STATE OF ALASKA

DEPARTMENT OF NATURAL RESOURCES

PLANT MATERIALS CENTER

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PREPARED BY:

Stoney J. Wright
Nancy J. Moore
Dawnelle Sheaver

Alaska Plant Materials Center
Department of Natural Resources
Palmer, Alaska

INTRODUCTION AND HISTORY

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.

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.

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.

North Latitude Revegetation & Seed Production Program Introduction

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

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 seedings to extend planting seasons, cost-effective and successful methods in willow planting, and wetland and coastal restoration are priorities for the Plant Materials Center.

To date, this program has gathered 20 plot years of information collected from sites around the state, developed 11 new cultivars for revegetation and reclamation and assisted scores of agencies and private companies in reclamation, erosion control and revegetation. The projects described in this report summarize more detailed reports found in the 1994 PMC Annual Report.

ONGOING PROJECTS COMPLETED IN 1994

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. 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.

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

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

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.

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.

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 insects 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 collect lupine from Amchitka in 1992. The collection effort produced 150 pounds of lupine pods, or 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. All plantings at Palmer failed to survive winter.

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 closed 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 for natural revegetation before starting a revegetation program. Monitoring began in 1992. In 1994, reinvasion was occurring satisfactorily. Future revegetation efforts on Shemya may rely solely on natural revegetation if erosion is not a problem.

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 started 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 occurred in 1994, and the restoration effort was determined successful. One final visit is planned in 1995.

Mass Aleutian Plant Collection Project

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

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

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

The species with the greatest potential 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.

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 occurred in May 1994, with total completion scheduled for May 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 across the Dalton Highway on mineral tailings covered with a thin layer of topsoil.

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

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.

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 grasses are growing very well on both substrate types. At least 75 percent of the willows became established and little germination occurred on the native forbs. Evaluation will occur in 1995. Results from these plantings will help formulate revegetation recommendations for the Forty Mile Mining District.

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 from Valdez to Prudhoe Bay. This project was made possible with assistance from the State Department of Transportation (DOT) who provided test sites and project support along the route.

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 in 1990. Evaluations in 1991 show a wide variety of plant growth at the different sites. 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 1995 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 and August 1993. Satisfactory plant colonization of native species on 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%. The seeded species were performing very well and overall cover was estimated at 30%. The final report was distributed in January 1995.

Port Clarence Beach Restoration Project

The U. S. Coast Guard Loran Station at Port Clarence was required to revegetate the station's former solid waste disposal site. Traditional seeding methods failed because of poor soil conditions. A PMC staff member examined the site in September 1990 and recommended transplanting beach wildrye. 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. 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 1995.

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 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.

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. The final report was completed in 1994.

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 were transplanted onto the elevated portions of the site. Low, flooded areas were planted with indigenous sedges, rush and arrowgrass transplants. 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.

In 1992, areas needing additional work were delineated. Performance of vegetation and the area flooded during high tides on the site were documented. Evaluation of this site will continue through 1995. This project is important since few coastal wetland rehabilitation projects have been attempted and results from this project will greatly enhance our knowledge regarding revegetating wetlands.

Arctic Forb Seed Collection

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

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. This combination of plots was intended to supply data for revegetation species selection and planting windows for seeding.

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. 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 which will begin in 1995.

Alyeska Ski Area Revegetation Study

In 1992, at the request of Seibu Alaska/Alyeska Resort in Girdwood, agronomists from the Plant Materials Center began consulting with the resort's mountain projects manager regarding revegetation on ski slopes and mountain construction sites. During the late summer, the PMC assisted resort personnel in identifying and collecting seed of native plants for future sowing. In 1993, three revegetation test plots were established. Sites were selected to represent the range of climatic zones present at Alyeska Resort. Evaluations will continue until 1996 or possibly 1997.

Deep Creek Soil Bioengineering Project

In January 1994, Division of Parks and the Department of Transportation and Public Facilities requested technical assistance from the Plant Materials Center (PMC) for the soil bioengineering component of the facility upgrade at the north Deep Creek Scenic Overlook. The PMC was asked to assist with winter identification

of willow collection sites, review the harvest plan, be on call to answer questions, make site visits at critical points during construction, and monitor and evaluate performance of the soil bioengineering.

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

Fort Knox Mine

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

PLANNED OR POTENTIAL PROJECTS

Coastal Wetland Restoration Project

In cooperation with a major electric utility, the PMC will conduct a project to reestablish coastal vegetation on a site affected by high tides. The disturbance will be created by powerline upgrading and realignment. Initial seed collection occurred in 1994.

Interior Mass Collection of Native Species

In cooperation with the Alaska Department of Transportation, the PMC will conduct a large-scale seed collection effort at three interior Alaska areas. The seed will then be increased for future use by DOT in their revegetation projects. This project is scheduled to begin August 1995.

Alyeska Pipeline Floodplain Revegetation Project

In July 1995, the PMC will initiate a three-year study on floodplain revegetation/natural recolonization 22 miles south of Prudhoe Bay.

Juneau Ski Area Restoration Project

In September 1995, the PMC is scheduled to assist a Juneau engineering firm with restoration of a tram development project. This project will rely on locally collected species.

Badami Pipeline Project

The Alaska PMC was selected to assist in the review project of a major pipeline development project on the North Slope. Field activities are planned for June and July 1995.

Yukon Territories Seed Collection Project

In cooperation with the Yukon Department of Renewable Resources, the PMC will assist in a major collection effort of *Dryas* sp. in August 1995.

Pillars Boat Launch and Rest Area

A RSA has been developed with the Division of Parks to help design and develop specifications for a soil bioengineering project on the Kenai River.

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