



**ALASKA
PLANT
MATERIALS
CENTER**

1994 ANNUAL REPORT

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January 1995

EXECUTIVE SUMMARY

ALASKA PLANT MATERIALS CENTER 1994 ANNUAL REPORT

The Plant Materials Center's 1994 Annual Report describes the work of the Center staff during calendar year 1994.

- 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 Ft. Wainwright; 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 Co., Cominco, the U.S. Army, Chugach Electric 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 second year in its new facility. Production techniques are being overhauled and include mechanization, cataloging seed inventories, and reassessment of seed spacing. The objective was to reduce operation costs and at the same time produce healthy tree seedlings. The U.S. Forest Service provided funding and valuable assistance to the nursery in this effort to improve efficiency. More than 300,000 seedlings were produced; these included conifers and a variety of deciduous trees.
- 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. Staff also worked with professional horticultural organizations to arrange summer tours of Alaskan sites with unique horticultural value.
- The Potato Program expanded in 1994. 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.

STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

DIVISION OF AGRICULTURE/PLANT MATERIALS CENTER
... PRACTICAL PLANT TECHNOLOGY FOR THE NORTH

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LETTER FROM THE DIRECTOR

The Plant Materials Center (PMC) has completed their seventh consecutive annual report. This report is designed to inform the Legislature and the public about the PMC's activities, accomplishments and budget expenditures.

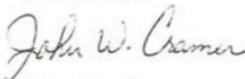
During the past twelve years, the PMC has reduced it's reliance on state appropriated general fund dollars. This shift was necessary if services were not going to be reduced. The PMC staff should be commended for the success they have experienced securing funding for different projects from various private and governmental sources.

PMC-generated program receipts and federal receipts have grown steadily since 1988 when program receipts were first authorized. In 1988, the PMC generated \$42,000, approximately 7% of its operating budget. By 1994, the PMC has increased its receipt of funds from outside sources to nearly 50% (\$377,000) of its operating budget. The success in raising non-general fund monies is particularly notable, since only a portion of the PMC staff are responsible for securing these funds.

Can we expect continued growth in program receipts? I have faith in the abilities and dedication of the PMC staff to obtain funding if it is available. However, support from the private sector is based on a strong economy, and federal spending may decline in the future. I expect the PMC will continue to work hard to bring in non-general fund money from various sources.

I urge you to continue to support this valuable state resource known as the Division of Agriculture's Plant Materials Center. If you would care to see first hand some of the activities of the PMC, you are invited to attend the annual open house scheduled for August 5, 1995.

Sincerely,



John W. Cramer
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 6, 1994.

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. Budget restrictions may preclude annual production of this type of report in the future. It is anticipated that the 1995 report will be a listing of projects and expenditures without narration. More detailed information will be presented in a 1995/1996 report of activities similar to the 1994 report format.



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.

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 in-state seed industry while providing state-of-the-art revegetation and erosion control information to the public.

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

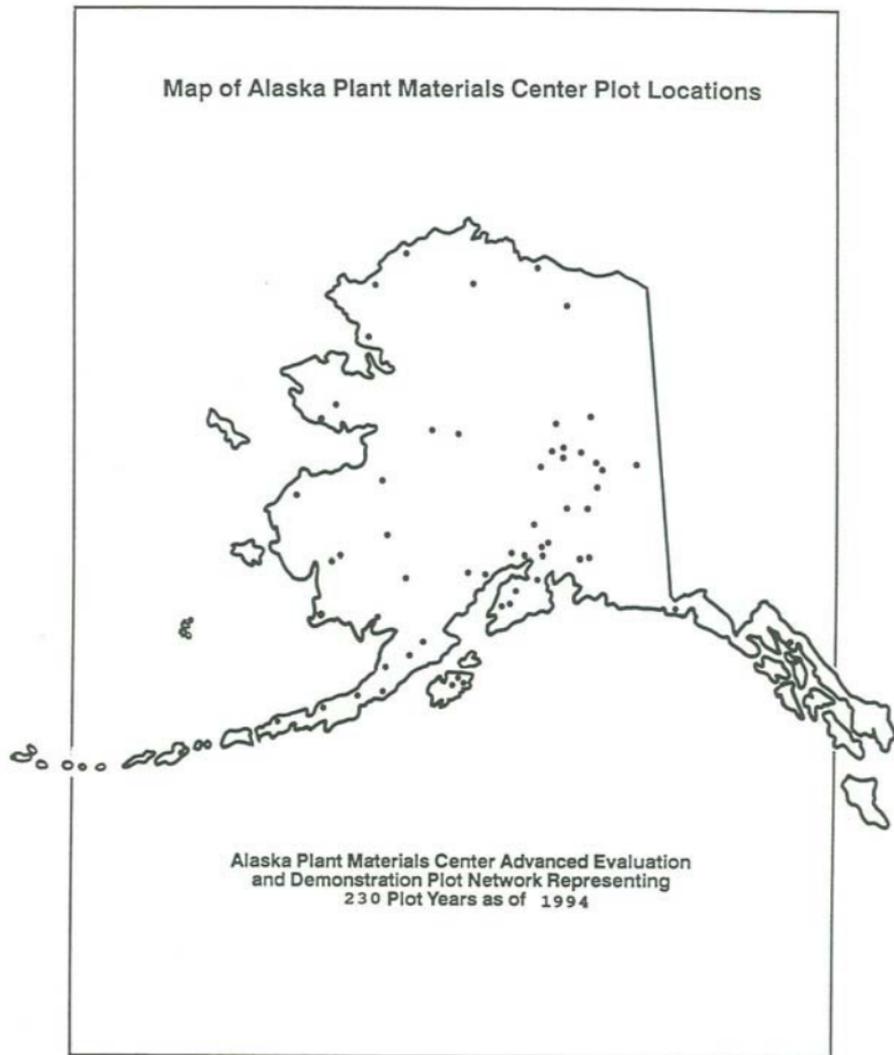


Figure 2 - Typical Plot Layout

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 yukonese</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

Aleutian Native Plant Propagation Project

In 1990, the Navy requested that the Plant Materials Center (PMC) collect and propagate woody plants native to the Aleutian Islands. This material was intended to be used for landscape plantings on Adak Naval Air Station. The PMC selected Barclay willow (*Salix barclayii*) and Siberian Mountain Ash (*Sorbus sambucifolia*) for propagation.

In May 1990, 1,500 Barclay willow cuttings were collected at Dutch Harbor. In June 1990, willow and Mountain Ash cuttings were obtained from Attu. This material was then prepared for propagation at the PMC. The willow was rooted successfully; however, the Mountain Ash failed to root. Attempts to propagate Mountain Ash with tissue culture techniques and seed were also tried.

