused applied research activities to address "reclamation" as defined by regulations, which in some cases has precluded the use of "traditional" plant material and planting technology.

The Alaska Plant Materials Center continues to lead Alaska in reclamation, erosion control, research and technology transfer and revegetation. The use of dormant seedlings to extend planting seasons, cost-effective and successful methods in willow planting, and wetland and coastal restoration are research priorities for the Plant Materials Center.

The project follows seven basic steps to establish a resource of conservation plants for use in land reclamation, wildlife habitat improvement and erosion control. They are: 1) Define and anticipate conservation problems and establish priorities; 2) research and assemble candidate plant materials; 3) conduct initial evaluations; 4) establish small scale seed or vegetative increases; 5) advanced and final testing and field evaluation plantings; 6) establish large scale seed or vegetative increases; and, 7) release of a variety or cultivar.

This program has gathered at least 230 plot years of information collected from sites around the state (Figure 1), developed 11 new cultivars for revegetation and reclamation and assisted scores of agencies and private companies in reclamation, erosion control and revegetation. Figure 2 represents a typical plot layout used in off-site evaluations.

This report outlines some of the present revegetation and reclamation research being conducted by the PMC and summarizes current activities at sites around the state. Additional information can be found in the individual reports that are listed in this report. Copies of these reports are available from the Alaska Plant Materials Center.



Figure 1

Map of Alaska Plant Materials Center Plot Locations



Alaska Plant Materials Center Advanced Evaluation  
and Demonstration Plot Network Representing  
230 Plot Years as of 1994.

Figure 2 - Typical Plot Layout

Nugget Kentucky bluegrass	Merion Kentucky bluegrass
Park Kentucky bluegrass	Banff Kentucky bluegrass
Sydsport Kentucky bluegrass	Fylking Kentucky bluegrass
Service big bluegrass	Troy Kentucky bluegrass
Sherman big bluegrass	Canbar canby bluegrass
Tundra glaucous bluegrass	Reubans Canada bluegrass
<i>Poa glauca</i> T08867	Gruening alpine bluegrass
<i>Agropyron subsecundum</i> 371698	Sodar streambank wheatgrass
Nordan crested wheatgrass	<i>Agropyron subsecundum</i>
Fairway crested wheatgrass	<i>Agropyron violaceum</i>
Summit crested wheatgrass	<i>Agropyron boreal</i>
Critana thickspike wheatgrass	<i>Agropyron yukonense</i>
Fults alkaligrass	Vantage reed canarygrass
Climax timothy	Engmo timothy
<i>Elymus arenarius</i>	<i>Elymus sibiricus</i> 34560
Norcoast Bering hairgrass	<i>Elymus sibiricus</i> 2144
Sourdough bluejoint	Nortran tufted hairgrass
Meadow foxtail	<i>Calamagrostis canadensis</i>
Garrison creeping foxtail	<i>Alopecurus geniculatus</i>
Boreal red fescue	Arctared red fescue
Egan American sloughgrass	<i>Festuca scabrella</i>
Durar hard fescue	Pennlawn red fescue
Covar sheep fescue	Highlight red fescue
Kenai polargrass	Manchar smooth brome
Alyeska polargrass	Carlton smooth brome
Caiggluk tilesy sagebrush	Polar brome

## **Amchitka Lupine Seed Collection Project**

In 1992, The Plant Materials Center was contracted by the U. S. Navy to collect seed of Nootka lupine (*Lupinus nootkatensis*) for use on Adak. Normally, lupine in southcentral Alaska and on Adak are infested with insect larvae that destroy the seed. In 1991, during a site visit to Amchitka, it was noticed that the extensive lupine stands on that island were not affected by insects. Plans were developed to utilize the naval facilities on Amchitka as a staging area for lupine collection in 1992. During a one-week period in September 1992, one PMC staff member collected 150 pounds of lupine pods on Amchitka. The material was cleaned in October 1992 producing 15 pounds of clean seed. During the winter of 1992-1993, the seed was stratified and scarified. Planting occurred on Adak during the fall of 1993. One acre of lupine was also planted at the Plant Materials Center in 1993. This planting failed to survive. Another 1/2 acre was planted in 1994 in an area where winter icing would not be a problem. Once again, in 1995, the seeding failed to survive. No additional attempts to propagate Aleutian lupines are planned for Palmer.

## **Shemya Air Force Base Road Close-Out**

In 1991, the PMC received a request to assist the Air Force to close out unnecessary roads on Shemya. These roads crossed lands used for potable water collection. The Air Force was concerned that fuel spills could contaminate the water gallery area, so final and complete road closures seemed to be the most effective solution. Removal of road material was not practical since communication wires were buried in the road bed. Therefore, the roads were abandoned by placing mounds of peat on the surface. These mounds required revegetation to prevent erosion and reduce the negative visual impact.

However, the PMC recommended that the site be monitored for two years before starting a revegetation program, and a natural revegetation study was implemented in 1992. A back-up plan for reseeding has been developed if a satisfactory stand of vegetation does not become established. To date, natural revegetation is occurring at a satisfactory rate. During the evaluation in October 1994, it was determined that the areas had approximately 60% cover consisting of at least 16 species. An evaluation occurred in 1995. Cover exceeded 80% in some areas.

A final report has been requested by the Air Force and one additional evaluation is scheduled for 1996.

## Homer Demonstration Plots

The PMC negotiated with the Homer Soil and Water Conservation District to develop a plot network for the region. During the summer of 1992, it was determined that three evaluation sites would be established in 1993.

In June of 1993, only two sites were available for planting. The first site was behind the Homer High School. This site was planted with 16 species recommended by the Revegetation Guide for Alaska. High School students assisted with the planting.

The second site was located on a farm on East End Road. This plot contained the same 16 species, however three different fertilizer rates were applied.

On August 11, 1993, the plots were evaluated. Both were heavily contaminated with weeds, a common problem when land is not properly prepared. Evaluation was difficult, however, both 'Garrison' creeping foxtail and 'Vantage' reed canary grass were showing the best performance.

In 1994, the High School plot was abandoned because of a weed problem. Information was, however, gathered from the East Road plot. In this plot, the best performance was noted for 'Vantage' reed canary grass, 'Alsike' clover, 'Norcoast' and 'Nortran' hairgrasses and 'Boreal' red fescue. No evaluations occurred in 1995. This plot will be evaluated and expanded in 1996.

## U.S. Army Revegetation of Gunnery Ranges at Fort Richardson and Fort Wainwright

In cooperation with the U.S. Army 6th Infantry Division and U.S. Army Corps of Engineers Cold Regions Engineering and Research Laboratory, the PMC assessed the erosion problems at small arms ranges on both Fort Richardson and Fort Wainwright. A program to evaluate plant species and potential maintenance practices was developed and agreed to by the cooperators. The planting effort began in July 1994. Evaluations will continue through 1997.

The Grezelka Firing Range at Fort Richardson was seeded during the week of July 5, 1994. Approximately 600 pounds of 'Boreal' red fescue and seven tons of 20-20-10 fertilizer were broadcast over the unvegetated portions of the range. Both mechanical and hand broadcast methods were used to seed and fertilize the range. The mechanical broadcast seeders and fertilizer spreaders were mounted on four-wheelers or towed behind.



Evaluations of the seeding were not conducted at the end of the 1994 growing season, however, reports from the Range Field Office indicate that limited germination and plant establishment had occurred. The best plant growth was found on the slopes of the berms. Most of the site consists of coarse and compact gravel and does not provide favorable growing conditions. The site would have benefited from scarification.

The Grizzly and Aurora Firing Ranges at Fort Wainwright were seeded with Boreal red fescue and fertilized with 20-20-10 fertilizer during the last week in July 1994. Much of the Grizzly Range had been colonized by native vegetation since the original revegetation plan was developed. The remaining unvegetated areas were hand seeded and fertilized. The Aurora Firing Range contained large unvegetated areas that were suitable for mechanical seeding and fertilizing methods.

Also, seed from two native plants, *Agropyron macrourum* and *Solidago multiradiata*, were collected from the Grizzly Range. The collections will be evaluated at the Plant Materials Center for potential commercial production.

The ranges at Ft. Wainwright were evaluated in late August in 1995. Little evidence of the seeding was apparent at the Grizzly Range. A brush cutter had cut back all of the vegetation to ground level. In contrast, the Aurora Range had benefited greatly from seeding and/or fertilizer and no unvegetated areas existed in the range area. Plant establishment on the firing line was spotty.

The seeding and fertilizer benefited the Grezelka Firing Range at Ft. Richardson also. Plant cover increased over the entire range, including around the targets. The seeded grass became established and the other species appeared to have benefited from the fertilizer.

If the military wishes to maintain a healthy ground cover on these firing ranges, the Aurora and Grezelka Range would benefit from an annual application of fertilizer. So much of the Grizzly Range was covered with vegetation prior to seeding that natural plant invasion should continue to provide plant cover at this site.

## **Project Chariot Clean Up**

The Department of Energy requested the PMC's assistance in restoring the disturbance resulting from the clean up of radioactive material at the Project Chariot site near Cape Thompson.



The PMC proposed a restoration plan for the site. This plan was not standard as the U.S. Fish and Wildlife Service imposed restrictions on proven arctic techniques.

During the actual restoration effort, a PMC staff member was on-site guiding the contractor through the prescribed work. All work was completed during a four day period in August 1993.

On August 3, 1994, the site was evaluated. Overall, the site had a 40% cover of seedling grasses. Hairgrass was the predominant species. No sign of thermal degradation was noted. Final evaluation occurred on July 15, 1995. Overall plant cover increased on the site and no signs of thermal degradation were observed. A final report was completed in December 1995.

### **Mass Aleutian Plant Collection Project**

The PMC proposed to both the U.S. Navy and U.S. Air Force that a major effort be initiated to collect seed of species native to the Aleutians and Alaska Peninsula. Both agencies agreed with the concept, a full proposal was developed and by July 1993, an agreement was signed by each cooperator.

This program is possibly one of the more significant efforts undertaken by the PMC. If even partially successful, the native seed industry in Alaska will enter a new era of production and the local seed producers should benefit significantly. All production of these species will be limited to Alaska, eliminating the competition from producers in other regions. Some of the species collected will also have potential markets outside the state.

During the months of August, September and October, staff from the PMC conducted large scale seed collection at King Salmon, Dutch Harbor, Adak, Shemya and Attu. Sixty-four species were collected.

The species with the greatest potential were distributed to seed producers on the Kenai Peninsula in the spring of 1994, with first sales to the Air Force and Navy planned for the spring of 1996. The attempt to propagate the more difficult or obscure species was undertaken by the PMC.

