

# Alaska Plant Materials Center

Annual Report  
1993

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Alaska Department of Natural Resources - Division of Agriculture



# STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

## DEPARTMENT OF NATURAL RESOURCES

DIVISION OF AGRICULTURE/PLANT MATERIALS CENTER  
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FROM THE DIRECTOR

January, 1994

The Alaska Plant Materials Center once again has printed this annual report of their activities during the past year. This ninety-page publication will introduce you to the varied projects and sites scattered throughout our great land. When one considers the number of locations where work is being performed, the question may be asked "why?" The answer is the expertise the Plant Materials Center staff has to offer, which is not readily available. The clients whom we do this work for are willing to help provide funds.

The Plant Materials Center's North Latitude Revegetation and Seed Production Project works with plant materials suitable for revegetating disturbed sites, controlling erosion, techniques for specific stabilization problems and increasing our selection of native species for revegetation.

The Foundation Seed Program increases Breeder Seed. This seed is sold to growers for production of Registered and Certified seed classes to assure genetic purity of plants adapted to Alaska and other circumpolar regions.

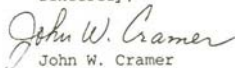
The spruce forests of our state are being decimated by spruce bark beetle, and the need to replant this tremendous eyesore is near to everyone. This past July, the state's Forest Nursery was transferred from the Division of Forestry to the Division of Agriculture. Our goal is to produce top quality seedlings from Alaska seed sources, and in turn, make them available primarily for reforestation efforts. With the facilities we have in place, our production goal for FY94 is 300,000 seedlings.

The Horticulture Development Program is assisting the planting, growing, harvesting, and processing of small fruits and berries, primarily in rural areas. Private business has an immediate need for additional product for jams, jellies and sauces. This will provide some diversification in rural economics.

The Potato Disease Control Program produces disease-tested seed potatoes for sale to commercial seed growers. This program assists one of Alaska's most valuable farm crops, the value of which has averaged \$2.5 million over the past ten years. The need for growers to have access to this type of top quality seed currently can only be met by the Plant Materials Center.

As you will read in this report, the activities of the Division of Agriculture's Plant Materials Center are very diverse. The need for repairing and protecting our land, waters, soil, and air is a must. We can and should have sound, as well as safe renewable and non-renewable development. The staff of dedicated professionals at the Division strive to provide the best possible assistance to "you", the people of Alaska, and I believe we are doing just that.

Sincerely,

  
John W. Cramer



**ALASKA  
PLANT  
MATERIALS  
CENTER**

**1993 ANNUAL REPORT**

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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 furthers 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 200 people attended the open house on July 17, 1993.

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.



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## History

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

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

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

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

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



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

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

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### **Revegetation & Reclamation Efforts**

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

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

To date, this program has gathered 20 plot years of information collected from sites around the state (Figure 1), developed 11 new cultivars for revegetation and reclamation and assisted scores of agencies and private companies in reclamation, erosion control and revegetation. Figure 2 represents a typical plot layout used in off-site evaluations.



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



Figure 1

Map of Alaska Plant Materials Center Plot Locations



Alaska Plant Materials Center Advanced Evaluation  
and Demonstration Plot Network Representing  
220 Plot Years as of 1992

**Figure 2 - Typical Plot Layout**

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

## **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 will be transplanted on Adak in 1994.

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 1993 showed no significant change in survival.

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

## **Seasonal Beach Wildrye Planting Study**

In 1990, the Plant Materials Center proposed to the Navy that a study be conducted to determine the actual transplanting season for beach wildrye (*Elymus arenarius*, *E. mollis*).

While previous studies on Shemya and Adak proved that the species could be successfully transplanted in May, June and August; the feasibility of planting in July and September needed to be tested. This continuous planting season would facilitate the use of the species in construction and reclamation activities.

This species has a very limited planting window (November to March) in the Pacific Northwest.

The project was funded and plantings occurred on Adak in July and September 1990. Initial evaluation of the July plantings indicated a 100% survival rate for the transplants. The September, 1990 plantings were evaluated in May and September, 1991, and exhibited survival in excess of 95%. By August 1992, the evaluation plots had grown together forming a stand of beach wildrye that appeared natural. The broad planting window that has been identified for the Aleutians contrasts sharply with the November to March planting window found in the Pacific Northwest. Final evaluation occurred during October 1993 and results will be presented in a "How To" manual for the use of beach wildrye. Publication is expected to be completed by mid 1994.

This study along with other current and future projects in arctic and western Alaska, will greatly enhance the knowledge regarding beach wildrye's potential for coastal restoration.

### **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.

### **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 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. Final decisions will be made in 1994. To date, natural revegetation is not occurring at a satisfactory rate.

### **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.

These plots may be salvageable, so in 1994 another evaluation will be attempted.

### **Nulato Airport Erosion Control Project**

In a program to assist the Alaska Department of Transportation, the PMC agreed to provide revegetation expertise, skilled labor and a small hydroseeder for a remediation project at the Nulato Airport.

A previous attempt by DOT/PF to revegetate the site was not satisfactory. A new plan was developed and during August of 1993, the PMC hydroseeder and one operator was placed on loan to DOT/PF for the revegetation project.

All work was completed in a timely manner, however delays in barge transport of the hydroseeder forced the seeding to occur past the optimum planting date.

This project has opened a dialogue with DOT/PF which is long overdue.

### **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 will start in July 1994. The project is scheduled to be completed by 1997.

### **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.

An additional site visit is planned for 1994, at which time the need for additional restoration work will be determined.

### **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 will be 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 will be accomplished by the PMC.

This effort has already generated interest from other agencies including DOT/PF, BLM and the U.S. Fish and Wildlife Service. The PMC expects more work in the production of native species.

## **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.

## **Alyeska Pipeline Revegetation Manual**

Alyeska Pipeline Service Company requested the assistance of the PMC to rewrite the companies revegetation manual. This involved changing seed mixes so new cultivars and more adapted native species would be incorporated. Additionally, more progressive methods of seeding and restoration were addressed.

The resulting specifications differentiated between seeding for erosion control and enhanced natural reinvason. The latter technique relies on very limited actual seeding and agressive surface preparation. This rather radical departure from previous specifications was granted conditional approval by the regulatory agencies.

## **Steese - White Mountain Mining District**

In June 1988, the PMC in cooperation with the Bureau of Land Management (BLM) Steese-White Mountain Mining District, established revegetation test plots on recontoured mine tailings. Each plot consisted of 50 smaller plots containing 49 grasses and one forb.

The BLM selected three sites in the district that had been recontoured and should not be disturbed for several years. A total of four evaluation plots were planted; two replicates of the plots were planted at the Birch Creek site, Mile 98 of the Steese Highway. This site is visible and readily accessible from the highway and hopefully will serve to inform others of the possibilities for revegetation. Other plots were planted at Nome Creek and Hope Creek, both of which were several miles off the Steese Highway. Staff from the Fairbanks BLM office volunteered their time to help lay out, seed and fertilize the plots.

In 1989, Birch Creek's main channel moved and began running adjacent to the Birch Creek #1 plot. The plot began eroding and disappearing downstream. This process continues and in 1993 very little of the plot remained. The Birch Creek #2 plot remained intact throughout the evaluation period. The Hope Creek site, also remained intact and contained the greatest number of species to survive the evaluation period. Most of the stakes marking the plots at Nome Creek had been disturbed or removed and many of the species had died. Very little information was collected from the final evaluation of this plot. The history of these plots indicates the importance of replicating the plantings so some information can be gained even though portions of the plots are destroyed during the evaluation period.