Because Mountain Ash is difficult to root, the proposal included a plan to gather Siberian mountain ash seed from Attu. The seed was collected during September 1990 and stratified for container planting in April 1991. Seeding also failed to produce satisfactory results. In 1991, additional seed was collected and stratified with various techniques. By June 1992, 50 seedlings of Siberian mountain ash were growing at the Plant Materials Center. These seedlings were transplanted on Adak in May 1994. In September 1994, 90% of the seedlings were alive and producing new growth.

Initial willow plantings occurred on Adak in July 1990. The main planting was completed in May, 1991. By 1992, the willow plantings were only marginally successful. Plantings in protected areas exhibited an 80% survival rate, while only 12% survived in unprotected areas. The evaluations in 1994 showed no significant change in survival.

The Navy has reimbursed the PMC for all costs associated with this project.

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 grubs 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 insect infestations. 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.

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. A final evaluation will occur in 1995.

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. This plot will be evaluated and expanded in 1995.

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.

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. One additional evaluation will occur in 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 produce 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.

Defense Fuel Supply Wetland Restoration

The Defense Fuel Supply 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 caused the PMC to expand research on this species.

Adak Sand Pit 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 five acres for completion in 1995. By September 1994, the areas having been sprigged and seeded 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.

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.

Evaluations on these plantings will continue through 1997. The results from these plantings will help formulate revegetation recommendations for the Forty Mile Mining District.

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 will be available in early 1995. All publishing costs will be covered by the Navy.

Air Force Revegetation Manuals

In 1993, the Air Force requested site specific revegetation manuals for Eareckson Air Force Station (Shemya) and King Salmon Air Force Base. The project required site visits and developments of a series of seed mixes and recommendations for techniques in revegetation. The manuals were developed to direct users with limited knowledge in revegetation through the process without additional help from the PMC. All costs associated with the manuals were covered by the Air Force.

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.

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. Now, over 200 pounds of locally native seed is available to Chugach Electric Association for use in the rehabilitation effort scheduled for May/June 1995.

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.

Western Region Coordinating Committee 21 (WRCC-21)

In 1993, Alaska was chosen as the site for the WRCC-21 committee meeting. The PMC hosted the meeting from July 24 to 27, 1994. In addition to the business meetings, field tours to the PMC and an alpine revegetation study site at Alyeska Ski Resort were conducted. A total of 15 people attended the meeting from nine western states. Assistance was provided by Alyeska Ski Resort and the University of Alaska Agriculture and Forestry Experiment Station.

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 one-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. All data will be published in the form of a final report during the winter of 1994-1995.

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. A final evaluation is planned for August 1995. The anticipated 1994 evaluation was cancelled.

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. Evaluation of this site will continue through 1995 when a final report will be prepared. 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.

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.

ABR and the PMC are committed to these investigations. Funding sources to continue this work will be explored.

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 1995.

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. Final evaluation and completion report will be in 1996.

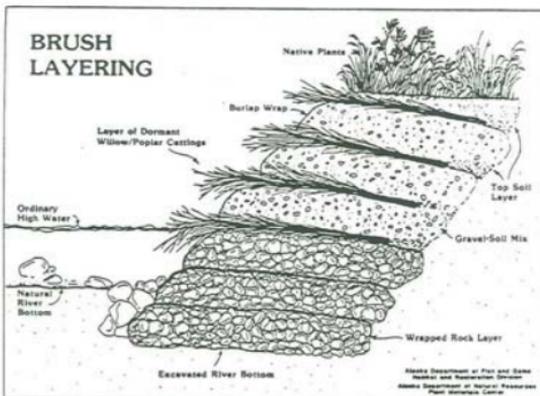
Deep Creek Soil Bioengineering Project

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.

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 1995.



Foundation Seed Program

This section of the North Latitude Revegetation and Seed Production Project increases and preserves cereal grain and grass varieties developed for the special growing conditions prevalent in Alaska and other northern latitude countries.

In the past, small amounts of "breeder" seed were obtained from the University of Alaska, Agricultural and Forestry Experiment Station. In 1994, this became a responsibility of the Plant Materials Center (PMC). Additional breeder seed is obtained from the PMC breeder plots, or other northern latitude sources. This seed is planted, grown, and processed at the PMC according to standards and procedures that ensure genetic purity, absence of noxious weed seeds, and freedom from injurious plant diseases.

The progeny of breeder seed, designated "foundation" seed, is made available to the industry through the state's seed certifying organization, the Alaska Seed Growers, Inc., in conjunction with the state Division of Agriculture. This process ensures that farmers growing "registered" (progeny of foundation) and "certified" (progeny of registered) classes of seed meet all requirements of genetic purity and cleanliness, and are in compliance with state seed regulations and the Federal Seed Act.

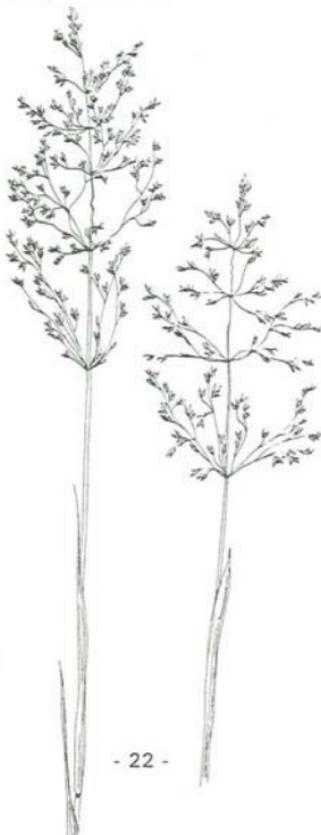
When the PMC began operations on 1973, the Foundation Seed Program began increasing newly released varieties of barley, oats, and wheat. These varieties, bred by the University of Alaska, Agricultural Experiment Station, became the primary crops of the large agricultural projects of the late 1970s and early 1980s. At the same time, new varieties of grasses for revegetation and turf gradually became available. As production from the large projects wound down, interest increased in revegetation varieties. Today, the Foundation Seed Program raises over a dozen varieties of grasses and forbs bred for revegetation and reclamation throughout the state. In addition, new seed collections from throughout the state are planted and evaluated. Promising species are increased at the PMC and made available for new revegetation projects.

Seed quality is a prime essential to successful farming. A grower needs to know that the variety will perform, has acceptable germination and is free from contaminants.

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.

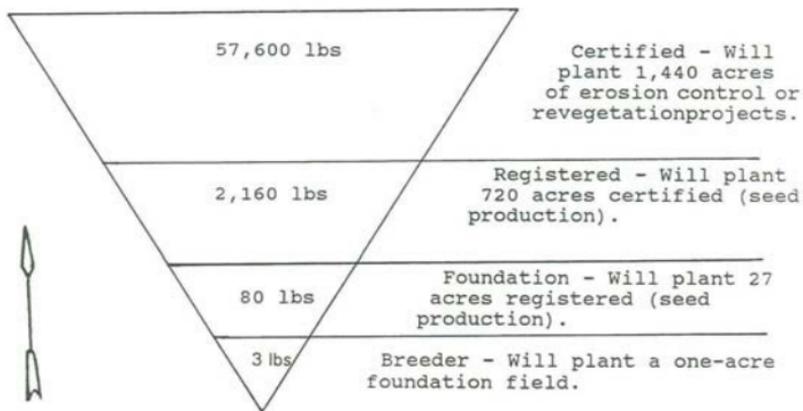
Successful growers understand the requirement for good germination and vigor from their seeds. The Federal Seed Act requires that seed offered for sale meets minimum germination standards.