In June 1994, 33 species were planted at the sites at Kenai and the PMC. All plantings produced stands. Several other species are still undergoing tests to determine requirements for germination. In 1995, the first production crop was harvested. Seed was collected from 30 species. Part of this seed will be used to increase production fields and the remainder will be sold to either the Navy or Air Force for use on Adak or Shemya.

## **Defense Fuel Supply Wetland Restoration**

The Defense Fuel Supply (DFS) office (an independent Department of Defense agency) located in Anchorage, requested assistance from the PMC in May 1993. The agency was concerned about revegetating wetland areas and a localized fuel contaminated site on the Anchorage Fuel Terminal property.

The PMC made recommendations on changing vegetation maintenance procedures and established plots at the site. The plot work relied on transplanting cattails into wet areas, some of which were contaminated with varying levels of petroleum products. A plan to develop and construct wetland filters was delayed until more information is available. In 1994, the reseeded site and the cattail stand exhibited excellent growth. The success in using cattails has encouraged the PMC to expand research on this species.

By the fall of 1995, the cattail stand completely covered the disturbance. DFS also implemented a program to manage existing cattail stands at the site. This program will allow cattails to grow and eliminated mowing of the species.

## **Adak Sand Quarry Restoration**

In 1992, the PMC was awarded a Navy contract to develop and monitor a restoration program for Pringle Hill Sand Pit on Adak. The 40-acre site will be restored with beach wildrye sprigs and seeded grasses over a three-year period starting in 1993. A management plan for surrounding vegetation will also be developed. The work force employed to do the project will be Navy Seabees. Initial plans were developed in 1992.

During May 1993, one third of the site was sprigged with beach wildrye and seeded with a mix of red fescue and hairgrass. During an October 1993 evaluation, excellent growth was noted for the seeded grasses and the beach wildrye sprigs.

Additional plantings occurred in May 1994, leaving roughly ten acres for completion in 1995. By September 1994, sprigged and seeded areas were supporting vigorous stands of vegetation. Additionally, the site is now being invaded by species native to the area. It is interesting to note that the invasion process did not start until seeding, sprigging and fertilization occurred on the site.

The final area to be revegetated was completed in May 1995. Final evaluation occurred in September 1995 with a final report being published in December 1995. This project has become the most successful restoration project on the Aleutians to date.

## **Forty Mile Mining District**

The Bureau of Land Management (BLM) Tok Field Office expressed interest in testing cultivars suitable for revegetation along Wade Creek in the Forty Mile Mining District. The test site is located on recently reclaimed mining tailings. Two plantings were made, each on different substrates. One plot was located along the Creek on scarified mine tailings. The other plot was located across the Dalton Highway on mineral tailings covered with a thin layer of topsoil.

On May 27 and 28, 1993, commercially available cultivars including ten grasses and one forb were planted at each site. In addition, several native forbs were planted in small plots adjacent to the commercial cultivars.

Each cultivar was broadcast on individual plots measuring 20 x 50 feet. The entire planting was then fertilized with 24-12-10 fertilizer at a rate of 450 pounds per acre.

Several freshly cut feltleaf and little tree willow cuttings were randomly planted in moist areas at the topsoil site. Also, the moist areas were seeded with Egan sloughgrass.

Two native forbs, Dwarf Jacob's Ladder and Maydell's Oxytrope, were included in the plantings. Additional forbs were planted by BLM staff later in the spring.

In 1994, the staff from the BLM's Tok Field Office continued to monitor the plantings. Reports indicate that plant growth at both test locations continued to perform well. The grasses, particularly the bluegrasses, flowered and produced seed. Dwarf Jacob's Ladder was the only planted forb noted in the plots. Approximately 85 percent of the willow cuttings had rooted and become established.

After two growing seasons, the plantings are still growing well and are just beginning to show signs of decline as the benefits of the fertilizer decrease. 'Sourdough' bluejoint reedgrass is the most vigorous grass in both of the test plots. Unfortunately, this variety is not readily available commercially. 'Nortran' tufted hairgrass, 'Arctared' red fescue, 'Gruening' alpine bluegrass and 'Reeve' beach wildrye are also growing very well on the scarified mine tailings. The dwarf Jacob's ladder has also become well established and has expanded beyond the original plot boundaries.

Only minor differences were noted in the topsoil plots on the north side of the Taylor Highway. Sourdough bluejoint reedgrass and Nortran tufted hairgrass were growing the best. 'Caiggluk' tiley sage, 'Kenai' polargrass and Reeve beach wildrye were growing relatively well. Again the dwarf Jacob's ladder was growing well and had been producing seed. These plots should not be destroyed during highway construction. 'Egan' sloughgrass had been planted in the wetter areas of the topsoil site and it had become well established. Willows were colonizing the site, but it was difficult to relocate the ones that had been planted in 1993.

These early results from these plantings indicate that several species may be suitable for revegetation in this area. Hopefully, continued evaluation will occur at the topsoil site for two more years to help determine which species will grow well for several years.

The 1995 evaluation was the last evaluation for the plantings on the scarified mine tailings. DOT has plans to mine this gravel for Taylor Highway improvements.

## **Beach Wildrye Manual**

The Plant Materials Center has been working with Beach wildrye, *Leymus mollis*, for the past eleven years. Much of the work in developing planting techniques was funded by the Department of Defense. In 1994, the U.S. Navy agreed to fund an effort to publish the data in the form of a manual. The manual was published in early 1995. All publishing costs were covered by the Navy.

## **Adak Wetland Rehabilitation**

In 1993, the Navy requested assistance from the PMC to rehabilitate a wetland area adjacent to a fish stream. In May 1993, a plan was developed and implemented on the site. The repair relied on seeding hairgrass, transplanting sedge and Beach wildrye. Also, the undisturbed area around the site was fertilized to encourage additional seed production.

In September 1994, the site supported 90% vegetative cover, comprised of species identical to the surrounding area.

Final evaluation occurred on September 30, 1995. On that date, the site supported a 60% cover of wetland vegetation.

## **Chugach Electric Wetland Rehabilitation Project**

Chugach Electric Association, Inc. requested assistance in wetland rehabilitation from the Plant Materials Center. The project area involved a transmission line re-build from Girdwood to Twenty Mile River. The PMC developed specific revegetation and rehabilitation plans for the various sites. All revegetation will rely on locally collected native species.

The PMC conducted the first Alaskan mechanical harvest of indigenous sedges and other wetland species. Over 200 pounds of locally native seed was available to Chugach Electric Association for use in the rehabilitation effort scheduled for 1995.

The seeding and fertilization program occurred during the four-day period in the first week of June 1995. The sites were periodically monitored during the summer of 1995. The final 1995 evaluation occurred on September 17. All the treated sites were supporting good to excellent stands of native wetland plant species. The PMC was awarded an extension to the project to assist with the restoration of an additional segment of powerline. An interim report was published in December 1995 and a final report is scheduled for December 1996.

## **Alyeska Pipeline Floodplain Investigation**

Alyeska Pipeline Service Company was facing the possibility of revegetating an active floodplain as a result of conditions attached to a permit. On August 9, 1994, Alyeska requested the opinion of a PMC staff member during a site visit.



The conditions were rejected by the PMC as not being appropriate for either restoration or research. However, regulatory desires prevailed and Alyeska agreed to conduct a study on floodplain restoration. The study plan developed by the PMC relied on comparisons of scarification only, fertilizer with scarification, and native seed with and without fertilizer, in combination with scarification. Five species were identified as important floodplain colonizers. During August 1995, a collection effort was initiated to collect seed from these species. The collection effort centered on the area around Pipeline Mile Post 22 and the Franklin Bluffs Camp Pad. By September, sufficient seed to conduct the study was collected. The seed was cleaned in November/December 1995. Planting will occur on the Sagavanirktok River in June or July 1996.

### **Nome Mine Site Revegetation Plots**

In 1989, the Soil Conservation Service (SCS) requested the PMC's assistance to establish evaluation plots at various mine sites in the Nome area. On June 21 and 22, 1989, three diverse sites were planted with 44-47 varieties that have been planted in other evaluation plots around the state. The sites varied in moisture regimes as well as soil substrate characteristics. One site contained a highly organic substrate, while the other two sites contained a more mineral substrate. All sites contained adequate fine material for plant establishment.

The plots were evaluated on September 14, 1989. All plots had become well established. The plot having high organic content supported a 65% moss and vascular plant cover in addition to the seeded grass species. The plots were evaluated again on September 6, 1990. During this evaluation, only two plots were accessible. Roughly 75% of the accessions had survived. This is normal for first winter recovery. However, the plots were in very poor condition and further die-out could be expected during the winter of 1990-1991. Due to lack of support from the SCS, the site was not evaluated in 1991.

Final evaluations occurred at these sites on September 1, 1992. Norcoast Bering hairgrass, Gruening alpine bluegrass, Arctared and Boreal red fescue, Sourdough bluejoint, violet wheatgrass and Reeve beach wildrye exhibited the best performance. The remainder of the accessions performed poorly or had died out. A final report was prepared on the site during the winter of 1992-1993. Additional work was planned for a local mine in 1994, however unanticipated developments required a two-year delay.

## **Atigun Pass Rehabilitation Project**

In January 1991, the Plant Materials Center was approached by Alyeska Pipeline Service Company to assist in the development of a rehabilitation plan for land affected by construction of the Atigun Pass Reroute. The plan also attempted to incorporate mitigation measures required by regulatory agencies. The most significant aspect of the proposed plan dealt with the establishment of willow along the margins of ponds constructed for fish habitat. A plan calling for re-establishing willow was approved in May 1992.

Between June 24 and 28, 1992, two PMC staff members directed Alyeska crews in planting willow sprigs (which were collected in April 1992 and held in cold storage) and grass seed. The sites were evaluated in August 1992. The results surprised everyone. The survival and growth of willow was much higher than anticipated. Results of the 1992 field program are available in Atigun Pass Re-Route Rehabilitation Plan Interim Report, 1992.

Additional evaluations occurred in August 1993. During this evaluation, satisfactory reinvasion of the scarified work pad was noted. Survival of willow sprigs around the ponds ranged from 50% to 90%, while sprig establishment along the crossflow channels ranged from 12% to 20%. These results are slightly higher than the original estimate. The seeded species were performing very well and overall cover was estimated at 30%. The final evaluation occurred on August 10, 1994. The data were published in the form of a final report in February 1995.

## **Port Clarence Beach Restoration Project**

The U. S. Coast Guard Loran Station at Port Clarence was required to revegetate the station's former solid waste disposal site. Traditional seeding methods failed because of poor soil conditions. A PMC staff member examined the site in September 1990 and determined that beach wildrye transplants would solve the problem. The area's small size and an available, eager work force convinced the Coast Guard that the approach was practical. The PMC was given Coast Guard approval to direct and assist in the project. The project was completed in June, 1991.