The plant growth varied between varieties and sites. The accessions that performed the best included 'Gruening' alpine bluegrass, 'Norcoast' Bering hairgrass, 'Arctared' red fescue, and 'Manchar' smooth brome.

Additional mine revegetation work was initiated in 1989 in the Nome Creek Maze area. Three treatments were tested on the mine tailings. Each treatment was replicated three times. One treatment consisted of planting ten different revegetation varieties in adjacent plots. A seed mix containing these ten varieties was used for the second treatment.

Both of these treatments were fertilized. The third treatment consisted of fertilizer only.

Qualitative evaluations indicate that the native vegetation responds favorably to fertilizer. The willows showed an increase in current annual growth and herbaceous plant cover appeared to have increased. Germination and establishment of the seed mix was localized and varied considerably with each site. The varieties that performed the best included Arctared red fescue, 'Nortran' tufted hairgrass, Norcoast Bering hairgrass and Gruening alpine bluegrass.

### **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.

An additional planting project is planned in May 1994, with total completion scheduled for 1995.

### **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 along 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.

The PMC did not evaluate the plantings at the end of the growing season, however, BLM monitored the performance of the plantings during the growing season. At the end of the growing season, all of the grasses had germinated and were growing well. None of the forbs had germinated. The forb seed had not been stratified prior to seeding, so hopefully the seed will stratify during the winter and germination will occur in the spring.

The results from these plantings will help formulate revegetation recommendations for the Forty Mile Mining District.

## **Kenny Lake Legume Evaluation**

In June 1990, the Plant Materials Center, in cooperation with the Kenny Lake Conservation District, planted a legume evaluation test plot at the Kenny Lake Community Garden site. Six varieties of alfalfa, four varieties of clover and two varieties of vetch were planted and fertilized with 20-20-10 fertilizer.

When the plot was evaluated in September 1990, very little germination had occurred. The summer had been very dry in Kenny Lake and the plot had not been irrigated. By late September 1991, additional germination had occurred and differences in the varieties' performances were becoming apparent. Also, the plot was well covered with weeds, particularly fireweed and lambsquarter. Only two varieties, 'Denali' and Siberian alfalfa, exhibited plant cover greater than 50%; the general vigor of these two varieties was greater than that shown by other varieties in the plot.

No evaluations occurred in 1992 and by the time the plot was evaluated in the fall of 1993, markers were missing and it was difficult to distinguish the different varieties. Alfalfa was present, but it was impossible to determine which varieties had survived. The portion of the Community Garden that was not occupied by the test plot was seeded with Peace alfalfa and it was growing nicely. Evaluations at this plot are completed.

## **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 is planned for a local mine in 1994.

## **Yukon Pacific Corporation Evaluation Plots**

In 1990, the Plant Materials Center and Yukon Pacific Corporation agreed to develop a series of ten revegetation test plots along the proposed gasline right-of-way. This project was made possible with assistance from the State Department of Transportation (DOT) who provided test sites and project support along the route.

DOT provided test sites in gravel pits, on unused airstrips and at abandoned oil pipeline camps. Sites were selected near Valdez, Thompson Pass, Glennallen, Isabel Pass, Birch Lake, Livengood, Pump Station 5, Chandalar Shelf, Happy Valley and Franklin Bluffs.

The size of the test plot was adjusted to fit the available space. The plot was subdivided into 36 smaller plots so that the individual plantings of twelve cultivars could be replicated three times at each site.



These plots tested only native revegetation material that would be commercially available for pipeline revegetation. The following cultivars were planted: 'Egan' American sloughgrass, 'Norcoast' Bering hairgrass, 'Nortran' tufted hairgrass, 'Alyeska' and 'Kenai' polargrass, 'Nugget' Kentucky bluegrass, 'Arctared' and 'Boreal' red fescue, 'Tundra' glaucous bluegrass, 'Gruening' alpine bluegrass, 'Sourdough' bluejoint reedgrass and 'Caiggluk' tilesy sagebrush.

The plots were planted between June 18 and July 3, 1990. Evaluations in 1991 show a wide variety of plant growth at the different sites. The plantings at Franklin Bluffs and Happy Valley exhibited very little plant growth. By 1992, evaluations at these two sites stopped because there were no plants to evaluate. The soils were compact and would have benefited from scarification, which normally occurs prior to seeding on most revegetation projects.

More plant growth occurred at test sites at more southern locations, however, many of the sites were characterized by harsh conditions, including soil compaction. All of the sites would have benefited from scarification prior to seeding.

In 1993, most of the plots were evaluated; the performance of the cultivars varied at the different sites and varied between replications at one site. The plots near Birch Lake have been invaded by moss, fireweed and willows and poplars, the grasses have almost all died. A final evaluation will be conducted in 1994 and an attempt will be made to develop regional seeding recommendations from the results from these test plots.

## **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%. One additional evaluation is planned in 1994, after which a final report will be prepared.

## **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 1994.

## **Interior Alaska Evaluation & Demonstration Planting**

Over the years, a variety of efforts have been made to establish an Interior Plant Materials Center. In lieu of developing an Interior PMC, the PMC in cooperation with the Fairbanks Soil and Water Conservation District, decided to establish an evaluation and demonstration plot at the Eielson Agricultural Development. A farmer provided newly cleared and prepared land for demonstration and test plots to evaluate revegetation plant materials.



In 1989, three revegetation evaluation plots and one demonstration plot were planted. The site was in excellent condition and by fall, the plantings had grown very well. The only areas that showed poor vigor were the edges of the plots where the fertilizer had probably been applied at a lower rate.

Evidently, the soils in the Eielsen Agricultural Project are nutrient poor and crops are heavily dependent on fertilizer. Since the plots are fertilized at the time they are planted and then left without any further fertilizer applications, plant growth is expected to decline over the evaluation period.

In 1991, evaluations occurred in early September. At that time, the plantings were performing relatively well. Cover and vigor had declined somewhat since the previous year and very few of the varieties were flowering. Flowering may have been affected when the plots were burned to help control weeds.

Most of the Kentucky bluegrasses continued to perform well, particularly 'Nugget' and 'Merion'. Two of the native wheatgrasses, *Agropyron boreale* and *A. violaceum*, which are being tested for commercial release, performed very well. Other varieties that were vigorous and provided good ground cover included 'Arctared' and 'Pennlawn' red fescue, 'Kenai' and 'Alyeska' polargrass, 'Caiggluk' tiley sagebrush, 'Sourdough' bluejoint reedgrass and pumpelly brome.

No major differences were noticed in the demonstration plantings from the previous year. Both 'Polar' and 'Manchar' brome and Sourdough bluejoint reedgrass performed reasonably well at all fertilizer levels. 'Boreal' red fescue provided a better plant cover with no fertilizer, whereas Arctared produced more seed than Boreal at the middle and high fertilizer levels. 'Park' and Merion Kentucky bluegrass produced a better overall ground cover than Nugget, but Nugget was the best seed producer. The legumes performed best at the lower fertilizer levels.