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 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.

1994 Growing Season

The growing season of 1994 started out looking like a repeat of 1993, but the cold soil temperatures that prevailed for May and June prevented the crops from taking off. Cloudy skies provided only marginal relief from drought conditions. Irrigation was used extensively. Precipitation was five inches below normal May 2nd through September.

Harvest began in early July and was completed in late September. Yields were average except for the 'Egan' American sloughgrass which produced an excellent yield.

Plantings were made with 26 species of seed collected from the Aleutians for observation, breeder seed of 'Sourdough' bluejoint, 'Arctared' red fescue, 'Alyeska' polargrass and 'Toral' oats.

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 1994.

Variety	Class	Acres
'Arctared' Fescue	Foundation	1.7
'Nortran' Tufted Hairgrass	Foundation	1.0
'Gruening' Alpine Bluegrass	Breeder	1.0
'Reeve' Beach Wildrye	Foundation	0.5
'Egan' American Sloughgrass	Breeder	1.0
'Norcoast' Bering Hairgrass	Foundation	1.0
'Nugget' Kentucky Bluegrass	Foundation	2.0
'Alyeska' Polargrass	Foundation	1.4
'Caiggluk' Tilesy Sagebrush	Breeder	0.5
'Nogal' Spring Wheat	Foundation	0.3
'Sourdough' Bluejoint	Foundation	0.6
'Arctared' Red Fescue	Foundation	1.7
'Toral' Oats	Foundation	1.0

TABLE 2. CEREAL GRAIN SEED & OIL SEED VARIETIES IN STORAGE AT THE PLANT MATERIALS CENTER, DECEMBER, 1994.

Barley		Wheat		Oats		Rye		Rapeseed		Buckwheat	
Variety	Tons	Variety	Tons	Variety	Tons	Variety	Tons	Variety	Tons	Variety	Tons
Lidal	12.0	Chena	9.0	Toral	1.0	Bebreal	0.5	Candle	3.0	Oly	0.1
Otal	5.6	Ingal	5.2	Ceal	1.0						
Thual	5.1	Vigal	1.9	Nip	1.9						
Weal	5.3	Nogal	1.3	Golden Rain	0.1						
Datal	3.6	1397	0.5	Freedom	.07						
Finnaska	1.0	661162 43344	0.3	Total	6.6						
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	17.5								
Tibet Hulless	0.03										
Galt	0.01										
Otra	Trace										
Steptoe	Trace										
Total	33.8										

TABLE 3. TURF, FORAGE, AND REVEGETATION VARIETIES IN STORAGE AT THE PLANT MATERIALS CENTER, DECEMBER, 1994.

Variety	Pounds
'Alyeska' Polargrass	280
'Arctared' Fescue	775
'Caiggluk' Tilesy Sagebrush	60
'Egan' American Sloughgrass	539
'Gruening' Alpine Bluegrass	220
'Kenai' Polargrass	114
'Norcoast' Bering Hairgrass	228
'Nortran' Tufted Hairgrass	172
'Nugget' Kentucky Bluegrass	233
'Polar' Brome	310
'Reeve' Beach Wildrye	121
'Service' Big Bluegrass	222
'Sourdough' Bluejoint	15
'Tundra' Glaucous Bluegrass	17
'Engmo' Timothy	565
Total	3,871.00

TABLE 4. CEREAL GRAINS SALES & RECEIPTS, 1992 - 1994.

Type	1992	1993	1994
Barley	-0-	4,300 lbs	150
		\$1,007.88	\$41.98
Oats	1,100 lbs	2,400 lbs	300
	\$382.91	\$629.53	\$87.51
Wheat	-0-	4,850 lbs	100
		\$353.39	\$32.75
Rye	100 lbs	-0-	-0-
	\$36.50		
Total	1,200 lbs	11,550 lbs	500
	\$419.41	\$1,990.80	\$162.24

TABLE 5. GRASS SEED SALES & RECEIPTS, 1992 - 1994.

Variety	1992	1993	1994
'Nugget' Kentucky Bluegrass	335 lbs	261 lbs	46 lbs
	\$3,870.80	\$3,276.72	\$587.88
'Arctared' Red Fescue	375 lbs	152.7 lbs	-0-
	\$3,404.26	\$2,203.01	
'Sourdough' Bluejoint	10 lbs	-0-	-0-
	\$527.60		
'Alyeska' Polargrass	-0-	60 lbs	-0-
		\$970.20	
'Gruening' Alpine Bluegrass	80 lbs	40 lbs	20 lbs
	1,426.60	\$774.00	\$490.00
'Kenai' Polargrass	-0-	50 lbs	-0-
		\$800.00	
'Egan' American Sloughgrass	40 lbs	40 lbs	-0-
	\$728.00	\$583.20	
'Norcoast' Bering Hairgrass	40 lbs	25 lbs	65 lbs
	\$749.20	\$532.00	\$974.80
'Nortran' Tufted Hairgrass	72 lbs	40 lbs	45 lbs
	\$1,450.66	\$624.40	\$930.10
'Polar' Brome	-0-	-0-	-0-
'Tundra' Glaucous Bluegrass	75 lbs	-0-	-0-
	\$1,103.75		
'Caiggluk' Tilesy Sagebrush	2 lbs	-0-	-0-
	\$17.22		
Total	1,029 lbs	668 lbs	176 lbs
	\$13,278.09	\$9,763.53	\$2,982.00

FOREST NURSERY

Nursery Operations

The Forest Nursery completed the second growing season in the new facility located adjacent to the University of Alaska Agricultural and Forestry Experiment Station's Matanuska Research Farm. The farm is southwest of Palmer on Trunk Road.

Production of containerized tree seedlings for reforestation of state timberlands continues to be the focus of the nursery. These seedlings are planted by the Division of Forestry through their planting programs. Seedlings are also sold to other state and federal agencies, native corporations, commercial organizations and individuals for their reforestation projects. Division of Forestry requests for seedlings are 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 1994. One project is a tree improvement project while the second project will compare different ages of field grown seedlings and containerized seedlings.

Development of the facilities continues. A refrigerator van was moved to the site to overwinter tree seedlings. Our goal is to ship the majority of the seedlings before winter arrives. The van will be used when it is not feasible to ship seedlings the year they were grown.

Production techniques to improve the product and decrease the cost of production were studied and are being implemented this winter. The U. S. Forest Service has provided valuable assistance to the nursery to continue improving the nursery's operation. They have also provided funds for a project to improve the nursery's seed inventory.