When the site was evaluated on September 5, 1991, a good stand of beach wildrye was observed. Although the stand was not as robust or vigorous as stands on Adak or Shemya, the planting was rated as a success.



The PMC supplied the Coast Guard with a site specific "How To" manual so that the planting technique can be incorporated into the standard operating procedure for the annual landfill restoration work.

The next evaluation of the site occurred on September 2, 1992. At that time, the plantings were well established and formed a stand of beach wildrye indistinguishable from natural stands in the area. Final evaluation occurred on September 3, 1995. The actual location of the site was difficult to ascertain as the area supported a stand of vegetation indistinguishable from the surrounding areas. This was a very successful restoration program.

### **Fish Creek Wetlands Restoration Project**

In August 1990, Anchorage Water and Wastewater Utility (AWWU) requested that the Plant Materials Center submit a proposal for restoring a wetland disturbed during a construction project. Because the request occurred late in the growing season, the PMC suggested that the project be delayed until spring, 1991. The landowner agreed. AWWU, however, wanted to demonstrate to the landowner that restoration would be attempted; therefore, a study area was established.

On August 23, 1990, PMC staff established a demonstration planting at the Fish Creek site. Sprigs of Beach wildrye which were obtained from the PMC were transplanted onto the elevated portions of the site. Low, flooded areas were planted with indigenous sedges, rush and arrowgrass transplants harvested from adjacent donor communities. The area was examined to determine the best approach for full-scale restoration activities scheduled for spring, 1991.

In May 1991, work resumed on the site. Three dikes were planted with beach wildrye sprigs and seeded with a hairgrass mix. Additional higher elevation areas off the dikes also received this treatment. In the lower areas, wetland species including sedges and rushes were transplanted.

In 1992, areas needing additional work were delineated. On June 3, 1992, these areas were planted. Areas subject to flooding by high tides were planted with seedlings of greenhouse grown sedges, plantain and arrowgrass. One dike was rototilled to reduce compaction and additional sprigs of beach wildrye were planted. The dike area also received an additional seeding of 'Norcoast' Bering hairgrass. Monitoring and data collection continued through September 1994. Performance of vegetation and the extent of high tides on the site were documented. Final evaluation of this site occurred on September 23, 1995.

This project is important since few coastal wetland rehabilitation projects have been attempted and results from this project will greatly enhance our knowledge regarding revegetating wetlands. A final report is planned. This report should be published during 1996.

## **Arctic Forb Seed Collection**

In 1990, ARCO Alaska, Inc. indicated that it wanted to investigate the use of native plants for revegetation of gravel pads. In response to this interest, the Plant Materials Center (PMC) and Alaska Biological Research (ABR) began collecting seeds of native forbs. The primary species collected included arctic sage and native legumes such as oxytropes, vetches and sweet pea.

The seed was divided between the PMC and ABR. ABR planted the seed in test plots on gravel pads to determine which species exhibited the greatest potential for revegetating these sites. Concurrently, the PMC began investigating the germination requirements, field production methods, and harvesting and processing techniques for these species.

The first field planting occurred in 1991 on a Fairbanks farm. Seedlings were grown at the PMC and transplanted into the field. Additional seed collections occurred in 1992 and 1993 and another more extensive field planting occurred in 1993.

Preliminary results indicate that arctic sage has great potential for revegetation; it grows well on gravel pads and is relatively easy to field grow. Testing needs to continue for several years to effectively select those species which can revegetate gravel pads and at the same time be grown as a commercial crop.

ABR and the PMC continued the arctic seed collection work during 1994. The collections were supported by the Arctic Slope Regional Corporation. Seed from native legumes were collected for two days during the first week in August. Primarily, oxytrope and astragalus seeds were gathered. The seed will be cleaned and the germination will be tested in Palmer.

A test planting was also established on the old Franklin Bluffs pipeline camp pad. A land use permit was obtained for the use of one acre of land to test the feasibility of producing seed of the native species. Six collections representing five species were planted. In August, some germination had occurred; additional germination and plant establishment should occur during the 1995 growing season.

The test plantings in Fairbanks are being evaluated and maintained. Since only a limited amount of flowering occurred in 1994, little to no seed was produced. The plantings were lightly fertilized mid-summer to encourage seed production in 1995.

In 1995, ABR continued monitoring the legume plot at the old Franklin Bluffs Pad; additional germination occurred in 1995. ABR also made a limited legume seed collection. The PMC did not participate in these activities although the PMC did monitor the field plantings at Fairbanks. Only a few collections had flowered and had produced seed at the time of the evaluation. Seed was harvested from two collections of *Aster sibiricus* and one collection of *Astragalus alpinus*; additional seed production is expected in 1996.

### **Identification of Willow Collection Sites**

The PMC has entered into a three-year agreement with the Department of Fish and Game to identify sites that contain willow species suitable for soil bioengineering projects in Southcentral Alaska and the Kenai Peninsula. The information will be compiled and shared with individuals in need of willow cuttings.

### **Red Dog Mine Revegetation & Demonstration Plots**

This project grew out of a mutual need for information. The PMC required revegetation data from northwestern Alaska, and Cominco Alaska, Inc. needed information on species that would perform well in future mine revegetation programs. In 1987, Cominco agreed to provide the PMC with sites to establish evaluation and demonstration plots for at least four years.

In order to provide the best information for both the PMC and Cominco, three plot sites, representing different conditions were selected. A site selected near the port facility was a sandy, gravel beach area common to the region. The second plot was located at the original camp site's fuel bladder containment area. The third plot was similar to the camp area, but provided a site to compare spring and fall seedings.

This combination of plots was intended to supply data for revegetation species selection and planting windows for seeding. The port site was planted on July 6, 1987 and provided information regarding revegetation in the coastal portion of the mine project.

A dormant plot was seeded at the camp site on September 8, 1987. Because of space limitations, the plot dimensions were slightly reduced and 12 accessions were dropped from the plot. The accessions that were eliminated are species that have failed elsewhere in northern Alaska. Their elimination from the plantings did not compromise the value of the information obtained from the plots. On June 15, 1988, a plot was planted on gravelly soil similar to the surface that will exist when construction of the mine is complete.

A major demonstration planting was also established on June 14, 1988. This plot, located on an abandoned disposal site north of the facility, was recontoured and seeded entirely with native species. It was also evaluated for four growing seasons. The completion of the evaluation program occurred September 1990, at which time a final report was prepared for Cominco.

A complete listing of conclusions and recommendations can be found in 1990 Final Report of Data and Observations Obtained From the Red Dog Mine Evaluation and Demonstration Plots.

During September 1992 and 1993, these sites were again visited and evaluated. All of the plots and trials continued to perform very well. During the 1993 site visit, plans were developed for a new research effort planned for 1994. These plans were put "on hold" until 1996.

## **Alyeska Ski Area Revegetation Study**

In 1992, at the request of Seibu Alaska/Alyeska Resort in Girdwood, agronomists from the Plant Materials Center began consulting with the resort's mountain projects manager regarding revegetation on ski slopes and mountain construction sites. During the late summer, the PMC assisted resort personnel in identifying and collecting seed of native plants for future sowing. In 1993, three revegetation test plots were established: one on the lower mountain near the new Alyeska Prince Hotel, the second at mid-mountain, and the third near the top of the mountain. These sites were selected to represent the range of climatic zones present at Alyeska Resort. The sites are located in areas unlikely to be disturbed by construction in the next few years. Evaluations will continue until 1996.

Thirty-five species of grasses and one forb were sown in each of the three plots in July, 1993. Due to dry summer conditions, germination was delayed at the mid-mountain and upper mountain plots. The lower mountain plot, sown one week earlier, exhibited good germination and ground cover for 'Kenai' polargrass, 'Climax' timothy and meadow foxtail when evaluated on September 3, 1993. All four cultivars of Kentucky bluegrass also were good performers.

At the mid-mountain and upper mountain plots, Nortran tufted hairgrass exhibited the best performance. It is expected that these seedling year performance figures will change over the next few years. In 1994, the plots were evaluated twice, the last occurred on September 7. Performance trends noted in 1993 have not changed. No evaluations occurred during 1995. Final evaluation and a complete report will be prepared in December 1996.

### **Deep Creek Soil Bioengineering Project**

In January 1994, Division of Parks and the Department of Transportation and Public Facilities requested technical assistance from the Plant Materials Center (PMC) for the soil bioengineering component of the facility upgrade at the north Deep Creek Scenic Overlook. The PMC was asked to assist with winter identification of willow collection sites, review the harvest plan, be on call to answer questions, make site visits at critical points during construction, and monitor and evaluate performance of the soil bioengineering.

Although high water made the initial phase of construction challenging, the project proceeded well and at the end of the growing season plant growth appeared vigorous. The success of the project can only be determined after a couple of growing seasons and several high water events have passed. The project will be monitored once or twice during the 1995 growing season.

The project was visited in the early spring shortly after plant recovery began. The project appeared to survive the winter and spring breakup quite well. Portions of the lower layer of the vegetated geogrid had completely silted in suggesting that the branches slowed the water sufficiently for sediment to deposit. Approximately 50 percent of the willows in the upper three layers of the vegetated geogrid survived; over 50 percent of the live stakes survived. It was too early in the growing season to evaluate the plant recovery for the live siltation and the brush mattress and unfortunately the project was not visited later in the summer. However, reports were received that the project survived the high water in September very nicely. Future evaluations will be conducted when the opportunity presents itself.



## **Fort Knox Mine**

In 1994, the PMC was contracted to assist in developing reclamation plans for the Fort Knox mining operation near Fairbanks. The multi-year projects will explore all phases of mine revegetation. In 1994, initial studies were conducted on mine tailings to determine suitability for revegetation. Full scale research will start on the mine site in 1996.

## **Department of Transportation Interior Seed Collection Project**

In 1995, the PMC initiated a program for the Alaska Department of Transportation to collect and commercially increase native species. The material collected will be used for future highway revegetation programs throughout the interior region.

The collection effort began on August 6, 1995 with a ten-day collection program in the Nome area and the surrounding road system. The collection program continued from Fairbanks to Tok along the Alaska Highway, as well as 50 miles south on the Parks, Richardson Highways and the Tok Cut-off. Additional collections occurred at Port Clarence. The collection effort ended on September 8, 1995. A total of 31 man days were expended on the collection effort.

A total of 153 collections covering 72 species were made. The amounts of seed collected ranged from 1 to 2 grams to 12 to 15 kilograms. A total of 108 kilograms of seed was delivered to the PMC.