Evaluations were not conducted in 1992. An early snowfall prevented the completion of late field season work. Although a site visit did not occur again in 1993, the farmer reported that the grasses are doing well, and that they have been fertilized again and mowed. Since these plantings are being treated differently from other revegetation test plots, these plantings may now be better suited for turf grass evaluation by the Horticultural Development Program.

## Wrangell District U. S. Forest Service

In 1990, the Plant Materials Center began a cooperative revegetation study with the Wrangell District of the U. S. Forest Service. The PMC provided seed, travel and personnel. The Forest Service provided lodging, travel to the site, supplies at the site and personnel to assist in planting the plots.

The standard test plot containing 40 accessions was established at 4 different sites representative of the revegetation conditions encountered during and after logging. The plots were planted during June 5 - 7, 1990. One plot was planted on Snowberry Shotrock Road. This site was very gravelly and moderately compacted by logging traffic when the unit had been harvested. Two plots, Lost Joe Road and Fool's Inlet Road, were planted on relatively recent road cutbanks. These sites differed from each other in slope, aspect and physical location. The fourth site occurred on wood chip waste that was used to construct the municipal shooting range.

Although the performance of the plantings varied between sites, the most notable difference occurred at the shooting range. The substrate at this site was primarily wood chips in various stages of decay mixed with a small amount of sand. Initially, plant cover was sparse and the accessions died within two years. The plot seeded with the Forest Service's seed mix containing alsike clover, 'Pennlawn' red fescue, 'Climax' timothy and annual rye grew relatively well initially, particularly the clover. The municipality also used this mix to stabilize the berms of the shooting range. The clover became established and this mix, or at least the clover component, appears to be the best selection for revegetating the wood waste.

When the plots were evaluated in mid-October 1992, the plots at Fool's Inlet had been destroyed by logging activities. The test plantings at Snowberry Shotrock Road and Lost Joe Road sites had remained intact; several accessions were performing well, including 'Merion' and 'Fylking' Kentucky bluegrass, Pennlawn red fescue and 'Nortran' tufted hairgrass. Sometime before the evaluations occurred in 1993, the plots at Snowberry Shotrock Road were destroyed. One test planting remained and an evaluation was conducted on the Lost Joe Road plantings in October.

The original design for this study included three evaluation plots representing different conditions encountered during revegetation of logging roads. The recommendations for seeding were to be developed from the final evaluations of these plantings. Since all but one test site was destroyed over the evaluation period, the final recommendations will be based primarily on the results from this one site.

At the Lost Joe Road site 'Sydsport' and 'Fylking' Kentucky Bluegrass, 'Sherman' Big Bluegrass, 'Norcoast' Bering Hairgrass all performed well. There was no apparent difference in the performance between 'Arctared', 'Boreal' and 'Pennlawn' creeping red fescue. A final report will be completed in 1994.

## Upper Susitna Demonstration & Evaluation Plots

The Plant Materials Center and the Upper Susitna Soil and Water Conservation District established demonstration and evaluation plots near Trapper Creek in June, 1987. The former hay field was plowed and cultivated by the landowner and the plots were seeded and fertilized by staff from the PMC and the Palmer Soil Conservation Service.

Originally, the evaluation plots, consisting of fifty grasses and one forb planted in 4 x 10 foot areas, were replicated three times; a fourth plot contained plantings of the same accessions in 20 foot-long rod rows. The demonstration plot consisted of 18 plant varieties recommended for the area by [The Revegetative Guide for Alaska](#). These plantings were made in 20 x 60 foot plots. The 60-foot length was divided into three 20-foot sections, each fertilized at a different rate (0, 250, and 500 pounds/acre of 20-20-10).

The plants germinated and became well established, but in many cases the plants were obscured by timothy and hempnettle. In the spring of 1988, the plots were sprayed with 2,4-D, which was relatively ineffective in killing the broadleaf weeds. In July, the PMC decided to spray the entire plot with a broad spectrum herbicide and replant in June, 1989.

Prior to planting in June, 1989, the site was sprayed again with a broad spectrum herbicide and allowed to stand for one week before planting. Staff from the Palmer Soil Conservation Service and the PMC reseeded the site. Three evaluation plots and one demonstration plot were planted. The rod row plot (1987) was eliminated.

When the plots were evaluated on August 28, 1991, the plants were growing reasonably well, although weed problems were again becoming widespread. Five varieties were performing well in the demonstration planting. They were 'Polar' brome, 'Arctared' red fescue, 'Merion' and 'Nugget' Kentucky bluegrass and 'Aurora' alsike clover. No differences were apparent between the three fertilizer treatments. Differences had been noted during the first year when the more heavily fertilized sections of grass had performed the best, and the legumes performed better where there was no fertilizer or the medium level of fertilizer.

Some accessions performed consistently well in the three evaluation plots. Some of the highest cover values and vigor ratings were recorded for Nugget and Merion Kentucky bluegrass, 'Gruening' alpine bluegrass, violet wheatgrass, 'Engmo' timothy, 'Norcoast' Bering hairgrass, 'Nortran' tufted hairgrass, Arctared red fescue, 'Vantage' reed canarygrass and 'Caiggluk' tilesy sagebrush. Evaluations will be conducted for one more growing season, at which time, a final report will be prepared.

Evaluations were not conducted in 1992. An early snowfall prevented the completion of late field season work. Evaluations will be conducted in 1993.

### **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 1992. Performance of vegetation and the extent of high tides on the site were documented. Evaluation of this site will continue through 1994.



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.

## **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.](#)

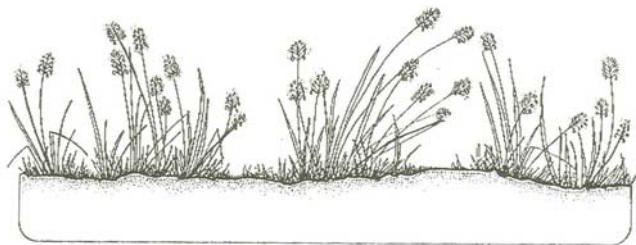
During September 1992 and 1993, these sites were again visited and evaluated. All of the plots and trials continued to perform very well. During the 1993 site visit, plans were developed for a new research effort planned for 1994.

## 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 and possibly 1997.

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.



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## Foundation Seed Program

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

Small amounts of "breeder" seed are obtained from the University of Alaska, Agricultural and Forestry Experiment Station, Plant Materials Center (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.

Today, the Foundation Seed Program continues to maintain cereal grain varieties as well as the revegetation species. Additionally, the program plays a key role in minimizing the introduction and spread of noxious weeds throughout the state. Through intense management of its small foundation seed production fields, the program produces an exceptionally clean product. As a result, private growers raising registered and certified seed can minimize the use of pesticides on large acreages to produce a certifiable seed lot.



## 1993 Growing Season

The growing season of 1993 will long be remembered as one of the best. The last frost occurred May 2, 1993 with the rest of the month well above average temperature. Soil temperatures were two weeks ahead and reached 50° F by the end of the first week of May. The first frost did not occur until mid September.

The down side was the lack of rainfall and those without irrigation suffered. The total precipitation for April through September was 6.52 inches with only one inch occurring April through mid August. Irrigation was used at the Plant Materials Center.

Harvest began in early July and was completed in mid September. Yields were above average, especially the 'Egan' American sloughgrass field.