Total seedling production increased in 1994 over the 1993 crop (Table 6). The number of seedlings grown for both the Division of Forestry and other organizations increased. Seedling sales to organizations other than the Division of Forestry totaled \$11,323.00. A list of the species grown by the nursery in 1994 is in Table 7.

Table 6. Number of Seedlings Produced in 1993 and 1994.

Year	Division of Forestry	Other Organizations
1993	119,472	41,056
1994	286,497	63,858

Table 7. Tree Species Grown in 1994.

Number of Seedlings Grown	Species
36	<i>Abies lasiocarpa</i> , Sub-alpine Fir
980	<i>Alnus crispa</i> , Alder
16,157	<i>Betula papyrifera</i> , Paper Birch
1,286	<i>Caragana arborescens</i> , Siberian Pea Tree
137	<i>Eleagnus commutata</i> , Silverberry
100	<i>Larix dahurica</i> , Dahurian Larch
100	<i>Larix decidua</i> , European Larch
6,788	<i>Larix sibirica</i> , Siberian Larch
800	<i>Malus baccata</i> , Siberian Crabapple
200	<i>Picea abies</i> , Norway Spruce
228,563	<i>Picea glauca</i> , White Spruce
1,600	<i>Picea pungens glauca</i> , Colorado Blue Spruce
68,430	<i>Picea sitchensis</i> , Sitka Spruce
17,258	<i>Pinus contorta latifolia</i> , Lodgepole Pine
100	<i>Pinus mugo</i> , Mugho Pine
2,052	<i>Pinus sylvestris</i> , Scots Pine
422	<i>Populus sp.</i> , Poplar
300	<i>Thuja plicata</i> , Western Red Cedar
300	<i>Tsuga mertensia</i> , Mountain Hemlock

NORTH LATITUDE VEGETABLE AND LANDSCAPE CROP IMPROVEMENT PROJECT

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 Survey¹ 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 1993². 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.

¹ 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.

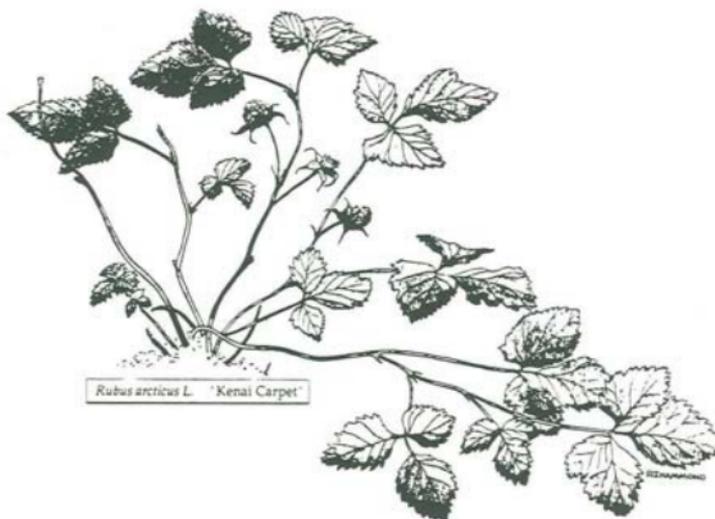
² Alaska Agricultural Statistics Service, U. S. Dept. of Agriculture; Alaska Dept. of Natural Resources, Division of Agriculture; University of Alaska, Agricultural & Forestry Experiment Station, and Cooperative Extension Service. 1993. Alaska Agricultural Statistics 1993. Palmer, AK. 38 pp.

The Horticulture Development Program provides assistance for the continued expansion of this industry. The efforts of this portion of the Vegetable & Landscape Crop Improvement Program target the ornamental and small fruit, greenhouse and vegetable production segments of the industry.

The program is 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.



Blueberry Applied Agricultural Research Account (AARA) Grant Study

Information on techniques to improve the fruit production of native stands of blueberries has been requested. In 1988, the program received an AARA Grant to investigate cultural techniques to increase the fruit production in wild stands of blueberries. Three trials, each consisting of four 10-meter by 10-meter plots were established. One trial is located in the Bartlett Hills Agricultural Project near Talkeetna and two are located on a farm in the Montana Creek area.

All of the plots, plus a 1-meter band around the perimeter of each plot, were cleared of trees and other shrubs. One plot of each trial was used as a control and received no additional treatment. The other three plots received a combination of fertilizer and pruning treatments. Ten grams of elemental nitrogen, phosphorus and potassium per square meter were applied to the fertilized plots. A weed whip modified with a triangular sawblade was used to prune the plots. Data was collected on cover, density and current annual growth.

The percent stand of blueberries and the *Vaccinium* species varies with each site. Alpine blueberry (*Vaccinium uliginosum*), dwarf blueberry (*V. caespitosum*), and early blueberry (*V. ovalifolium*) grew at the Talkeetna site. The predominant species at the west Montana Creek site is early blueberry, *V. ovalifolium*. Both *V. ovalifolium* and *V. uliginosum* grew at the north Montana Creek site.

In 1990 and 1991, elemental nitrogen, phosphorous and potassium was applied at the rate of 10 gm/m² to each of the fertilized plots early in the season. At the time of fertilization, undesired trees and shrubs were cut back to ground level. In 1990 grasses were treated with a 20% solution of Roundup applied with a hand-held wiper applicator.

Dry weather conditions during the 1991 growing season appear to have affected the yield more than the treatments. The blueberry and other plants at the sites showed signs of drought stress. In Talkeetna, the sites with the highest yields had the best moisture conditions early in the season. Yield from the Montana Creek sites was not taken after 1991 because the sites were required for other farm activities.

A late, cold spring followed by a dry period again impacted the yield in 1992 at Talkeetna (Table 8). Yield was up in both fertilized plots, but lower in the unfertilized plots. Grasses, trees, shrubs and other forbs continue to encroach the plots and provide competition for the blueberries. The Talkeetna site experienced a dry spring again in 1993. Blueberry plants did not produce fruit at the site and no yield information was collected. Again in 1994, the yield was higher in fertilized plots than the unfertilized plots.

Table 8. Yield at Talkeetna.

Total Harvested Year	No Fertilizer, Not Pruned, Harvest g	No Fertilizer, Pruned, Harvest g	Fertilized, Not Pruned, Harvest g	Fertilized, Pruned, Harvest g
1990	116	814	133	37
1991	5	97	9	5
1992	0	>1	28.5	108
1993	0	0	0	0
1994	195	29.6	359.1	267.7

Small Fruit Applied Agricultural Research Account (AARA) Grant Study

The Small Fruit AARA grant is a cooperative project with the University of Alaska Fairbanks, Agricultural and Forestry Experiment Station. The study's goals were to systematically evaluate small fruit varieties in 13 locations in the railbelt area. The PMC planted seven sites in southcentral Alaska. The trials planted in 1988 and 1989 include five varieties of serviceberry (*Amelanchier spp.*), four black currant varieties (*Ribes spp.*), two red currant (*Ribes spp.*) varieties, 13 raspberry (*Rubus spp.*) varieties and three half-high blueberry (*Vaccinium spp.*) varieties. One raspberry variety, 'Heritage', did not perform well in 1988 and was replanted in 1989 with plants from the supplier. This variety has not thrived in most of the sites. An occasional primocane may grow, but no fruit is produced.