Seed cleaning was initiated in November 1995 and is scheduled to continue through February 1996.

## **Navy Germplasm Preservation Program**

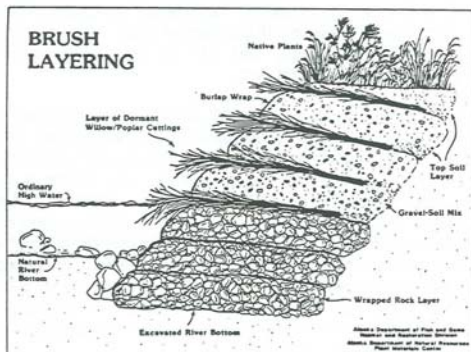
In September 1995, the PMC was awarded a two-year contract to collect and preserve Aleutian germplasm. This project is being funded by a Department of Defense Legacy Grant.

During the autumn of 1996 and 1997, collection programs will be undertaken on Attu, Shemya and Adak. Unlike the previous collection efforts, this program will preserve germplasm for future study.

## Yukon Territory Collection Project

In 1995, the PMC and the Yukon Department of Renewable Resources entered into a cooperative agreement to collect *Dryas drummondii* seed. In 1994, a vast stand of the species was located near Destruction Bay. This stand was adjacent to the Alaska Highway and appeared to be easily harvestable.

In August 1995, a crew from the PMC met their Yukon counterparts and initiated the collection effort. A Prairie seed stripper was brought from Alaska to accomplish the harvest. Unfortunately, the exceptionally dry year caused the *Dryas* seed heads to be roughly three inches shorter than in 1994. This unexpected difference in plant height made mechanical harvest impossible. The collection was done by hand. This resulted in less than 20 pounds of seed.

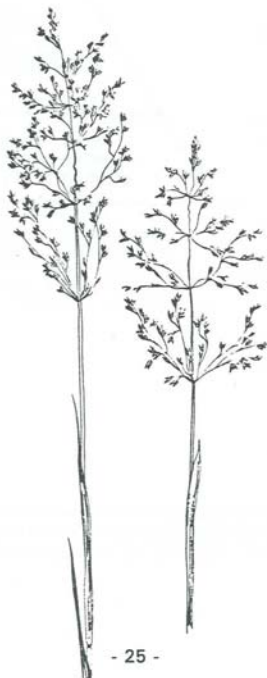




The genetic potential of a variety is explored by plant breeders. Varieties are selected based on the intended use as food, fibre, an ecological niche or its chemistry.

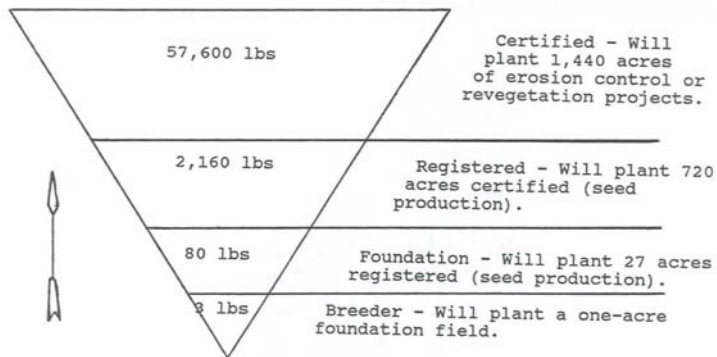
Successful growers understand the requirement for good germination and vigor from their seeds. The Federal Seed Act requires that seed offered for sale meets minimum germination standards.

Contaminants in seed include broken seed, chaff, dust, weed seed and pathogenic organisms. The higher the purity of clean seed, the less the possibility of introducing unwanted pests. The introduction of weeds or diseases in the seed increases the production costs and reduces yields not only in the present, but in future years as well.



As a member of the Association of Official Seed Certifying Agencies, the PMC's Foundation Seed Program, along with the Alaska Seed Growers, Inc., joins 43 other states in insuring that in-state and interstate purchasers have access to high quality, genetically pure seed.

**Figure 3 - Seed Increase Pyramid**



This diagram illustrates the increase of three pounds of grass breeder seed to a commercially useable quantity. Clean seed yield is based on 80 lbs./acre. The planting rate is based on 3 lbs./acre for seed production and 40 lbs./acre for reclamation purposes.

## **1995 Growing Season**

The weather in early May was warm and dry allowing a good jump on the season's activities. Irrigation was required to maintain adequate soil moisture at the PMC, as rainfall was below normal through August. The number of growing degree days remained above normal. The first frost did not occur at the PMC until late September.

Harvest began in July and continued into October. Several of the foundation oat fields were slow to mature.

Plantings were made to upgrade the supply of 21 varieties of grain seed because the germination of many of the existing seed lots had deteriorated. Breeder blocks of ten grass varieties along with numerous revegetation materials were also planted.

## **Inspection and Sampling**

A service formerly delegated to the Division of Agriculture's main office has been reassigned to the PMC's Foundation Seed Production Program - inspection of certified seed fields and official sampling of seed lots for germination and purity testing. The area of responsibility is southcentral Alaska, primarily the Matanuska and Susitna Valleys. Seed lots were sampled for testing as required.

**TABLE 1. REVEGETATION AND TURF VARIETIES IN PRODUCTION IN 1995.**

Variety	Class	Planting Date	Acres
'Arctared' Fescue	Foundation	94	1.7
'Nortran' Tufted Hairgrass	Foundation	90	1.0
'Reeve' Beach Wildrye	Foundation	89	0.5
'Egan' American Sloughgrass	Breeder	92	1.0
'Norcoast' Bering Hairgrass	Foundation	92	1.0
'Nugget' Kentucky Bluegrass	Foundation	93	2.0
'Caiggluk' Tilesy Sagebrush	Breeder	94	0.5
'Sourdough' Bluejoint	Foundation	94	0.6
'Toral' Oats	Foundation	95	1.0
'Nip' Oats	Foundation	95	2.0
'Weal' Barley	Foundation	95	2.0
'Thual' Barley	Foundation	95	0.5
'Datal' Barley	Foundation	95	0.5
'Otal' Barley	Foundation	95	0.5
'Lidal' Barley	Foundation	95	0.5

**TABLE 2. CEREAL GRAIN SEED & OIL SEED VARIETIES IN STORAGE AT THE PLANT MATERIALS CENTER, DECEMBER, 1995.**

Barley		Wheat		Oats		Rye		Rapeseed		Buckwheat	
Variety	Tons	Variety	Tons	Variety	Tons	Variety	Tons	Variety	Tons	Variety	Tons
Lidal	10.0	Chena	1.0	Total	7.0	Bebral	0.5	Candle	3.0	Oly	0.1
Otal	5.6	Ingal	1.2	Ceal	1.0						
Thual	5.0	Vigal	1.9	Nip	3.9						
Weal	8.0	Nogal	1.3	Golden Rain	0.1						
Datal	5.6	1397	0.5	Freedom	.07						
Finnaska	1.0	661162 43344	0.3	Total	11.2						
Pokko	0.6	Norstar	0.07								
Arra	0.3	Gasser	0.04								
Eero	0.2	Froid	0.07								
Edda	0.05	Rough-rider	0.03								
Paavo	0.03	Total	6.2								
Tibet Hulless	0.03										
Galt	0.01										
Otra	Trace										
Steptoe	Trace										
Total	36.3										

**TABLE 3. TURF, FORAGE, AND REVEGETATION VARIETIES IN STORAGE AT THE PLANT MATERIALS CENTER, DECEMBER, 1995.**

Variety	Pounds
'Alyeska' Polargrass	120
'Arctared' Fescue	300
'Caiggluk' Tilesy Sagebrush	160
'Egan' American Sloughgrass	463
'Gruening' Alpine Bluegrass	160
'Kenai' Polargrass	70
'Norcoast' Bering Hairgrass	170
'Nortran' Tufted Hairgrass	210
'Nugget' Kentucky Bluegrass	30
'Polar' Brome	310
'Reeve' Beach Wildrye	40
'Service' Big Bluegrass	180
'Sourdough' Bluejoint	15
'Tundra' Glaucous Bluegrass	26
'Engmo' Timothy	300
<b>Total</b>	<b>2,554</b>



**TABLE 4. CEREAL GRAINS SALES & RECEIPTS, 1992 - 1995.**

Type	1993	1994	1995
Barley	4,300 lbs	150	500
	\$1,007.88	\$41.98	\$184.25
Oats	2,400 lbs	300	500
	\$629.53	\$87.51	\$140.65
Wheat	4,850 lbs	100	-0-
	\$353.39	\$32.75	-0-
Rye	-0-	-0-	-0-
	-0-	-0-	-0-
Total	11,550 lbs	500	1,100 lbs
	\$1,990.80	\$162.24	\$324.90

**TABLE 5. GRASS SEED SALES & RECEIPTS, 1993 - 1995.**

Variety	1993	1994	1995
'Nugget' Kentucky Bluegrass	261 lbs	46 lbs	20 lbs
	\$3,276.72	\$587.88	\$239.40
'Arctared' Red Fescue	152.7 lbs	-0-	-0-
	\$2,203.01	-0-	-0-
'Sourdough' Bluejoint	-0-	-0-	-0-
	-0-	-0-	-0-
'Alyeska' Polargrass	60 lbs	-0-	-0-
	\$970.20	-0-	-0-
'Gruening' Alpine Bluegrass	40 lbs	20 lbs	12 lbs
	\$774.00	\$490.00	\$232.20
'Kenai' Polargrass	50 lbs	-0-	-0-
	\$800.00	-0-	-0-
'Egan' American Sloughgrass	40 lbs	-0-	-0-
	\$583.20	-0-	-0-
'Norcoast' Bering Hairgrass	25 lbs	65 lbs	-0-
	\$532.00	\$974.80	-0-
'Nortran' Tufted Hairgrass	40 lbs	45 lbs	75 lbs
	\$624.40	\$930.10	\$1,578.20
'Polar' Brome	-0-	-0-	-0-
	-0-	-0-	-0-
'Tundra' Glaucous Bluegrass	-0-	-0-	8lbs
	-0-	-0-	\$150.61
'Caiggluk' Tilesy Sagebrush	-0-	-0-	-0-
	-0-	-0-	-0-
<b>Total</b>	668 lbs	176 lbs	115 lbs
	\$9,763.53	\$2,982.00	\$2,200.41

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## FOREST NURSERY

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### Nursery Operations

The Forest Nursery completed it's third growing season at the Matanuska farm facility. The nursery is located adjacent to the University of Alaska Agriculture and Forestry Experiment Station's research farm, southwest of Palmer on Trunk Road.