Two fields which were not likely to be flooded were planted. Stands of 'Nogal' spring wheat, 'Nugget' Kentucky bluegrass, 'Alyeska' polargrass and 'Caiggluk' tiley sagebrush were established for certified seed production. Plantings of *Agropyron macrourum* and *Lupinus nootkatensis* were made for use in revegetation trials.

## 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. In 1993, five growers requested inspections of six certified seed fields. Seed lots were sampled for testing as required.

**TABLE 1. REVEGETATION AND TURF VARIETIES IN PRODUCTION IN 1993.**

Variety	Class	Acres
'Arctared' Fescue	Foundation	1.4
'Gruening' Alpine Bluegrass	Foundation	1.0
'Nortran' Tufted Hairgrass	Foundation	1.0
'Gruening' Alpine Bluegrass	Breeder	1.0
'Service' Big Bluegrass	Breeder	0.5
'Reeve' Beach Wildrye	Foundation	0.5
'Benson' Beach Wildrye	Foundation	0.2
'Egan' American Sloughgrass	Breeder	1.0
'Norcoast' Bering Hairgrass	Foundation	1.0
'Nugget' Kentucky Bluegrass	Foundation	2.0
'Alyeska' Polar Grass	Foundation	1.5
'Caiggluk' Tilesy Sagebrush	Breeder	0.5
'Nogal' Spring Wheat	Foundation	0.3

TABLE 2. CEREAL GRAIN SEED & OIL SEED VARIETIES IN STORAGE AT THE PLANT MATERIALS CENTER, DECEMBER, 1993.

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	3.5	Bebral	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	66116243 344	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										

**TABLE 3. TURF, FORAGE, AND REVEGETATION VARIETIES IN STORAGE AT THE PLANT MATERIALS CENTER, DECEMBER, 1993.**

Variety	Pounds
'Alyeska' Polargrass	257
'Arctared' Fescue	771
'Caiggluk' Tilesy Sagebrush	72
'Egan' American Sloughgrass	250
'Gruening' Alpine Bluegrass	142
'Kenai' Polargrass	57
'Norcoast' Bering Hairgrass	197
'Nortran' Tufted Hairgrass	212
'Nugget' Kentucky Bluegrass	152
'Polar' Brome	358
'Reeve' Beach Wildrye	52
'Service' Big Bluegrass	214
'Sourdough' Bluejoint	38
'Tundra' Glaucous Bluegrass	32
<b>Total</b>	<b>2,804</b>

**TABLE 4. CEREAL GRAINS SALES & RECEIPTS, 1991 - 1993.**

Type	1991	1992	1993
Barley	-0-	-0-	4,300 lbs
			\$1,007.88
Oats	1,000 lbs	1,100 lbs	2,400 lbs
	\$355.90	\$382.91	\$629.53
Wheat	200 lbs	-0-	4,850 lbs
	\$31.52		\$353.39
Rye	-0-	100 lbs	-0-
		\$36.50	
Total	1,200 lbs	1,200 lbs	11,550 lbs
	\$387.42	\$419.41	\$1,990.80



**TABLE 5. GRASS SEED SALES & RECEIPTS, 1990 - 1993.**

Variety	1991	1992	1993
'Nugget' Kentucky Bluegrass	-0-	335 lbs	261 lbs
		\$3,870.80	\$3,276.72
'Arctared' Red Fescue	-0-	375 lbs	152.7 lbs
		\$3,404.26	\$2,203.01
'Sourdough' Bluejoint	-0-	10 lbs	-0-
		\$527.60	
'Alyeska' Polargrass	20 lbs	-0-	60 lbs
	\$273.80		\$970.20
'Gruening' Alpine Bluegrass	10 lbs	80 lbs	40 lbs
	\$177.90	1,426.60	\$774.00
'Kenai' Polargrass	-0-	-0-	50 lbs
			\$800.00
'Egan' American Sloughgrass	5 lbs	40 lbs	40 lbs
	\$57.65	\$728.00	\$583.20
'Norcoast' Bering Hairgrass	89 lbs	40 lbs	25 lbs
	\$1,028.84	\$749.20	\$532.00
'Nortran' Tufted Hairgrass	-0-	72 lbs	40 lbs
		\$1,450.66	\$624.40
'Polar' Brome	-0-	-0-	-0-
'Tundra' Glaucous Bluegrass	-0-	75 lbs	-0-
		\$1,103.75	
'Caiggluk' Tilesy Sagebrush	-0-	2 lbs	-0-
		\$17.22	
Total	124 lbs	1,029 lbs	668.7
	1,538.19	\$13,278.09	\$9,763.53

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## FOREST NURSERY

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### Seedling Production

On July 1, 1993, the Forest Nursery was officially transferred from the Division of Forestry to the Division of Agriculture. Formerly located in Eagle River, new facilities had been completed in March 1993, adjacent to the University of Alaska, Matanuska Research Farm on Trunk Road, southwest of Palmer. Now administered by the Plant Materials Center, the Forest Nursery's new facilities consist of two 30' x 100' environmentally controlled greenhouses, and a 100' x 100' metal all-purpose building. This building houses offices, headhouse/preparation facilities, pesticide storage, cold seed storage and large work and warehouse areas.

The Forest Nursery's function continues to be the cultivation and distribution of containerized tree seedlings for reforestation of state timberlands through planting programs carried out by Division of Forestry. In addition, smaller amounts of seedlings are supplied to other state and federal agencies as well as native corporations, private commercial interests and individuals for small lot plantings. Because greenhouse space is limited, top priority is given to reforestation of state lands.

Production figures for 1993 indicate that 119,472 tree seedlings were distributed to the Division of Forestry for reforestation projects. Sales to native corporations and private companies and individuals totaled 38,974 seedlings for \$7,930.62. Federal agencies bought 1,882 seedlings for \$73.50. In addition, the nursery distributed over 200 tree seedlings to schools and other state agencies.





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# NORTH LATITUDE VEGETABLE AND LANDSCAPE CROP IMPROVEMENT PROJECT

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## Horticulture Development Project

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

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.

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

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

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.

The basic steps used to establish a data base 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.

## **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*) grow at the Talkeetna site. The predominant species at the west Montana Creek site is early blueberry, *V. ovalifolium*. Both *V. ovalifolium* and *V. uliginosum* grow at the north Montana Creek site.

In 1990 and 1991, elemental nitrogen, phosphorous and potassium was applied at the rate of 10 gm/m<sup>2</sup> 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 the Talkeetna. 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.

### **Small Fruit Applied Agricultural Research Account (AARA) Grant Study**

The Small Fruit AARA grant is a cooperative project with the University of Alaska Fairbanks, Agriculture and Forestry Experiment Station. The study's goals were to systematically evaluate small fruit varieties in 13 locations in the railbelt area. The PMC is responsible for 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 replacement plants from the supplier. This variety has died in most of the sites.

Information to be collected by the cooperators in this study includes winter hardiness rating, date of bud break, bloom and harvest dates and yields. The yield information indicates that in southcentral Alaska each variety's performance varies depending upon the site. Results from two sites are given in Table 6. The plants in this study have been observed for five years.

Observations made at the different trial sites are that the Consort Black Currant and Willoughby Black Currant are susceptible to mildew. The UAF Cooperative Extension Service 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.