A winter hardiness rating, date of bud break, bloom and harvest dates and yield information were collected by the cooperators at each site. Each variety's performance varies depending upon the site. Results from the trial will be published in a separate report. Evaluations and reports from the sites indicate that it took six years for the plants to begin producing the yield expected in four or five years in Canada or other northern states.

A variety's disease or insect resistance or susceptibility can be observed at the sites. Two black currant varieties, 'Consort' and 'Willoughby Black', are susceptible to mildew. The UAF Alaska Cooperative Extension Integrated Pest Technicians identified both downy and powdery mildew on the currants at Talkeetna and Trapper Creek. Those varieties did not show signs of either mildew at the Palmer or Anchorage sites.

Annual Alaska Greenhouse and Nursery Conference

A conference was not held in November 1994 to avoid conflicting with the Agricultural Symposium which was held in Anchorage in 1994 and continue rotating the conference between communities in Alaska.

The 14th conference will be held in Fairbanks, February 22 and 23, 1995. The conference will again be co-sponsored by the PMC, University of Alaska Cooperative Extension Service (ACE) and the Alaska Horticultural Association. The Master Gardener Conference will be held in conjunction with the conference on February 21, 1995.

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. Evaluations are generally made at the trial sites on an annual basis. Site evaluations were made at Fairbanks, Nenana, Kenai, Talkeetna and Trapper Creek in 1994.

Horticulture and Revegetation Plant Sales & Receipts

Several types of plants have been sold by the PMC to commercial growers since 1979 to promote the commercial production of those plants. Plant materials for both horticultural and revegetation uses are sold by the PMC. They are sold to assist the development of the horticulture industry and increase the diversity of the materials commercially available in Alaska. These varieties have been promoted for use in Alaska by the University of Alaska Agriculture and Forestry Experiment Station and the PMC. Growers purchasing plants agree to use them as stock plants or for food production. The demand for the plants varies each year depending upon the commercial availability of the varieties (Table 9). The Alaska Horticultural Association receives 25% of the plant sales receipts for handling the plant sales, and the PMC uses the remaining 75% of the receipts to pay for the publication of the reports.

Table 9. Horticulture and Revegetation Plant Sales and Receipts

Variety	1991	1992	1993	1994
'Holland Long Bunch' Currant			25 plants	10 plants, 15 dormant cuttings
			\$30.00	\$240.00
'Swedish Black' Currant				10 plants, 150 dormant cuttings
				\$240.00
'Kenai Carpet' Nagoonberry	275 plants	75 plants	100 plants	
	\$550.00	\$150.00	\$200.00	
'Friedrichsenii' Potentilla				
'Kiska' Raspberry		12 plants		
		\$28.80		
'Pioneer' Strawberry		50 plants		
		\$30.00		
'Sitka' Strawberry		25 plants		
		\$15.00		
'Skwentna' Strawberry		25 plants		
		\$15.00		
'Talkeetna' Strawberry		50 plants		
		\$30.00		
'Toklat' Strawberry			625 plants	
			\$315.00	
'Long' Barclay Willow	40 cuttings	20 cuttings	35 cuttings	
	\$48.00	\$25.00	\$43.75	

Table 9. Continued

Variety	1991	1992	1993	1994
'Oliver' Barrenground Willow	40 cuttings		20 cuttings	
	\$48.00		25.00	
'Rhode' Feltleaf Willow	40 cuttings			
	\$48.00			
'Roland' Pacific Willow	40 cuttings	20 cuttings		
	\$48.00	\$25.00		
'Wilson' Bebb Willow	40 cuttings	20 cuttings		
	\$48.00	\$25.00		
Feltleaf Willow		200 cuttings		
		\$235.00		
Pacific Willow		100 cuttings		
		\$125.00		
'Alpha' Tomato	9 g Seed	15 g Seed	10 g Seed	
	\$18.00	\$30.00	\$21.00	
'Denali' Tomato	15 g Seed	6 g Seed	6 g Seed	
	\$30.00	\$12.00	\$12.00	
'Polar Baby' Tomato	36 g Seed	28 g Seed	7 g Seed	
	\$72.00	\$56.00	\$15.00	
'Polar Gem' Tomato	28 g Seed	12 g Seed	7 g Seed	
	\$56.00	\$24.00	\$14.00	
'Polar Star' Tomato		6 g Seed	6 g Seed	
		\$12.00	\$12.00	

Cottage Industry Project/Russian Mission Village Farm Project

The Plant Materials Center became involved with village farm/gardening projects in 1991 at the request of the Kuskokwim Economic Development Council (KEDC). Members of the Russian Mission community had requested assistance from KEDC to develop a farm project in their community. They wanted to produce vegetables and fruits for local use.

In 1992, PMC staff assisted in the development of the project and procuring plants; laying out and planting the project. A calendar of tasks for a farm/garden project was compiled for the project manager and the KEDC.

The farm/garden site became associated with the Cottage Industry Project in 1993. It is funded through an Alaska Science and Technology Foundation grant. The production of fresh vegetables and fruit in rural Alaska communities and identification of techniques to improve wild blueberry production in rural areas remain goals of the Cottage Industry Project.

The PMC staff works with the new project and continues to monitor the plantings made in 1992 and provides technical assistance to the managers of the Cottage Industry Project. PMC staff provided technical assistance to the project in 1994 and began editing a project manual developed by the managers.

Educational Programs

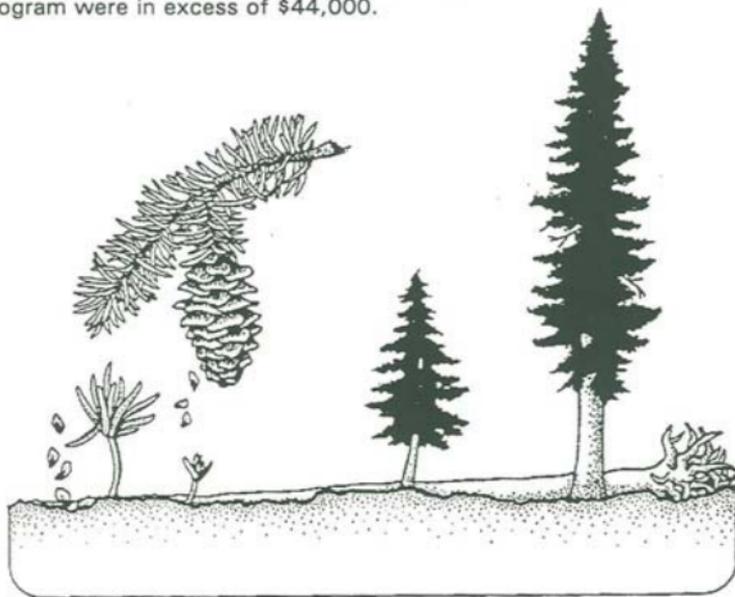
Plant Materials Center staff are often called upon to share their expertise with local organizations, school classes from pre-school to university levels, and professional groups. Individual assistance is given throughout the year.