Production of containerized tree seedlings for reforestation of state timberlands continued to be the focus of the nursery. These seedlings are planted by the Division of Forestry through their reforestation, stewardship and community forestry programs. Seedlings are also sold to other state and federal agencies, native corporations, commercial organizations and individuals for their reforestation or stewardship projects. Some seedlings are grown for use by commercial nurseries in Alaska. Division of Forestry requests for seedlings for reforestation of state lands remained the first priority for the nursery.

The nursery continues to participate in or assist in improving reforestation practices in Alaska. Seedlings were grown for two Alaska Science and Technology Foundation grant projects in 1995. One project, a tree improvement project, focuses on White Spruce for the Tok area and Sitka Spruce for Afognak Island. Raeann Blanton is the primary researcher for the tree improvement project. The second project will compare different ages of field grown seedlings and containerized seedlings in the interior, south central and Kenai Peninsula. Dr. Mike Newton, Oregon State University is the principal researcher for the container project.

Many improvements and changes of the facility were made in 1995 to help reduce the cost of seedling production or solve problems that had occurred at the facility. Improvements/changes included:

- Installed a freezer to overwinter seedlings. The freezer was obtained from the U.S. Forest Service.
- Upgraded the boom irrigation system in the greenhouses and converted the existing booms for use in the holding blocks.
- Extended the irrigation line to the holding block so the old irrigation boom could be used.

- Designed and installed a plenum that captured better the heat from the overhead gas heaters and brought it under the benches.
- Purchased a conveyor system to mechanically move seedling flats and boxes to the greenhouse or storage areas.
- Purchased a used radiator washer to wash larger lots of seedling containers.
- Installed a new pitless adaptor for artesian wells to prevent the well head from leaking due to the artesian pressure.
- Raised the irrigation pump and installed a self-flushing filter to solve the problem of silt and small gravel getting into the water lines.
- Upgraded the seed inventory database; it includes germination test information, accession information and crop production information.

More techniques to improve our seedlings and decrease the cost of production were implemented in 1995. The U S Forest Service has provided valuable assistance to the nursery to improve the nursery's operation. A nursery manager from Oregon reviewed nursery operations and assisted in implementing changes, and the director from the National Seed Laboratory provided training in seed cleaning and testing for the PMC staff. A group of seedlings were grown in styroblock containers to compare with the Ray Leach containers and a group was grown in large 20 cc Copperblocks to compare the seedlings with plug + 1 transplants.

The U.S. Forest Service has also provided funds for a project to test and upgrade the nursery's seed inventory. Germination tests, percent purity and seed weights are being calculated for new seed lots or lots that have out-dated germination test results. Accurate information about a seed lot is required for the best use of the seed and helps to reduce production costs. Two hundred seed lots from the nursery's inventory were tested in 1995. Seed lots with a high percentage of foreign matter were cleaned to increase their purity.

Total seedling production decreased in 1995 (Table 6.) The number of seedlings grown for the Division of Forestry decreased while other organizations ordered more seedlings from the nursery. A list of the species sown at the nursery in 1995 is in Table 7.

School groups from elementary to universities, scout groups and other organizations continued to tour the nursery or receive materials for educational programs. PMC staff participated in two cone collection and seed cleaning workshops sponsored by the Alaska Reforestation Council.

Despite all of the efforts placed on increasing efficiency and reducing production costs, the nursery is not receiving adequate funding to maintain operations and the facility was closed in December 1995.

Other funding sources are being explored and if they can be located, the nursery will be reopened.

**Table 6. Number of Seedlings Ordered in 1995.**

Year	Division of Forestry	Other Organizations
1993	119,472	41,056
1994	286,497	63,858
1995	200,295	107,379

**Table 7. Tree Species Grown in 1995.**

Number of Seedlings Grown	Species
4,100	<i>Alnus</i> , Alder
5,800	<i>Betula papyrifera</i> , Paper Birch
2,348	<i>Caragana arborescens</i> , Siberian Pea Tree
6,400	<i>Larix</i> , Larch
98	<i>Malus baccata</i> , Siberian Crabapple
500	<i>Picea abies</i> , Norway Spruce
190,550	<i>Picea glauca</i> , White Spruce
4,048	<i>Picea pungens glauca</i> , Colorado Blue Spruce
71,800	<i>Picea sitchensis</i> , Sitka Spruce
13,636	<i>Pinus contorta latifolia</i> , Lodgepole Pine
5,694	<i>Pinus sylvestris</i> , Scots Pine
1,600	<i>Prunus virginiana</i> , Chokecherry
1,100	<i>Tsuga</i> , Hemlock

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# NORTH LATITUDE VEGETABLE AND LANDSCAPE CROP IMPROVEMENT PROJECT

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## Horticulture Development Project

The horticulture industry has been a strong component of Alaska's agriculture industry for several years. The 1990 Alaska Railbelt Horticulture Industries Survey<sup>1</sup> states that in 1989 and 1990 the industry made up over 50% of the state's total agricultural cash receipts. Cash receipts for the greenhouse and nursery industry were valued at \$15,197,000.00 in the Alaska Agricultural Statistics 1993<sup>2</sup>. A majority of the products sold by the industry were produced in the state. In 1990, Alaska grown products accounted for 70% of the live plant sales. Over 1,800 people were employed by the horticulture industry in 1990.

No new surveys or statistical analysis of Alaska's horticultural industry have been conducted during the past few years. Yet, changes in the retail markets in Alaska have affected our horticultural industry. Several of the nationwide retail chains opened stores in Anchorage, Fairbanks and Kenai. They have impacted the horticultural industry in several ways; they provide another market for local and wholesale growers and competition for the local garden centers and nurseries. Nursery and garden center operators have mixed opinions about the impact of these outlets on their businesses. However, the impact does not appear to be as negative as first thought.

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<sup>1</sup> Alaska Agricultural Statistics Service, U.S. Dept. of Agriculture; Alaska Dept. of Natural Resources, Division of Agriculture; University of Alaska Fairbanks, Cooperative Extension Service and Alaska Horticulture Association. 1991. 1990 Alaska Railbelt Horticulture Industries Survey. Palmer, AK. n.p.

<sup>2</sup> Alaska Agricultural Statistics Service, U. S. Dept. of Agriculture; Alaska Dept. of Natural Resources, Division of Agriculture; University of Alaska, Agricultural & Forestry Experiment Station, and Cooperative Extension Service. 1993. Alaska Agricultural Statistics 1993. Palmer, AK. 38 pp.

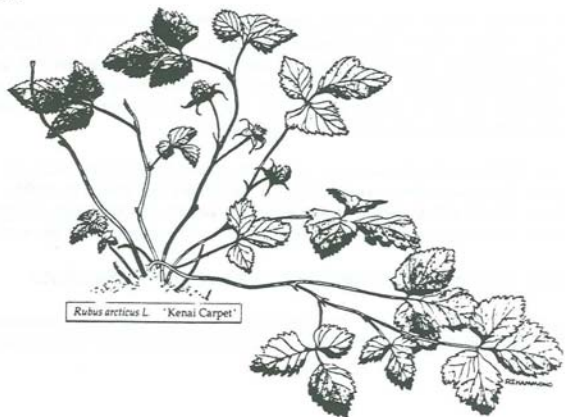


The Horticulture Development Program provides assistance for the continued expansion of this industry. From 1982 to 1994, the efforts of this portion of the Vegetable & Landscape Crop Improvement Program targeted the ornamental and small fruit, greenhouse and vegetable production segments of the industry. In 1995, the emphasis of the program was placed on the Forest Nursery as staff was reassigned to manage the nursery.

The program was responsible for trials of vegetable, small fruit, and ornamental plants. Both native and introduced plants are evaluated in the trials. Cultural and production techniques are also evaluated.

The basic steps used to establish a database of information and a resource of horticulture plants for use by the industry are as follows: 1) define and anticipate horticulturally related problems with the assistance of the industry; 2) establish priorities; 3) research solutions to the problems; 4) collect plant materials for trials; 5) conduct initial evaluations; 6) conduct off-site and advanced evaluations; 7) propagate the plants to be released to the industry; and 8) formally release the cultivar.

This program benefits the greenhouse production industry the most by co-sponsoring the Alaska Greenhouse & Nursery Conference and Polar Grower Trade Show. Other co-sponsors of the conference and trade show are the University of Alaska Cooperative Extension Service and the Alaska Horticulture Association.



## **Annual Alaska Greenhouse and Nursery Conference**

The 14th conference was held in Fairbanks, February 22 and 23, 1995. the conference was again co-sponsored by the PMC, University of Alaska Cooperative Extension Service (ACE) and the Alaska Horticultural Association. The Master Gardener Conference, held in conjunction with the conference, was on February 21, 1995. More than 150 people attended the conference. Thirteen presentations were made at the two-day conference. Topics presented ranged from "Factors Affecting Cold Hardiness" to "Greenhouse Media." The Polar Grower Trade Show included 15 business or organizational displays.

## **Off-Site Plant Trials**

The Horticulture Development Program has established plant trials throughout the state. Trials have been located in Fairbanks, Delta, Homer, Kenai, Kodiak, Nenana, Trapper Creek and the Manillaq area and Copper Center. A planting in Unalaska was destroyed before hardiness and growth information could be collected.

Volunteers planted and maintain the Copper Center site. Other cooperators assisting with the trials include the University of Alaska Cooperative Extension, individual cooperators, local governments and native corporations.

Ornamental trees and shrubs, and small fruits are being evaluated at these sites. Plants which have performed well in PMC trials or in the nursery are propagated and planted in the off-site trials. Plant materials not expected to grow well in Palmer or interior Alaska are tested at a Kodiak trial site. Data collected for each plant grown at the sites include growth rate, winter hardiness and disease and insect resistance.

Until 1995, evaluations were generally made at the trial sites on an annual basis. Site evaluations were made at Fairbanks and Kenai in 1995. The focus of the offsite trials was on the Kenai site where the site was reorganized and plants that had not performed well were removed or slated for removal.

## **Horticulture and Revegetation Plant Sales & Receipts**

Since the emphasis of the horticulture program was forestry seedling production in 1995, no horticulture or revegetation plant sales were made.

## **Educational Programs**

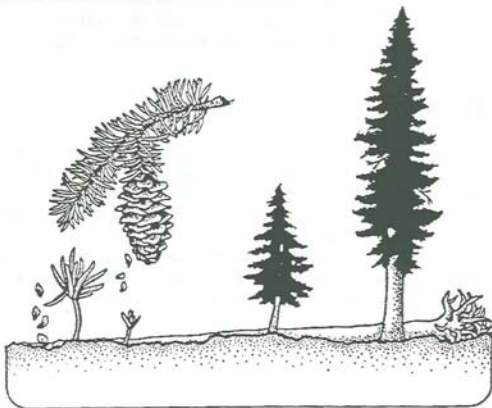
Plant Materials Center staff are often called upon to share their expertise with local organizations, school classes from pre-school to university levels, and professional groups. Individual assistance is given throughout the year.