Raspberry plants at the Talkeetna and Trapper Creek sites produced what appeared to be healthy primo canes, but the floricanes (fruit producing) died each spring. Many samples were taken and observations made of the raspberry plants to determine if the dieback was caused by a disease or other factors. It was determined by PMC staff and confirmed by Oregon State University staff that the lack of fruit production was not caused by a disease. The floricanes are being damaged by winter injury and do not develop their second year to produce fruit.

Table 6. 1992 Results of Applied Agricultural Research Account Small Fruit Trials

Varieties	Palmer PMC Avg Yield g/plant			Talkeetna Avg Yield g/plant		
	1991	1992	1993	1991	1992	1993
<i>Amelanchier - Serviceberry</i>						
'Honeywood'*	127	25	6	6	0	121
'Northline'***	4	0	0	0	0	4
'Pembina'***	1	14	0	0	0	0
'Smoky'*	7	2	9	2	40	236
'Thiessen'*	23	36	1	2	0	26
<i>Ribes - Black Currant</i>						
'Boskoop'*	1,867	608	839	655	813	10
'Consort'*	592	522	287	0	0	0
'Swedish Black'	550	295	1,182	129	203	9
'Willoughby'*	343	190	127	0	0	0
<i>Ribes - Red Currant</i>						
'Holland Long Bunch'	0	631	225	129	370	0
'Honeywood'*	0	286	0	2	6	0
'Viking'***	0	1	0	0	0	0
<i>Rubus - Raspberry</i>						
'Anelma'*	4	56	0	0	0	0

Continued on Page 39

Table 6. Continued

Varieties	Palmer PMC Avg Yield g/plant			Talkeetna Avg Yield g/plant		
	1991	1992	1993	1991	1992	1993
'Autumn Bliss'*	0	0	0	0	0	0
'Blackhawk'**	0	0	0	0	0	0
'Boyne'*	3	209	62	0	0	0
'Festival'*	51	353	0	0	>1	0
'Kiska'*	62	350	38	3	5	0
'Jewel'*	0	0	0	0	0	0
'Red Wing'**	0	0	0	0	0	0
'Reveille'*	>1	44	0	0	0	0
'Royalty'**	0	18	0	0	0	0
'Ruby'**	0	>1	0	0	0	0
'Titan'**	0	8	25	0	0	0
<i>Vaccinium</i> - Blueberry						
'North Blue'*	0	>1	12	0	0	0
'North Country'	0	0	0	0	0	0
'North Sky'*	0	0	0	0	0	0

\* Planted in 1988

\*\* Planted in 1989



## Annual Alaska Greenhouse and Nursery Conference

Three conferences comprised the 1993 Alaska Agricultural Week. They were the 13th Alaska Greenhouse and Nursery Conference, Master Gardener Conference and Agriculture Symposium. All three conferences were held in Anchorage at the Hotel Captain Cook.

Co-sponsors of the Alaska Greenhouse and Nursery Conference included the Alaska Plant Materials Center, the University of Alaska Cooperative Extension Service (CES) and the Alaska Horticultural Association. Many other organizations support the conference through contributions.

Contributions to support the conference were received from the following businesses and organizations: Alaska Garden & Pet Supply, Anchorage, Alaska; Alaska Department of Environmental Conservation, Palmer, Alaska; Dean Environmental Recycling, Anchorage, Alaska; Far North Garden Supply, Wasilla, Alaska; Florists' Mutual Insurance Co., Edwardsville, Illinois; McCalif Grower Supplies, Lake Steven, Washington; McConkey Company, Sumner, Washington; Northwest Landscape, Anchorage, Alaska; P & M Garden Services, Eagle River, Alaska; Skagit Gardens, Mt. Vernon, Washington; Steuber Distributing Company, Snohomish, Washington; V. F. Grace Inc., Anchorage, Alaska; and WeHoP, Sequim, Washington.

The Polar Grower Trade Show continues to be an integral part of the conference. Seventeen businesses and organizations participated in the Trade Show this year.

One hundred-forty people from 20 different communities in Alaska attended the 13th Alaska Greenhouse and Nursery Conference. The number of Alaskan and Canadian communities represented each year at the conference has ranged from 16 to 22 communities over the past six years. Ninety percent of those attending the conference work as professionals in the horticulture industry. Sixty-eight of the professionals attending work in the commercial sector of the industry.

A combination of speakers from Alaska businesses, University of Alaska Fairbanks Cooperative Extension and School of Agriculture and Land Resource Management; University of Alaska Anchorage, federal government and national business representatives were brought together for the conference. This year the conference focused on recycling greenhouse and nursery wastes, composting, environmental effects and management on plant growth.

Tips on how to bid landscape contracts, the design process, and urban forestry, including tree planting recommendations and pests were discussed the second day of the conference. Proceedings of the Greenhouse and Nursery Conference presentations are compiled by the Alaska Cooperative Extension. Copies are available for a small fee from their Anchorage office. The proceedings have been published since the 1983 conference and are a useful tool for people interested in the horticulture industry in Alaska.

## **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. A planting in Unalaska was destroyed before hardiness and growth information could be collected.

A new site was established in Copper Center at the public library in 1991. The volunteers who work at the library planted the site and will care for the trial. Other cooperators assisting with the trials include the University of Alaska Cooperative Extension Service, individual cooperators, local governments and native corporations.

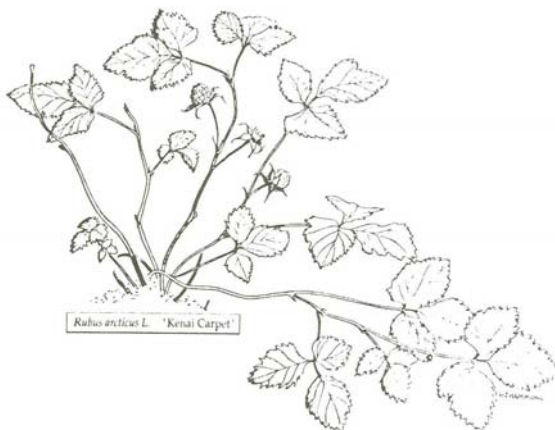
Ornamental trees and shrubs, and small fruits are being evaluated at these sites. Plants which have performed well in trials or in the nursery at the PMC farm, are propagated and planted in the off-site trials. Plant materials may also be selected from plant exchanges for Kodiak which may not perform as well in Palmer or interior Alaska. Data collected for each plant grown at the sites includes growth rate, winter hardiness and disease and insect resistance. Evaluations are generally made at the trial sites on an annual basis.

At least one evaluation was made of the Fairbanks, Homer, Nenana, Kenai and Trapper Creek sites in 1993. Several trips were made to the Trapper Creek site this summer to determine if there was an insect infestation at the trial site and identify disease infestations.

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

In order to develop commercial horticulture production, several types of plants have been sold by the PMC to commercial growers since 1979. 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 plants 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 7). 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 PMC reports.