Educational efforts in 1994 focused on the Urban and Community Forestry Conference held in April and tours for two national meetings that were held in Anchorage. The Garden Writers of America met in Anchorage in August and the Society of American Foresters met in Anchorage in September. PMC staff organized tours for both groups.

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. The Division of Forestry Urban and Community Forestry staff and the council organized Alaska's first Urban and Community Forestry Conference. It was held in April. Dr. Alex Shigo was brought to Alaska for the conference. Over 100 people participated in the conference. Dr. Shigo also held a one-day class for 26 utility arborists on line clearing and maintenance.

Council members review community forestry grants and recommend funding for the grants. Seven grants totaling over \$26,365 were awarded to projects for the 1994 Community Forestry Grant Program. Those grant dollars were matched with \$39,177 for projects which promote community forestry. The council also reviews grants for the National Tree Planting Program funded by the Small Business Administration (SBA) and administered by the Community Forestry Program. Over \$38,000 in grant funds were awarded to six projects in the 1994 SBA National Tree Planting Program. Matching funds for the SBA program were in excess of \$44,000.



Potato Disease Control Program

Potatoes are among the most valuable crops grown on Alaskan farms. The value of the 1993 crop was \$ 3,020,000 and has averaged \$2.5 million over the last ten years.

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.

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 increased 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 which require chemical control common to the North American continent do not occur here. Late Blight, Potato Virus Y and Potato Leafroll Virus are not found in commercially grown potatoes. 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.

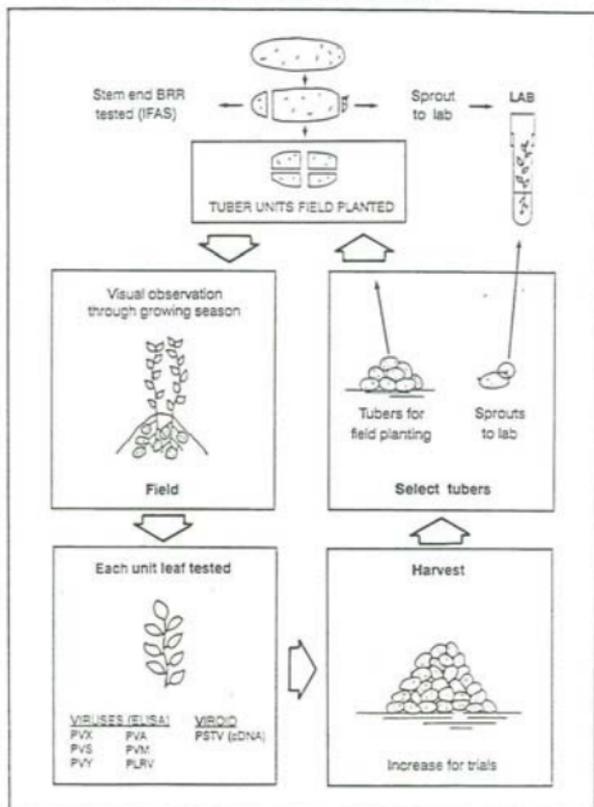
Disease-Tested Seed Potato Production

In 1994, the project produced 10,000 disease-tested plants of 69 varieties. Six varieties accounted for 67% of this total. The varieties most in demand were Bake-King, Shepody, Frontier, Russet Norkota, Frontier Russet and Goldrush Russet.

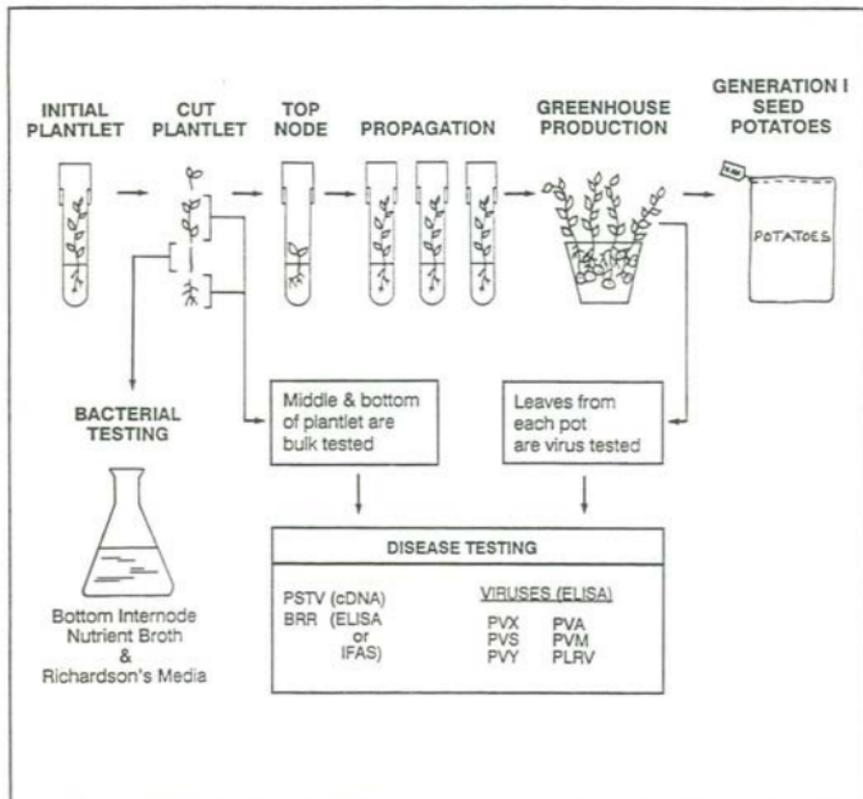
Approximately 1,000 plants were made available to three growers for production of Generation 0 (G-0) seed. The remaining plants were grown in greenhouses at the Plant Materials Center (PMC), and produced 2,063 pounds of G1 seed to meet the orders placed in 1993. Disease-tested seed amounting to 4,000 pounds of several varieties were field grown to provide seed for trials to be in 1994.

The potato project performed over 8,000 tests to ascertain the health of the materials produced. Each mother plant was tested for Bacterial Ring Rot, six potato viruses (X, S, Y, A, M, LR) and Potato Spindle Tuber Viroid prior to propagation. Tests for virus infection were also conducted at harvest.