Presentations were made at the Kenai Alaska Cooperative Extension Master Gardeners program.

## **Alaska Urban and Community Forestry Council**

The council was established in 1991 to advise the Division of Forestry on aspects of developing and delivering community forestry programs to Alaskan communities. Community Forestry Program staff receive assistance from the council on projects which promote the goals of the program. A PMC staff member serves on the council.

Council members review community forestry grants and recommend funding for the grants. Nineteen Arbor Day grants were awarded in 1995. They totaled \$ 19,825 and were matched with \$ 38,391. The August council meeting was held in Fairbanks. A special education program on tree selection, planting and maintenance was attended by local residents and council members. Program participants planted a tree on the UAF campus to practice the new planting techniques.



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## Potato Disease Control Program

Potatoes are among the most valuable crops grown on Alaskan farms. Commercial potato production is highly capital intensive. High yields with good quality are required to assure a fair return on investment. Diseases can cause significant losses reducing yield and quality factors.

The potato is a vegetatively propagated plant and as a consequence, has unique production problems. Many economically important diseases and pests can be carried in or on the tubers used as seed. The use of seed potatoes having little or no disease is basic to any management plan. Planting certified seed reduces the risk of losses caused by disease. It is for this reason that the production of disease free seed is a primary goal of the Plant Materials Center.

Seed produced at the PMC is sold to growers who increase the original allotment over the next several years. Seed potatoes are subjected to strict certification inspections to assure minimal disease incidence. The volume of certified seed produced in this fashion enables a grower to replace older diseased seed with clean seed.

Alaska is unique in that many disease and insect pests common to North America which require chemical control do not occur here. The importation of seed from outside the state has the potential to introduce pests not known to occur in Alaska. The inadvertent introduction of these diseases or pests would cause major problems. The importation of seed is therefore discouraged. Growers who wish to try new varieties are encouraged to obtain clean seed stock from the PMC.

### Pathogen Testing

The major focus of the potato program is providing quality seed potatoes to commercial seed growers. Low levels of disease are required of quality seed because diseases can negate a crop's usefulness as seed. The seed provided by the PMC is used as the initiating stock for the ensuing multiple year certified seed production scheme. This seed, therefore, must be of the highest quality possible since any disease introduced at this point would be multiplied during each successive year of seed increase. To this end, all production is rigorously tested and retested for disease prior to sale.

Testing for the presence of diseases is performed in the PMC laboratory on all the initial seed stocks (Figure 4). The diseases of primary importance are Bacterial Ring Rot (BRR) and the viruses Potato Leafroll Virus (PLRV), Potato Virus Y (PVY), Potato Virus X (PVX), Potato Virus S(PVS), Potato Virus A (PVA), Potato Virus M (PVM), and the viroid Potato Spindle Tuber Virus (PSTV).

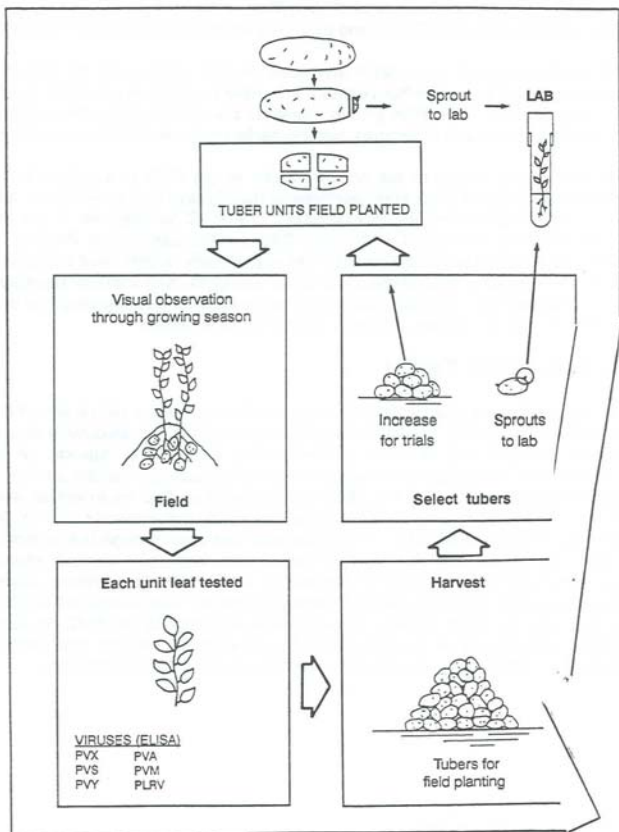
All newly acquired germplasm and each mother plant used for the in vitro propagation of the greenhouse stock are tested prior to production and again prior to harvest. The field grown materials are visually inspected during the growing season with laboratory testing performed prior to harvest (Figure 5).

Monitoring the health of the potato stocks at the PMC is a critical function. Understanding and accurately performing the disease test procedures, as well as interpreting the results, is essential. The PMC participates in the Potato Association of America Certification Section Standardization Project. This exercise provides participating labs the opportunity to test their materials and methods against a standardized series of antigens, and thereby developing a level of credibility. The PMC has been successful in detecting very low antigen levels as well as various strains found in North America.

## **Special Disease Testing**

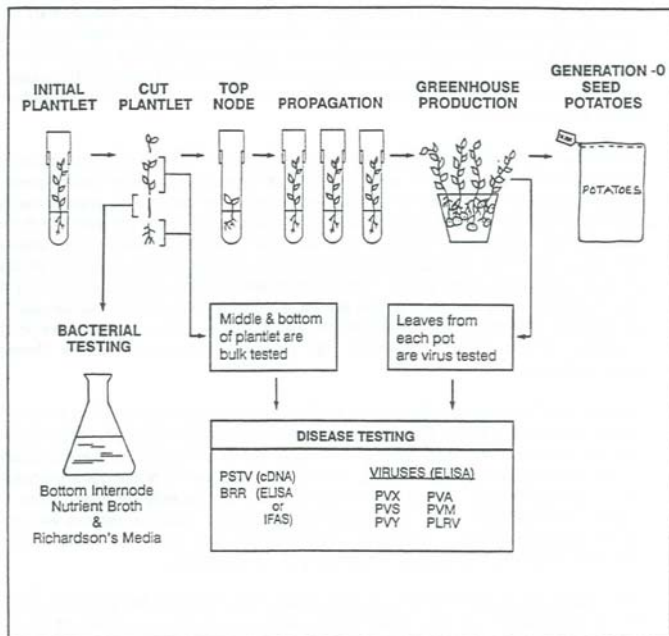
The results from a disease testing survey performed by the University of Alaska Fairbanks during the 1994 growing season, reported the discovery of several viruses thought not to occur in commercial potatoes in Alaska. A major concern was the report of viruses in the field-grown germplasm at the PMC. The protocols utilized by the PMC are designed to find an infection level of 0.1%. The PMC testing in 1994 could not verify the presence of PVY, PLRV or PVX as reported by UAF. It was decided that even though the potential for these viruses to exist in the field was small, extensive testing should be conducted of the field-grown materials in 1995. Dr. Chet Setula, owner of AGDIA, a well-respected disease testing company, was contacted and agreed to oversee the 1995 testing. Leaves were collected at the PMC on July 31, 1995. The testing of 11,000 plants for six different viruses was completed August 4, 1995. No viruses were detected in the PMC germplasm.

Figure 4. TUBER INTRODUCTION





**Figure 5. Alaska Seed Potato Production & Disease Testing**



## Seed Potato Certification

State of Alaska Seed Regulations 11 AAC 34.075 (J) require that all potatoes sold, offered for sale or represented as seed potatoes be certified.

The Seed Potato Certification Program is designed to provide growers with potato seed stock that is varietally pure and relatively free from disease causing organisms. These results are achieved by the voluntary compliance of seed growers to the certification regulations. Growers manage their seed production to limit the possible exposure to diseases, but reinfection can occur from soil or other sources. Certification is designed to identify and remove from use as seed those seed lots which have become diseased or are otherwise of reduced value for use as seed.

Diseases are capable of causing severe losses. Many of the diseases affecting the potato are carried in or on the potatoes themselves. The use of seed in which diseases are absent or at low levels has been proven to greatly reduce the risk of losses caused by disease. Certified seed has been inspected during the growing season and has met low levels of the disease tolerances allowed for seed. Certified seed potatoes produced in Alaska are far superior to seed produced outside of the state. The importation of potatoes carries with it the risk of introducing diseases which are capable of having severe consequences to Alaskan growers. The local availability of disease-tested seed reduces the potential of introducing diseases not presently found in Alaska through imported seed.

The Alaska Certification Program is a "limited generation system" in which the initiating seed lot, called Generation 0 (G-0), can be field planted only a limited number of years; i.e., eight years. The rationale of a limited generation system is that the contamination of seed stocks by tuber-borne pathogens increases with each replanting. If the older seed stock is continually removed from the system and replaced with new stock, the probability that pathogens will build up to problem levels is reduced. This system has been very effective in reducing, and in some cases, eliminating virus diseases.

Seed fields are inspected for diseased plants twice during the growing season and once while in storage. Seed lots in which excessive amounts of disease are found are not allowed to be sold as certified seed.

Alaska's Certified Seed Program is administered by the Alaska Seed Growers, Inc. The inspections are conducted by the PMC's Potato Disease Control Program. Inspections were performed during the growing season on 241 lots planted to 324 acres. This is an increase over last year due to large growers certifying their entire farm potato crop.

There were 58 varieties grown as certified seed. The varieties Russet Norkota, Shepody, Frontier Russet, Bake King and Hilite Russet comprised the majority of certified seed acreage. Certified seed potatoes were grown in the Matanuska Valley, Fairbanks, Bartlett Hills, Nenana and Delta Junction. Each lot was inspected according to certification standards for disease and varietal purity.

## **Educational Program**

The educational component of the program at the PMC allows interaction with wide ranges of interested groups from elementary school children to life-long experienced farmers.

Four Houston first grade classes were shown a variety of different types of potatoes. Round, oblong, flat, white, red, russet, yellow and purple potatoes helped generate questions concerning food production from the children. The idea of a plant's life cycle and it's association with garden plants was discussed.

The University of Alaska Cooperative Extension Service holds an Annual Potato Conference to update growers on research projects and innovations pertaining to potato production. Presentations were made outlining potato diseases found in Alaska. Various control measures were discussed focusing primarily on using quality seed as a management tool.