**Table 7. Horticulture and Revegetation Plant Sales and Receipts**

Variety	1990	1991	1992	1993
'Holland Long Bunch' Currant				25 plants
				\$30.00
'Swedish Black' Currant				
'Kenai Carpet' Nagoonberry		275 plants	75 plants	100 plants
		\$550.00	\$150.00	\$200.00
'Friedrichsenii' Potentilla	25 plants			
	\$62.60			
'Kiska' Raspberry	100 plants		12 plants	
	\$200.00		\$28.80	
'Pioneer' Strawberry	150 plants		50 plants	
	\$60.00		\$30.00	
'Sitka' Strawberry	300 plants		25 plants	
	\$135.00		\$15.00	
'Skwentna' Strawberry	150 plants		25 plants	
	\$60.00		\$15.00	
'Talkeetna' Strawberry	150 plants		50 plants	
	\$60.00		\$30.00	
'Toklat' Strawberry				625 plants
				\$315.00
'Long' Barclay Willow		40 cuttings	20 cuttings	35 cuttings
		\$48.00	\$25.00	\$43.75
'Oliver' Barrenground Willow		40 cuttings		20 cuttings
		\$48.00		25.00

Table 7. Continued

Variety	1990	1991	1992	1993
'Rhode' Feltleaf Willow		40 cuttings		
		\$48.00		
'Roland' Pacific Willow	25 cuttings	40 cuttings	20 cuttings	
	\$62.50	\$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 Russian Mission Village Farm Project was first discussed in 1991, when the Kuskokwim Economic Development Council (KEDC) requested the Plant Materials Center's assistance in the development of the project for Russian Mission. One goal of the project was to provide fresh vegetables and fruits for the village. In 1992, PMC staff assisted in the development of the project by ordering and procuring small fruit plants for the project, and providing cabbage transplants for a variety trial at the project.

Assistance was also provided to help the farm manager lay out and plant the project in 1992. A calendar outlining when tasks for the garden/farm project were to be completed was compiled for the project manager and the KEDC.

This project has since become part of a larger project, the Cottage Industry Project. The Cottage Industry Project is funded by an Alaska Science & Technology Foundation grant. Through the new project, PMC staff continue to monitor the plantings made in 1992 and provide technical assistance to the managers of the Cottage Industry Project.

The goal to produce fresh vegetables and fruit in rural Alaska communities remains a goal of the Cottage Industry Project. Another goal of this project is to identify the best techniques to improve wild blueberry production in rural Alaska. Cultural techniques similar to those used by the Maine wild blueberry industry, harvesting and berry cleaning techniques will be studied near the community of Chuathbaluk.

The Cottage Industry Project brought Dr. Dave Yarborough, University of Maine, to Alaska to give advice about developing a wild blueberry industry in Alaska. Dr. Yarborough made two presentations, one in Talkeetna and one in Fairbanks, to describe the Maine wild blueberry industry and share his observations about the potential for developing a similar industry in Alaska.

The small fruit varieties planted in 1992 were evaluated for their winter survival in June 1993 (Table 8).



Table 8. Plant List for Russian Mission Farm Project, 1993.

Plant Variety	Survival in 1993 <sup>1</sup>	Plant Variety	Survival in 1993	Plant Variety	Survival in 1993
Serviceberry		Nanking Cherry		Raspberry	
<i>Amelanchier alnifolia</i> 'Regent'	4/5, 10% dieback	<i>Prunus tomentosa</i>	2/2, 20% dieback	<i>Rubus</i> 'Mammoth Red Thornless'	Did not survive
<i>Amelanchier alnifolia</i> 'Smokey'	4/5, 10% dieback	Currant and Gooseberry		<i>Rubus</i> 'Golden Amber'	Survived, set fruit
Chokeberry		<i>Ribes</i> 'Consort' Black Currant	2/5, 20% dieback	<i>Rubus</i> 'Trent'	Survived, set fruit*
<i>Aronia melanocarpa</i>	5/5, 50% dieback	<i>Ribes</i> 'Pixwell' Gooseberry	5/5, 10% dieback	<i>Rubus</i> 'Hilton'	Poor survival
Strawberry		<i>Ribes</i> 'Captivator' Black Currant	4/5, 25% dieback	<i>Rubus</i> 'Yellow Rasp'	Survived
<i>Fragaria</i> 'Chief Bemidji'	Survived	<i>Ribes</i> 'Crandall' Black Currant	5/5	<i>Rubus</i> 'Canby'	Did not survive
<i>Fragaria</i> 'Ogallala'	Survived	<i>Ribes</i> 'Wilder' Red Currant	4/5, 66% dieback	<i>Rubus</i> red raspberry	Survived
<i>Fragaria</i> 'Matared'	Survived	<i>Ribes</i> 'Red Lake' Red Currant	4/5, 10% dieback	<i>Rubus</i> 'Heritage'	Survived, set fruit*
<i>Fragaria</i> 'Susitna	Survived	<i>Ribes</i> 'Swedish Black' Black Currant	4/5, 10% dieback	<i>Rubus</i> 'Latham'	Survived
<i>Fragaria</i> 'Toklat'	Survived, set fruit	<i>Ribes</i> 'Holland Long Bunch' Red Currant	5/5	<i>Rubus</i> 'Kiska'	Survived, set fruit
<i>Fragaria</i> 'Honeyeye'	Survived			<i>Rubus</i> 'Boyne'	Survived, set fruit
<i>Fragaria</i> 'Gloscap'	Survived				

\* Only a few fruit were set on each variety, no ripe fruit was observed.

<sup>1</sup> Number of plants surviving/number of plants planted, average percent of dieback.

## **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 also given throughout the year.

A presentation was made to the Willow Garden Club about the horticultural plant trials at the PMC. Meetings such as these create a good opportunity to exchange ideas and learn more about the performance of plants in the local areas.

Identification and uses of Alaskan edible plants was the topic of a presentation with a fourth grade class in Palmer. The class shared their knowledge about edible plants and learned characteristics to use when identifying plants. The field trip was "blown-out" rather than being "rained-out", so plant samples were collected and taken into the class for identification purposes.

Currants, gooseberries and serviceberries was the topic of a presentation made to the 1993 Master Gardener Course in Anchorage. The optimum growing conditions, insect and disease problems and available varieties were discussed. The course is conducted by the University of Alaska Fairbanks Cooperative Extension Service.

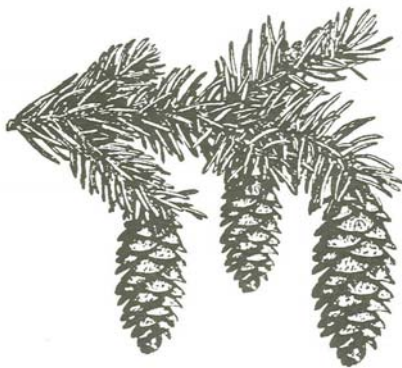
A Wasilla elementary school received assistance with plant identification and interpretive sign information on their newly constructed trail. Plans for in-service training for the school to help teachers better utilize the trail are being discussed.

An educational display featuring seeds and the plants they produce was developed for the 1993 Alaska State Fair in Palmer. Grass and grain seed and "seed" potatoes produced by the PMC were included in the display along with tree seedlings grown at the forest nursery and flowers which are commonly grown in southcentral Alaska.

## **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 has served as chair for the council since October 1991.

Council members also assist in reviewing community forestry grants and recommend funding for the grants. Ten grants totaling over \$40,000 were awarded to projects for the 1993 Community Forestry Grant Program. Those grant dollars were matched with \$76,500 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 \$ 64,000 in grant funds were awarded to ten projects in the 1993 SBA National Tree Planting Program. Matching funds for the SBA program were in excess of \$78,000.



