

Alaska
Plant
Materials
Center

Annual Report
1989

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Materials
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1989 Annual Report

prepared by:

Stoney J. Wright
Manager, Plant Materials Center

Nancy J. Moore
Agronomist

Catherine I. Wright
Agronomist

William L. Campbell
Agronomist

Donald R. Ross
Agronomist

Dawnelle Sheaver
Secretary

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Table of Contents

| | Page |
|--|-------------|
| List of Figures | iii |
| List of Tables | iv |
| List of Appendices | v |
| Introduction | 1 |
| History | 2 |
| North Latitude Revegetation and Seed Production Project | 3 |
| Revegetation and Reclamation Efforts | 3 |
| Adak Naval Air Station Erosion Control and Reclamation | 6 |
| Red Dog Mine Revegetation and Demonstration Plots | 7 |
| Steese-White Mountain Mining District | 8 |
| Nome Mine Site Revegetation. | 9 |
| Fairbanks Division of Mining Demonstration Plantings | 10 |
| Interior Alaska Evaluation and Demonstration Planting. | 11 |
| Green's Creek Mine | 12 |
| Echo Bay Mines | 13 |
| Valdez Oil Spill Grant | 13 |
| Upper Susitna Demonstration and Evaluation Plots | 14 |
| Kuparuk Arctic Pendant Grass Study | 15 |
| Kenai Wetland Restoration Plots. | 15 |
| Ft. Richardson Off-Road Vehicle Trail Restoration Project | 16 |
| Foundation Seed Production Project | 17 |
| North Latitude Vegetable and Landscape Crop Improvement Project. | 24 |
| Horticulture Development Project | 24 |
| Strawberry Plant Production Trial | 25 |
| Blueberry AARA Grant Study | 26 |
| Small Fruit AARA Grant Study | 27 |
| Vegetable Variety Trials | 27 |
| Off-Site Plant Trials | 28 |
| Alaska Greenhouse and Nursery Conference | 29 |
| Plant Sales and Distribution | 30 |
| Potato Disease Control Program | 31 |
| Disease Tested Seed Potato Production. | 32 |
| Seed Potato Certification. | 35 |
| Educational Program. | 36 |
| Matanuska Valley Demonstration Plot. | 36 |
| Copper River Native Association Trials | 37 |
| Alaska State Fairground Educational Plot | 37 |
| Cooperative National Plant Pest Survey | 37 |

Table of Contents

| | Page |
|----------------------|-------------|
| Appendix A | 39 |
| Appendix B | 43 |
| Appendix C | 45 |
| Appendix D | 53 |

List of Figures

| <u>Figure No.</u> | | <u>Page</u> |
|-------------------|---|-------------|
| 1 | Map of Alaska Plant Materials Center Plot Locations . | 4 |
| 2 | Typical Plot Layout | 5 |
| 3 | Seed Increase Pyramid | 17 |
| 4 | Tuber Introduction | 33 |
| 5 | Alaska Seed Potato Production and Disease Testing . . | 34 |

List of Tables

| <u>Table No.</u> | | <u>Page</u> |
|------------------|---|-------------|
| 1 | Revegetation and Turf Grass Production (1989) | 18 |
| 2 | Grain and Oil Seed Crops in Storage (1989) | 19 |
| 3 | Grass Seed in Storage | 20 |
| 4 | Cereal Grain Sales and Receipts (1987-1989) | 21 |
| 5 | Grass Seed Sales and Receipts (1987-1989) | 22 |

List of Appendices

| Appendix | | Page |
|-----------------|---|-------------|
| A | Current and Historical Budget Information | 39 |
| B | New and Pending Crop Releases | 43 |
| C | List of Publications and Presentations | 45 |
| D | Acknowledgements | 53 |

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 two major programs: Revegetation and Seed Production, and Vegetable and Landscape Crop Improvement. Each of these programs will be addressed in this report.

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 and the private sector and through the sale of plant materials.

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, 285 acres near Palmer were selected for the center's site. An additional 120 acres were 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.

Within a dozen years after its founding, the program grew to include horticultural development and disease-free potato seed production projects. In 1987, the PMC's programs were consolidated into the two programs it carries out today: the North Latitude Revegetation and Seed Production Project and the North Latitude Vegetable and Landscape Crop Improvement Project.

North Latitude Revegetation & Seed Production Project

The Revegetation and Seed Production Project'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.