A presentation was made at the 79th Potato Association of America held in Bangor, Maine entitled, "Reviving Potato Breeding in Alaska". This educational opportunity was made possible with funding from Alaska Seed Growers, Inc.

## **Scab Resistance Trial**

The varieties Belle de Fontenay, Krantz, Lemhi, Reddale and Bake King were planted in gardens in Anchorage and the Matanuska Valley known to produce scabby potatoes. When dug in September, tubers of the varieties Krantz, Lemhi, Reddale and Belle de Fontenay had very little scab, whereas tubers of the susceptible variety, Bake King, were heavily infected. The resistance exhibited by these varieties has been observed over several years at multiple locations.

## Variety Development

There are many varieties of potato beyond the mainstream russets, whites and reds. A veritable cornucopia of shape, size, color, texture and flavor await those willing to explore. As new and unusual potato varieties are collected by the PMC, they are tested for diseases, purified and then planted. Observations are made of horticultural characteristics, plant type, flower color, tuber shape and color, yield, and storage characteristics; the end result being a variety description.

Several novel varieties lacking this type of database have been cleansed of virus and offered for production as "experimental" varieties. These novelty potatoes have been promoted in several gardening magazines and are prized by some Alaskan growers. The PMC maintains these cultivars to provide an instate source to help obviate the necessity of importing seed potatoes which could introduce exotic diseases.

Several of the following varieties were tested for total glycoalkaloids, a natural toxin. The cultivar designated 24-3 was determined to have a level greater than 20 mg/100g fresh weight.

24-3	German Butter Ball
77-2	Huckleberry
Alaska Redeye	Makah
Alaska Sweetheart	Peanut
All Blue	Peruvian Purple
All Red	Rose Fin Apple
Candy Cane	Daku
Favorite Red	Nosebag

## Disease-Tested Seed Potato Production

The PMC produced 1,900 pounds of disease tested seed potatoes from 12,000 plantlets raised in greenhouses. Five varieties, Frontier Russet, Goldrush Russet, Ranger Russet, Russet Norkota and Shepody, accounted for 50% of the total production.

Growers ordered seed from 102 different cultivars. Approximately 1,000 test tube plantlets were sold to growers for their production. Field production of germplasm accessions was increased to provide seed for trials in 1996.

## **Virus Disease Expression Plot**

A small plot was established to examine viral disease symptom expression. Four seed pieces each of known virus-infected materials were planted May 30th. The diseases were Potato Leafroll Virus (PLRV), Potato Virus Y (PVY), Potato Virus M (PVM), Potato Virus X (PVX), Potato Virus S (PVS), and very small tubers harvested from a plant having Witches Broom symptoms in 1994.

Symptoms of virus infection, except PVS, were apparent throughout the season for all viruses beginning a few days after emergence. The Witches Broom material did not emerge until mid August. It appeared healthy until late September when a light marginal chlorosis could be observed on the newer expanding leaves.

## **Supplemental Seed Distributions**

The use of disease-tested seed is encourage to eliminate the spread of seed-borne diseases. Germplasm is maintained at the PMC to service this goal. Seed was made available for various trials to the following:

- University of Alaska, Cooperative Extension Service
  - Palmer, Juneau, McGrath and Kenai
- University of Washington, Cooperative Extension Service
  - Prosser and Pullman
- Alaska State Fair
  - Palmer
- Cottage Vegetable Project
  - Russian Mission
- Agriculture Showcase Garden
  - Palmer

## **Cooperative National Plant Pest Survey**

The Potato Disease Control Project joined the National Plant Pest Survey Program in 1984. The project assists the survey program by reporting the incidence of potato diseases found during inspections. The program is designed to promote disease surveys and improve methods used in the detection of important plant pests. The inspection data is entered into a computer system and is accessible by program participants. The information will facilitate research, extension and regulatory agencies in making decisions concerning plant pests.

## Kodiak Island Plot

A plot was established at Port Lions in cooperation with Norm Ursin. Various amounts of six varieties were planted early June. The summer was exceptionally wet and cool. Harvest was completed by mid September.

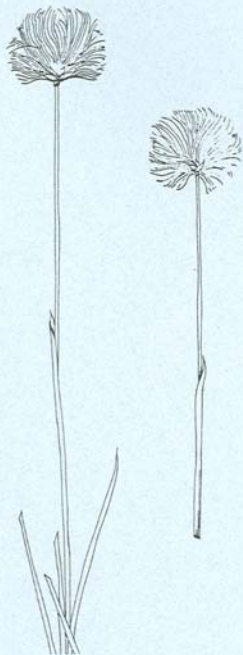
**Table 10. Kodiak Island Plot.**

Variety	Remarks
Allagash	(Russet) Cut seed pieces produced large baking-type potatoes while whole seed produced only smalls. No scab, hollow heart, slug damage or growth cracks.
Chaleur	(White) Fair yield of medium size tubers with excellent appearance. No scab.
Erik	(Red) Low yield of large tubers. Some scab.
Purple Viking	(Purple) High yield of large tubers. Some scab and growth cracks.
Red Pontiac	(Red) High yield of large tubers. Scab, hollow heart, slug damage and growth cracks.
Yukon Gold	(Yellow) Low yield of large tubers. Heavy scab, some hollow heart and growth cracks, heavy slug damage.



# APPENDIX A

## CURRENT & HISTORICAL BUDGET INFORMATION



# CALENDAR YEAR 1995 AUTHORIZATIONS, EXPENDITURES, AND PROGRAM RECEIPTS

## General Fund Authorizations

Authorization FY 95 PMC Total	690,500
Alaska Plant Materials Center	
Project Total	595,300
Personal Services	547,000
Travel	2,000
Contractual	35,300
Supplies	11,000
Capital Outlay	-0-
Forest Nursery	
Project Total	95,200
Personal Services	95,200
Travel	-0-
Contractual	-0-
Supplies	-0-
Capital Outlay	-0-
Authorization FY 96 PMC Total	528,500
Alaska Plant Materials Center	
Project Total	433,300
Personal Services	389,000
Travel	2,300
Contractual	32,000
Supplies	32,000
Forest Nursery	
Project Total	95,200
Personal Services	88,900
Travel	1,000
Contractual	5,300
Supplies	0

## PMC General Fund Operating Budgets for the Past Thirteen Fiscal Years

		FY 84	FY 85	FY 86	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	FY 93	FY 94	FY 95	FY 96
Author- ization in Thous- ands	PMC	912.3	863.4	888.5	733.7	596.7	556.7	566.1	566.1	620.8	608.9	585.6	595.3	433.3
	Forest Nursery											180.0	95.2	95.2
Personnel		25	19	19	17	16	16	16	16	16	16	17	17	15
Full Time		12	10	10	9	7	7	7	7	7	7	7	7	6
Part Time		13	9	9	8	9	9	9	9	9	9	10	10	9

When comparing personnel figures listed for FY 96 to those in FY 84, bear in mind that the Plant Materials Center is now performing basically the same duties at nearly the same level as it did in 1984 with 479,000 fewer dollars. The PMC has started generating operating money from federal and private grants to cover needed operations. These funds are in the form of short-term contracts that must continually be renewed. Money to hire and keep labor support staff has been the most critical issue facing the PMC. In the last two years, reductions in supplies and contractual (utilities) have also become areas of constant concern. These funds are now being supplemented with program receipts.

**Program Receipts  
Calendar Year 1995**

**Contracts, Reimbursable Service Agreements and Grants**

<u>Source</u>	<u>Face Value of Contracts Awarded During 1995</u>	<u>Monies Collected During 1995</u>
U. S. Forest Service/AK Div of Forestry	108.0	105.0
U. S. Army	0	0.7
U. S. Navy	28.3	21.3
Alyeska Pipeline Service Co.	41.0	4.3
U. S. Forest Service	0	66.0
State Pipeline Coordinator's Office	12.1	2.0
Chugach Electric Association	18.4	14.2
AK Dept of Transportation	35.8	16.0
AK Dept of Fish & Game	45.6	0
AK Division of Parks	8.7	1.6
Enstar Gas Company	1.8	1.5
Seed, Potato & Plant Sales	<u>34.5</u>	<u>34.5</u>
	334.2	267.10

**Program Receipts  
In Kind Assistance**

<u>Source</u>	<u>Estimated Value</u>
Alaska Seed Growers, Inc.	1,200.00
U.S. Coast Guard	1,500.00

**RSA, Program & Federal Receipt Values Since CY 1988**

Prior to 1988, Program Receipts and contracts were not sought by the Plant Materials Center.

1988	1989	1990	1991	1992	1993	1994	1995
42,195	31,407	58,417	117,981	126,071	202,886	377,161	334,200

## 1995 Calendar Year Monthly Expenditures to the Nearest Dollar

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PMC Totals	37,853	44,808	43,487	31,594	64,489	60,327	25,854	52,058	45,252	36,578	32,215	18,150
Personal Services	33,862	41,899	39,477	28,818	63,444	58,999	24,312	44,202	39,006	28,965	26,432	13,831
Travel	0	0	0	0	0	0	61	1231	1888	392	0	0
Contractual	4679	2462	4121	2452	516	0	590	4219	3513	6885	5096	3799
Supplies	0	447	192	324	529	1328	891	2407	845	336	1314	520
Forest Nursery	2487	9252	20219	34690	0	0	1350	17439	11147	16812	14955	10685
Personal Services	2413	9252	20219	34690	0	0	1350	13860	9761	12150	14041	10685
Travel	0	0	0	0	0	0	285	597	345	0	354	0
Contractual	0	0	0	0	0	0	433	1361	969	4220	554	0
Supplies	74	0	0	0	0	0	631	1621	73	443	6	0

# APPENDIX B

## CROP RELEASES

### Registration Certificate Crop Cultivar

Eqan American Sloughgrass  
Reg. No. CV-143

Developed by

Alaska Plant Materials Center

Registered by the  
CROP SCIENCE SOCIETY OF AMERICA



*Steve A. Elcheest*  
President

*Henry J. Thoms*  
Chair, Crop Registration Committee  
01/31/1991

Date of Registration



## CROP CULTIVARS DEVELOPED AND ADVANCED BY THE ALASKA PLANT MATERIALS CENTER

'Long' Barclay Willow, *Salix barclayi* - This attractive, fast growing native willow was released for commercial production in 1985. This cultivar will be used for reclamation, landscaping and shelter belts.

'Roland' Pacific Willow, *Salix lasiandra* - Roland was released in 1985 and is probably the most attractive willow selected by the PMC to date. This cultivar will be used for landscaping, stream protection and revegetation throughout most of Alaska.

'Wilson' Bebb Willow, *Salix bebbiana* - This willow has a dense growth form and has many potential uses for screening, windbreaks and living fences. Because of the the species' wide range of adaptability, it is also expected to be utilized for reclamation activities. Wilson is a 1985 release.