FIGURE 4. TUBER INTRODUCTION



Alaska Seed Potato Production & Disease Testing



Seed Potato Certification

State of Alaska Seed Regulations 11 AAC 34.075 (J) require that potatoes sold, offered for sale or represented as seed potatoes be certified. Potato seed certification programs are important to the health of the potato industry. Disease-free seed can quickly become infected with disease when exposed to pathogens. Growers manage their seed production to limit possible exposure to diseases, but reinfection from soil or other sources can occur. Certification is designed to identify and remove from use as seed those seed lots which have become diseased, or otherwise are of reduced value for use as seed. This is accomplished by inspection for diseases in potato fields.

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 the disease tolerances allowed for seed. Certified seed potatoes produced in Alaska are far superior to seed produced outside of the state. Alaska's commercial production areas are free from the diseases Late Blight, Potato Leafroll Virus (PLRV), and Potato Virus Y (PVY). These are diseases that growers in other areas can only control with an arsenal of pesticides. The importation of potatoes carries with it the risk of introducing these and other diseases which are capable of having severe consequences to Alaskan growers. The local availability of disease-free seed reduces the potential of introducing diseases not presently found in Alaska.

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 210 lots planted to 210 acres. This is a fourfold increase over last year due to large growers certifying their entire farm potato crop. There were 44 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.

Students from Pioneer Peak Elementary School near Palmer were escorted on a field trip to a potato field near their school. A discussion of food production methods and problems faced by farmers indicated a level of understanding one would not expect from such a young group. A feast of french fries made with potatoes gathered from the field was delightful.

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 78th Potato Association of America held in Calgary, Alberta entitled, "Varietal Resistance to Potato Scab 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 a garden area in Anchorage known to produce scabby potatoes. When dug in September, tubers of the varieties Krantz, Lemhi, Reddale and Belle de Fontenay were well russeted and had very little scab. Bake King tubers were heavily infected.

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 and McGrath
- University of Washington, Cooperative Extension Service
Prosser and Pullman
- Copper River Native Association
Glennallen
- Alaska State Fair
Palmer
- Cottage Vegetable Project
Russian Mission

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

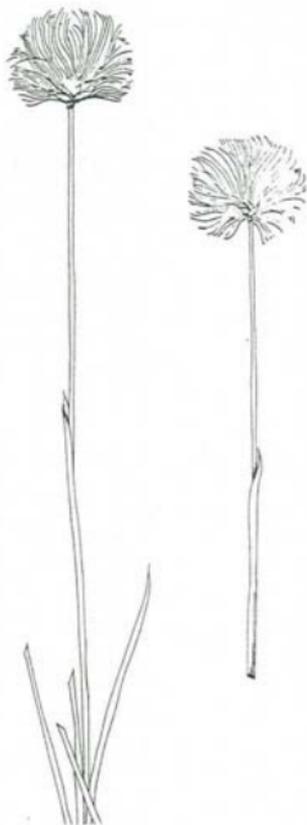
A plot was established near Port Lions in cooperation with Norm Ursin. Three pounds of each variety were planted June 6 and harvested September 6, 1994. The weather was reported to be cool and wet all summer.

Table 10. Kodiak Island Plot.

Variety	Pounds Total Yield	Remarks
Allagash	100	Excellent bakers, size small to large
Belle de Fontenay	47	Good color and flavor
Belle Isle	23	
Brigus	111	Some hollow heart, excellent taste
Campbell 13	47	
Erik	29	Few large tubers
Jemseg	49	
Rote Erstling	30	Small, poor yield and shape
Snow Chip	77	
Sunrise	75	Large set, many small ones
Yellow Finn	17	Late, poor set

APPENDIX A

CURRENT & HISTORICAL BUDGET INFORMATION



CALENDAR YEAR 1994 AUTHORIZATIONS, EXPENDITURES, AND PROGRAM RECEIPTS

General Fund Authorizations

Authorization FY 94 PMC Total	\$765,600
Alaska Plant Materials Center	
Project Total	585,600
Personal Services	535,400
Travel	5,000
Contractual	32,300
Supplies	11,000
Equipment	1,900
Forest Nursery	
Project Total	180,000
Personal Services	123,600
Travel	1,000
Contractual	40,000
Supplies	15,400
Equipment	-0-
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-

PMC General Fund Operating Budgets for the Past Ten 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
Authorization in Thousands	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
	Forest Nursery											180.0	95.2
Personnel		25	19	19	17	16	16	16	16	16	16	17	17
Full Time		12	10	10	9	7	7	7	7	7	7	7	7
Part Time		13	9	9	8	9	9	9	9	9	9	10	10

When comparing personnel figures listed for FY 95 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 300,000 fewer dollars. In addition, the PMC now manages and operates the Forest Nursery, a section formerly operated by the Division of Forestry.

**Program Receipts
Calendar Year 1994**

Contracts, Reimbursable Service Agreements and Grants

<u>Source</u>	<u>Face Value of Contracts Awarded During 1994</u>	<u>Monies Collected During 1994</u>
U. S. Forest Service/AK Div of Forestry	175,000	175,000
AK Div of Forestry (Budgeted RSA)	80,000	42,360
U. S. Army	44,900	44,900
U. S. Navy	5,800	13,028
U. S. Air Force	-0-	11,900
U. S. Forest Service	10,000	2,000
Dept. of Environmental Conservation	6,386	2,284
Chugach Electric Association	18,490	7,185
Fort Knox Gold Mine	12,750	900
AK Dept of Transportation	2,400	2,400
Enstar	1,800	-0-
ARCO Alaska	-0-	15,840
Seed, Potato & Plant Sales	<u>21,435</u>	<u>21,315</u>
	377,161	338,096

**Program Receipts
In Kind Assistance**

<u>Source</u>	<u>Estimated Value</u>
Alaska Seed Growers, Inc.	3,000
Alyeska Pipeline Service Company	1,200
Alyeska Ski Area	250

Program 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
42,195	31,407	58,417	117,981	126,071	202,886	377,161

1994 Calendar Year Monthly Expenditures to the Nearest Dollar

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PMC Totals	36,414	38,295	43,281	49,643	47,545	53,844	15,909	55,832	62,055	52,010	50,496	45,968
Personal Services	31,540	34,442	39,790	46,327	43,919	53,264	14,454	46,094	53,552	46,539	47,417	40,340
Travel	213	700	0	95	0		1217	2075	0	387	0	0
Contractual	4512	3104	3336	3271	3446	830	100	6571	6273	4769	2460	5216
Supplies	150	49	265	0	84	4	138	1093	2779	315	889	412
Forest Nursery	2079	16193	22894	15165	16959	10922	4349	15553	9440	9993	4847	0
Personal Services	0	11231	12241	12236	13610	11556	4248	14581	9258	9084	6458	0
Travel	0	0	0	0	0	0	0	0	0	0	0	0
Contractual	2083	1041	2122	2748	3193	797	0	0	0	0	0	0
Supplies	0	3921	8531	182	156	0	0	0	0	0	0	0