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## Potato Disease Control Program

Potatoes are among the most valuable crops grown on Alaskan farms. The value of the 1992 crop was \$2,470,000 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

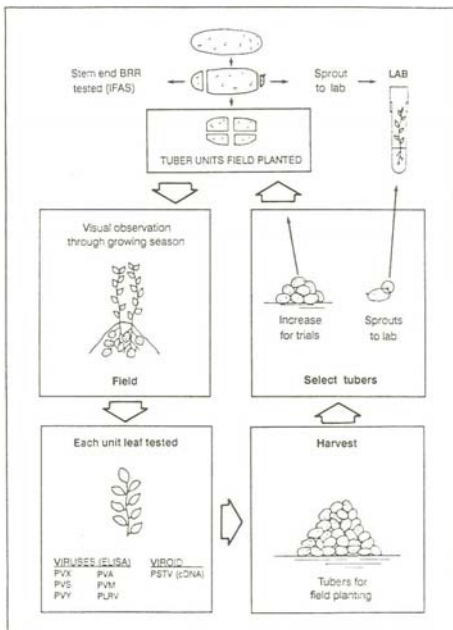
In 1993, the project produced 10,000 disease-tested plants of 35 varieties. Five varieties accounted for 61% of this total. The varieties most in demand were Hilite, Bake-King, Shepody, Frontier, and Russet Norkota.

Approximately 1,000 plants were made available to three growers for production of Generation 1 (G1) seed. The remaining plants were grown in greenhouses at the Plant Materials Center (PMC), and produced 1,400 pounds of G1 seed to meet the orders placed in 1992.

Disease-tested seed amounting to 6,000 pounds of several varieties were field grown to provide seed for trials to be in 1993.

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

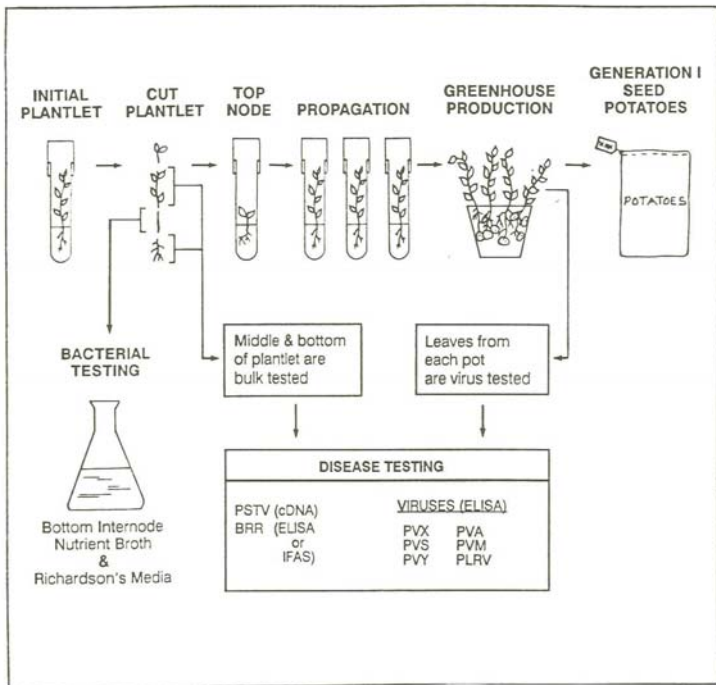


Figure 5



## **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 201 lots planted to 45 acres. There were 35 varieties grown as certified seed. The varieties Bake-King, Shepody and Green Mountain comprised the majority of certified seed acreage. Certified seed potatoes were grown in the Matanuska Valley, Fairbanks and Bartlett Hills area near Talkeetna. 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.

Eighty fourth grade 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 77th Potato Association of America held in Madison, Wisconsin entitled, "Factors Reducing Monetary Return of Potato Production in Alaska.

## **Potato Variety Scab Resistance Evaluation - Wiederkehr Plot**

Soil-borne potato diseases, primarily Potato Scab, Silver Scurf, and Pinkeye, account for significant economic losses estimated at over \$ 400,000 annually to Alaska's growers. A reduction of these losses would be of great benefit to the potato industry. Potato varieties differ in their tolerance to disease.

A cooperative effort to study this problem was agreed to with personnel from the University of Alaska Cooperative Extension Service and resulted in a plot being established in a field on the Wiederkehr farm near Palmer to evaluate the response of the cultivar Bake-King to the soil amendments, sulfur and manganese. Scab control has been reported from amending soil with sulfur or manganese. One row 25 feet long was treated with sulfur at a rate of 600 pounds per acre. Another row was treated with manganese at a rate of 450 pounds per acre. A third row and border rows were left untreated. A total of 25 seed pieces were planted in each row. No supplemental irrigation was used.

The plot was dug in mid September. No reduction in the amount of scab as compared to the control or border rows was observed.

## Woody Woodward Plot

The varieties Alaska Red, Krantz, Lemhi and Frontier Russet were planted in a garden area in Palmer known to produce scabby potatoes. When dug in September, tubers of the variety Krantz were well russeted and had very little scab. The variety Lemhi was acceptable in its resistance to scab. Alaska Red and Frontier Russet were covered 50% or more with scab.

## 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 and Juneau

- University of Washington, Cooperative Extension Service

  - Prosser and Pullman

- University of West Virginia, Dept. of Horticulture

  - Blacksburg

- 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.

# APPENDIX A

## CURRENT & HISTORICAL BUDGET INFORMATION



# CALENDAR YEAR 1993 AUTHORIZATIONS, EXPENDITURES, AND PROGRAM RECEIPTS

## Authorizations

Authorization FY 93 PMC Total \$608,900

Alaska Plant Materials Center

Project Total	608,900
Personal Services	521,800
Travel	9,700
Contractual	42,300
Supplies	15,800
Equipment	19,300

Authorization FY 94 PMC Total \$775,600

Alaska Plant Materials Center

Project Total	595,600
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-

## 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
Authorization in Thousands	912.3	863.4	888.5	733.7	596.7	556.7	566.1	566.1	620.8	608.9	595.6
Personnel	25	19	19	17	16	16	16	16	16	16	17
Full Time	12	10	10	9	7	7	7	7	7	7	7
Part Time	13	9	9	8	9	9	9	9	9	9	10
Forest Nursery											180.0

When comparing personnel figures listed for FY 94 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.



**Program Receipts  
Calendar Year 1993**

**Contracts, Reimbursable Service Agreements and Grants**

<u>Source</u>	<u>Contracts Awarded During 1993</u>	<u>Monies Collected During 1993</u>
U. S. Navy	26,600	45,121
U. S. Air Force	24,700	12,899
ARCO Alaska	20,000	14,883
U. S. Army	26,900	-0-
Dept. of Environmental Conservation	11,000	3,998
U. S. Forest Service	2,000	-0-
National Park Service	3,850	3,850
Dept. of Transportation/PF	12,500	4,341
Division of Forestry	28,600	15,000
Cottage Berry Industry Project	5,000	100
Alyeska Pipeline Service Company	12,000	7,428
Seed, Potato & Plant Sales	<u>29,736</u>	<u>24,445</u>
	202,886	131,765

**Program Receipts  
In Kind Assistance**

<u>Source</u>	<u>Estimated Value</u>
U. S. Coast Guard	5,000
Alaska Seed Growers, Inc.	1,500
Cominco Alaska	350
Division of Mining	<u>2,000</u>
	8,850