'Oliver' Barren Ground Willow, *Salix brachycarpa* - Oliver was released for commercial production in 1985. This cultivar's interesting growth form will lend itself well for incorporation into hedges. Additional uses range from reclamation to windbreaks.

'Rhode' Feltleaf Willow, *Salix alaxensis* - Rhode was also released for commercial production in 1985. This species occurs throughout Alaska and is listed as a preferred wildlife species. This cultivar will find uses in habitat restoration, reclamation, streambank protection and shelter belts.

'Egan' American Sloughgrass, *Beckmannia syzigachne* - Egan was released for commercial seed production in 1986. This cultivar has performed well at most test sites. Its expected uses are wetland restoration and waterfowl habitat enhancement. In 1991, Egan was registered as a crop cultivar with the Crop Science Society of America.

'Gruening' Alpine Bluegrass, *Poa alpina* - This selection of alpine bluegrass was released for production in 1987. A native species, alpine bluegrass has shown extreme hardiness throughout Alaska and it is well adapted to harsh sites such as mine spoil. In 1991, Gruening was registered as a crop cultivar with the Crop Science Society of America.

'Caiggluk' Tilesy Sagebrush, *Artemisia tilesii* - Caiggluk tilesy sagebrush is a native collection of sagebrush. It was placed in commercial production in 1989. The expected uses range from mine reclamation to restoration of sites contaminated with toxic metals. The cultivar will add diversity to seed mixes. This is the first native broadleaf species brought into commercial production in Alaska. In 1991, Caiggluk was registered as a crop cultivar with the Crop Science Society of America.

'Service' Big Bluegrass, *Poa ampla* - This accession of big bluegrass was derived from a collection made in the Yukon Territories. During the PMC evaluation process, the collection out-performed 'Sherman' big bluegrass (the only known cultivar of big bluegrass) in all categories. Service is expected to find use in dry land revegetation projects in Alaska south of the Yukon River.

'Reeve' Beach Wildrye, *Elymus arenarius* - Reeve beach wildrye was developed from a seed collection obtained from Norway. During the evaluation process, it was determined that this accession was capable of producing commercially viable amounts of seed. This was of extreme interest, as beach wildrye is notorious for not producing seed. Further evaluation indicated that the accession also had hardiness and adaptive traits making it useful in coastal revegetation and reclamation. In 1991, Reeve was released for commercial production. Reeve was registered as a crop cultivar with the Crop Science Society of America in 1994.

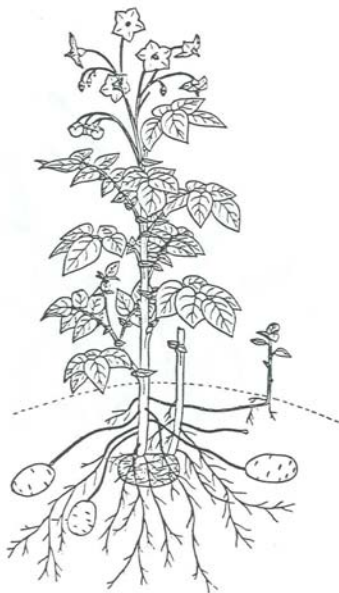
'Benson' Beach Wildrye, *Elymus mollis* - This accession was released for commercial production in 1991. Unlike Reeve, Benson was released for vegetative production only. This extremely aggressive and hardy, local collection does not produce seed in any appreciable amounts, therefore, commercial propagation can only be accomplished by vegetative means. This cultivar will find use in transplanting projects where erosion and accretion are beyond the capabilities of any seed species. Benson will become an important cultivar in coastal dune stabilization and restoration in Alaska. In 1994, the cultivar Benson was registered with the Crop Science Society of America.

'Kenai Carpet' Nagoonberry, *Rubus arcticus* L. - 'Kenai Carpet' nagoonberry was selected from a native collection made on the Kenai peninsula. This vigorously growing ground cover has been tested at various trial sites since 1985. It is best suited for use in large areas where an alternative to turfgrass or a mulch is desired. Kenai Carpet nagoonberry spreads by rhizomes and often out competes the surrounding vegetation. A minimal amount of fruit is produced by this cultivar. It was named and released for commercial production in 1991.

'Peanut' syn. 'Swede' Potato. This fingerling potato traces back to the Matanuska Valley in the 1930s. The tubers are small and resemble a peanut in shape and have yellow flesh. Desirable qualities include good yield under adverse conditions and a long dormancy.

'Rote Erstling' syn. 'Rode Eerstling' Potato. European variety promoted by Dr. Donald Dinkel, University of Alaska Fairbanks (retired). Round, red with yellow flesh. Early maturing.

'Alaska Sweetheart' Potato. Germplasm provided by Jayson Dearborn. Round, red with pale pink flesh.



## Pending Releases

Violet Wheatgrass, *Agropyron violaceum* - This native accession has undergone evaluation by the PMC since 1979. It has exhibited superior hardiness throughout Alaska, especially on dry, gravelly sites. Release is expected in 1996 - 1997.



# APPENDIX C

## LIST OF PUBLICATIONS AND PRESENTATIONS



ARCTOPHILA FULVA

1985 ~ 1989

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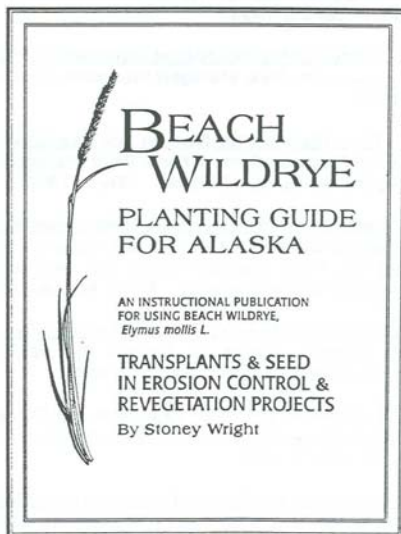
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## PRESENTATIONS DURING 1995

- Campbell, W. L. Potato Association of America Annual Meeting Report. Alaska Potato Conference. Palmer, Alaska. March 1, 1995.
- Campbell, W. L. Plant Pathology as a Career. Colony Middle School, 4th and 6th grade classes. Palmer, Alaska. March 10, 1995.
- Campbell, W. L. Reviving Potato Breeding in Alaska. Potato Association of America, 78th Annual Meeting. Bangor, Maine. July 23-27, 1995.
- Campbell, W. L. Potatoes of the World. Big Lake Elementary School, 4th and 1st grade classes. Big Lake, Alaska. October 14, 1995.
- Campbell, W. L., Chairman. Pathology Section of Potato Association of America. Potato Association of America Annual Meeting. Rapid City, South Dakota. November 29, 1995.
- Moore, N. J. Updates on Riparian Habitat Improvement Projects on the Kenai Peninsula. Interagency River Managers Workshop, Cooper Landing, Alaska. April 27, 1995.
- Moore, N. J. Plant Materials for Riparian Soil Bioengineering Techniques. Department of Fish and Game's Kenai River Protection and Restoration Monday Evening Series, Kenai, Alaska. May 1, 1995.
- Moore, N. J. Kenai River Salmon Rearing Habitat Problems and Restoration Projects Poster at Department of Fish and Game's Kenai River Festival. Represented the Plant Materials Center and was available to answer questions relating to plant materials. Kenai, Alaska. June 10, 1995.
- Moore, N. J. Streambank Restoration Techniques and Plant Materials. Guest lecture for graduate course on Aquatic Restoration, Alaska Pacific University. Anchorage, Alaska. June 21, 1995.
- Moore, N. J. Department of Natural Resources and Fish and Game's Kenai Riverbank Protection and Habitat Restoration Poster at Kenai River Classic, Kenai, Alaska. July 7, 1995.
- Moore, N. J. Streambank Restoration Techniques and Plant Materials. Guest lecture for graduate course on Aquatic Restoration. University of Alaska, Anchorage, Alaska. October 11, 1995.

- Wright, C. I. Update on PMC and State Forest Nursery. 14th Alaska Greenhouse and Nursery Conference. Fairbanks, Alaska. February 23, 1995.
- Wright, C. I. Alaska Fruits and Berries. Kenai Alaska Cooperative Extension Master Gardener Class. Seward, Alaska. April 19, 1995.
- Wright, C. I. Cone Collection and Seed Cleaning Workshop. Alaska Reforestation Council. Kenai, Alaska. July 20, 1995.
- Wright, C. I. Kenai Beautification Committee. Kenai Cooperative Trial Site Openhouse. Kenai, Alaska. August 3, 1995.
- Wright, C. I. Cone Collection and Seed Cleaning Workshop. Alaska Reforestation Council. Tok, Alaska. August 8, 1995.
- Wright, S. J. Collection and Production of Native Plant Species. Alaska Native Plant Society. Anchorage, Alaska. January 9, 1995.
- Wright, S. J. Collecting and Commercializing Native Wetland Species for Seed Production. National Inter Agency Workshop on Wetlands. New Orleans, Louisiana. April 6, 1996.
- Wright, S. J. Natural Revegetation on Peat Soils on Eareckson AFS, Shemya, Alaska. American Society of Agronomy. St. Louis, Missouri. October 31, 1995.
- Wright, S. J. Restoration of a Sand Quarry Located at Adak NAF, Adak, Alaska. American Society of Agronomy. St. Louis, Missouri. November 2, 1995.
- Wright, S. J. Recent Collection Efforts and Potential Commercialization of Native Plant Species in Alaska. American Society of Agronomy. St. Louis, Missouri. November 2, 1995.
- Wright, S. J. Commercial Value of Seven Native Sagebrush Species. Alaska Native Plant Society. Anchorage, Alaska. December 4, 1995.

## APPENDIX D

### ACKNOWLEDGEMENTS



## ACKNOWLEDGEMENTS

This annual report is composed of activities undertaken by the Plant Materials Center. Private industry, individuals and government agencies often assisted in these activities. The implementation of these activities would have been impossible without the cooperation and contribution of many individuals.

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Division of Mining

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Alaska Dept of Fish and Game

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Division of Habitat and Restoration, Juneau

Alaska Dept of Transportation/PF, Anchorage

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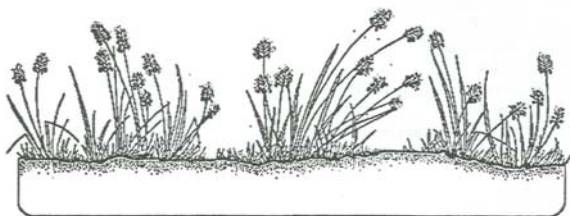
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