APPENDIX B

CROP RELEASES

Registration Certificate

Crop Cultivar

Open American Sloughgrass
Reg. No. CV-143

Developed by

Alaska Plant Materials Center

Registered by the
CROP SCIENCE SOCIETY OF AMERICA



Steven A. Elshout
President

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

Date of Registration

CROP CULTIVARS DEVELOPED AND ADVANCED BY THE ALASKA PLANT MATERIALS CENTER

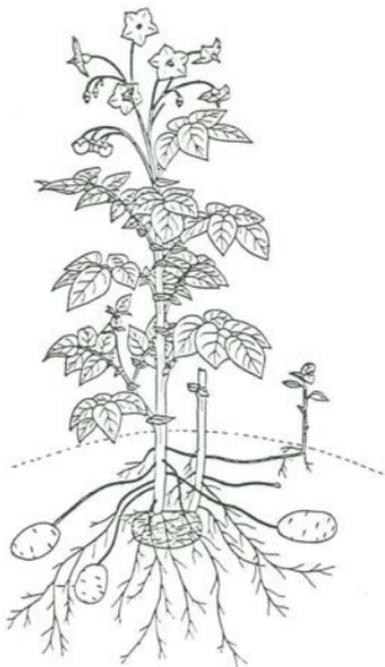
- 'Long' Barclay Willow, *Salix barclayi* - This attractive, fast growing native willow was released for commercial production in 1985. This cultivar will be used for reclamation, landscaping and shelter belts.
- 'Roland' Pacific Willow, *Salix lasiandra* - Roland was released in 1985 and is probably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



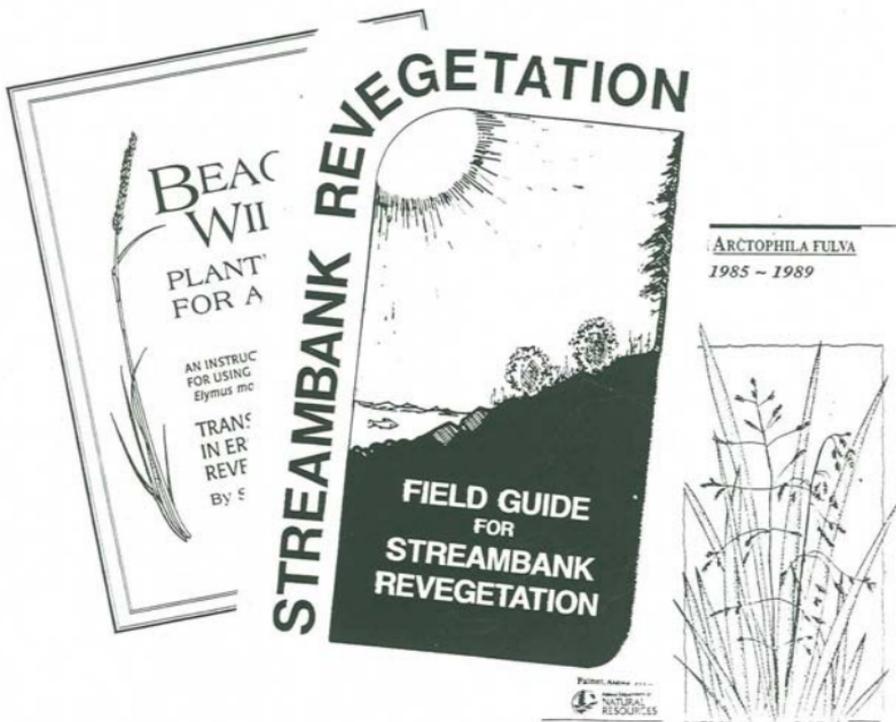
Pending Releases

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 1995 - 1996.



APPENDIX C

LIST OF PUBLICATIONS AND PRESENTATIONS



PUBLICATIONS

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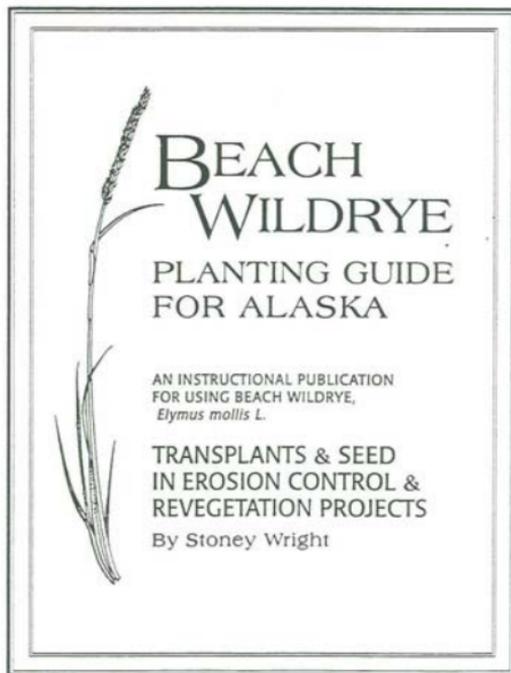
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PRESENTATIONS DURING 1994

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- Campbell, W. L. Potato Association of America Annual Meeting Report. Alaska Potato Conference. Palmer, Alaska. March 1, 1994.
- Campbell, W. L. Potato Certification Update. Alaska Potato Conference. Palmer, Alaska. March 1, 1994.
- Campbell, W. L. Potato Field Tour. Pioneer Peak Kindergarten. Palmer, Alaska. September 22, 1994.
- Campbell, W. L. Novelty Potatoes. Big Lake Elementary School. Big Lake, Alaska. September 23, 1994.
- Moore, N. J. Selected Riparian Habitat Improvement Projects - Kenai Peninsula. Aquatic Habitat Restoration in Northern Ecosystems Symposium. Girdwood, Alaska. September 22, 1994.
- Moore, N. J. Streambank Restoration Techniques and Plant Materials. Guest Lecture for Graduate Course on Aquatic Restoration. University of Alaska, Anchorage. March 21, 1994.
- Wright, S. J. Restoration of Areas Contaminated with Hydrocarbons. Bioremediation Workshop, Dept of Environmental Conservation, U. S. Air Force, Elmendorf, Alaska. February 1, 1994.
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APPENDIX D

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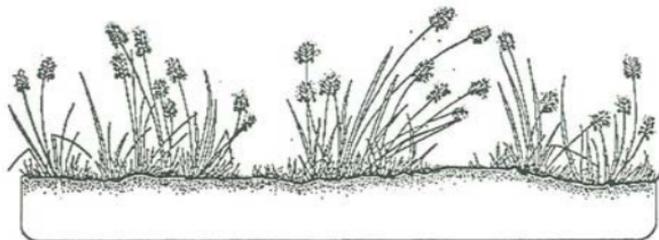
A special thank you is extended to Tom Klebesadel, PMC Farm Foreman, and the seasonal staff. The work of the PMC could not be accomplished without their support.

Don Ross resigned and Joe Stehlik retired and we wish them well.

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