**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
42,195	31,407	58,417	117,981	126,071	202,886

### 1993 Calendar Year Monthly Expenditures to the Nearest Dollar

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
PMC Totals	36,348	36,348	34,600	37,087	33,070	51,112	31,662	70,663	50,816	47,319	37,056	32,824
Personal Services	31,754	32,757	30,143	32,741	30,059	44,698	31,072	58,879	42,664	39,128	30,225	29,504
Travel	0	0	90	0	74	366	135	1661	1331	294	549	13
Contractual	4059	3040	4144	3458	2345	2808	430	5514	3993	5835	4795	2459
Supplies	535	0	253	777	592	1094	25	4328	2683	1335	1329	848
Capital Outlay	0	7411	0	110	0	2145	0	281	145	727	159	0

# APPENDIX B

## CROP RELEASES

### Registration Certificate

#### Crop Cultivar

Eqan American Sloughgrass  
Reg. No. CV-143

Developed by

Alaska Plant Materials Center

Registered by the

CROP SCIENCE SOCIETY OF AMERICA



*Steven A. Crockett*  
President

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

-----  
Date of Registration

## CROP CULTIVARS DEVELOPED 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.

'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 acretion are beyond the capabilities of any seed species. Benson will become an important cultivar in coastal dune stabilization and restoration in Alaska.

'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.

## 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

Information and Data Leading  
to the Release of  
'Reeve' Beach Wildrye  
*Leymus arenarius* L.  
(*Elymus arenarius* L.)

and

'Benson' Beach Wildr  
*Leymus mollis* (Trin.) (B  
(*Elymus mollis*) (E. *arenarius*  
for Commercial Prod

Prepared by

Stoney J. Wr

Cultivars Developed  
by the Alaska Plant  
a Section of the Alaska Depart  
Division of /



Alaska  
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# STREAMBANK REVEGETATION

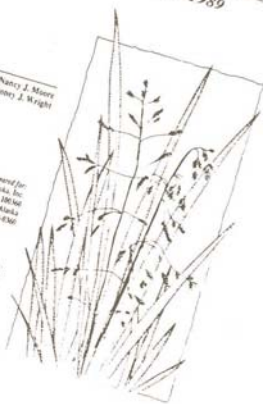


REVEGETATION WITH *ARCTOPHILA FULVA*  
Final Report 1985 - 1989

Nancy J. Moore  
Stoney J. Wright

Prepared for  
ARCO Alaska, Inc.  
P.O. Box 10666  
Anchorage, Alaska  
99510-0666

Prepared by  
Alaska Plant Material Center  
Dept. of Natural Resources  
Division of Agriculture  
P.O. Box 1440  
Palmer, Alaska 99645  
NATURAL RESOURCES



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## PRESENTATIONS DURING 1993

- Campbell, W. L. Potato Association of America Annual Meeting Report. Alaska Potato Conference. Palmer, Alaska. March 3, 1993.
- Campbell, W. L. Potato Certification Update. Alaska Potato Conference. Palmer, Alaska. March 3, 1993.
- Campbell, W. L. Factors Reducing Monetary Return of Potato Production in Alaska. Potato Association of America 76th Annual Meeting. Madison, Wisconsin. August 9-12, 1993.
- Campbell, W. L. Potato Field Tour Pioneer Peak Kindergarten, Palmer, Alaska. September 22, 1993.
- Campbell, W. L. Novelty Potatoes. Big Lake Elementary School. Big Lake, Alaska. September 23, 1993.
- Moore, N. J. Native Seeds and *Arctophila*. North Slope Third Annual Terrestrial Studies Workshop. Wildlife and Rehabilitation Studies. Anchorage, Alaska. February 23, 1993.
- Moore, N. J. Collecting Seeds from Native Plants. Community Workshop. Unalaska, Alaska. September 11, 1993.
- Moore, N. J. Revegetation of Riparian and Wetland Environments. Riparian and Aquatic Restoration Graduate Class at Alaska Pacific University. Anchorage, Alaska. November 16, 1993.
- Stehlik, Joseph. Containerized Seedling Production of Alaska Tree Species. 13th Alaska Greenhouse and Nursery Conference. Anchorage, Alaska. November 9, 1993.
- Wright, C. I. Plant Materials Center's Horticulture Trials. Willow Garden Club. April 17, 1993.
- Wright, C. I. Edible Fruits. Pioneer Peak School. Mrs. Linda Schwald's 4th Grade Class. September 13, 1993.
- Wright, C. I. Gooseberries, Currants, Serviceberries. Alaska Master Gardener's Course. October 5, 1993.

Wright, S. J. Wetland Revegetation Projects in Alaska Using Adapted Species Having Commercially Available Seed. Environmental Protection Agency Mining Conference, Anchorage, Alaska, March 18-19, 1993.

Wright, S. J. The Alaska Plant Materials Center - Working for Alaska. Eagle River Rotary, Eagle River, Alaska, June 3, 1993.

Wright, S. J. Gravel Pit Restoration Using Imprinting to Encourage Natural Revegetation by Woody Species on Fort Richardson, Alaska. American Society of Agronomy 1993 Annual Meeting, Cincinnati, Ohio, November 9, 1993.



Proceedings



Welcome to Oregon!

12th Annual National Potato Council  
Seed Seminar

December 5-7, 1993

Jantzen Beach Red Lion Hotel  
Portland, Oregon

American Society of Agronomy  
and American Society of America  
of Plant Pathology

# APPENDIX D

## ACKNOWLEDGEMENTS



## ACKNOWLEDGEMENTS

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

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

Jesse retired this past November after 20 years of service and we wish him well. We look forward to working with our new farm foreman, Thomas Klebesadel.

There are many people other than the industry and government agencies mentioned in the text, who the authors wish to thank for their assistance. They include:

AARA Small Fruit Cooperators  
Alaska Division of Mining  
Alaska Horticultural Association (GHC Sponsor)  
Alaska Seed Growers, Inc.  
Alaska State Fair  
Alaska Department of Fish & Game, King Salmon Area Office  
Ed Bostrom  
Copper River Native Association  
Fairbanks Soil & Water Conservation District  
Ray Gavlak  
Paul Huppert  
Sue Adams & Dick Green, Natural Garden Supply  
Don Kratzer  
Dr. G. Allan Mitchell  
Andy Muscovich  
Willie Pitka  
Pyrah's Pioneer Peak Farm  
Salcha-Big Delta Soil & Water Conservation District  
Alan & Leilani Kingsbury, Birch Creek Ranch  
Warren Smith  
Carol Sturgulewski & Annabelle Wilt, Unalaska Pride  
Upper Susitna Soil & Water Conservation District  
Wasilla Soil & Water Conservation District  
Bob Watkins Family

Bill Wiederkehr  
Jeannie Wooderson & Kuskokwim Economic Development Council  
University of Alaska Fairbanks Agriculture & Forestry Experiment Station  
UAF Cooperative Extension Service  
U. S. Coast Guard, 17th District  
U. S. Fish & Wildlife Service, Aleutian Island Unit  
Woody Woodward  
Ken Suel



As required in AS 03.22.060, this publication was released by the Department of Natural Resources. 300 copies were produced at a cost of \$5.01 per copy, and printed in Anchorage, Alaska for the purpose of providing the Legislature and the public an opportunity to review the 1993 Annual Report of the Alaska Plant Materials Center.