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 162 plot years of information collected from sites around the state (Figure 1), developed 7 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 elsewhere in this report. Copies of the 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
184 Plot Years as of 1989

Figure 2 - Typical Plot Layout

| | |
|--------------------------------------|------------------------------------|
| Nugget Kentucky Bluegrass | Merion Kentucky Bluegrass |
| Park Kentucky Bluegrass | Banff Kentucky Bluegrass |
| Sydsport Kentucky Bluegrass | Fylking Kentucky Bluegrass |
| Poa Ampla | Troy Kentucky Bluegrass |
| Sherman Big Bluegrass | Canbar Canby Bluegrass |
| Tundra Bluegrass | Reubans Canada Bluegrass |
| Poa Glauca T08867 | Poa Alpina |
| Agropyron Subsecundum 371698 | Sodar Streambank Wheatgrass |
| Nordan Crested Wheatgrass | Agropyron Subsecundum |
| Fairway Crested Wheatgrass | Agropyron Violaceum |
| Summit Crested Wheatgrass | Agropyron Boreal |
| Critana Thickspike Wheatgrass | Agropyron Yukonese |
| Fults Alkaligrass | Vantage Reed Canarygrass |
| Climax Timothy | Engmo Timothy |
| Elymus Arenarius | Elymus Sibiricus 34560 |
| Elymus Sibiricus 1966 | Elymus Sibiricus 2144 |
| Norcoast Bering Hairgrass | Tufted Hairgrass |
| Sourdough Bluejoint | Calamagrostis Canadensis |
| Meadow Foxtail | Alopecurus Geniculatus |
| Garrison Creeping Foxtail | Arctared Red Fescue |
| Boreal Red Fescue | Festuca Scabrella |
| Beckmannia | Pennlawn Red Fescue |
| Durar Hard Fescue | Highlight Red Fescue |
| Covar Sheep Fescue | Manchar Smooth Brome |
| Alyeska | Carlton Smooth Brome |
| Tiley Sage | Polar Brome |

Adak Naval Air Station Erosion Control & Reclamation Project

As a result of the successful Shemya Air Force Base Beach Wildrye project, the U. S. Navy asked the PMC to assist in developing a Natural Resource Management Plan for Adak Naval Air Station.

The Navy project involved all aspects of sand erosion control, lawn establishment, mine restoration and base landscaping.

As a result, several plots were established to evaluate species for the following purposes:

1. Beach stabilization using transplanted Beach Wildrye sprigs and the enhancement of natural stands of Beach Wildrye through the use of fertilizer.
2. Landfill, quarry and World War II structure site restoration and land rehabilitation using seeded species.
3. Landscaping for beautification and morale purposes using hardy species.
4. Additional plots were established to test new plant material being developed by the PMC. These plots include native trees, shrubs, forbs and grass. The plots are located on a variety of sites on the base.

This project started in May 1988 and will continue through 1990. The Navy will reimburse the PMC \$ 27,100.00 by 1990 for personal services, transportation and supplies.

The first years' work was successful, and the Navy expanded the PMC's role in 1989. In 1989, selected sites within the housing areas were seeded to control sand erosion and enhance the appearance of the base. Also in September, 1989, additional PMC services were requested in the area of horticultural landscaping. These 1989 efforts were successful and have led to possible expanded roles for the PMC on Adak through 1992.

A complete report will be prepared in October, 1990 covering the initial program at Adak NAS.

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 needed information on species that would perform well in future mine revegetation programs. In 1987, Cominco agreed to provide the PMC with a site to establish evaluation and demonstration plots.

In order to provide the best information for both the PMC and Cominco, three plot sites, representing different conditions were selected. A site was selected near the Port Site. This site was a sandy-gravel beach area common to the region. The second site was at the original camp site 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 is intended to supply data for revegetation species selection and time of seeding. The Port Site plot was planted on July 6, 1987. This site will provide information regarding revegetation in the coastal portion of the mine project.

A dormant plot was seeded at the Camp Area 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 Alaska. Their elimination from the plantings should not compromise the value of the information obtained from these plots. The third plot, planted on June 15, 1988, was placed on gravelly soil similar to the surface that will exist when construction is complete.

The evaluation process for these plots will be continued for a period of four growing seasons after planting.

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

In 1989, the PMC assisted Cominco in a project intended to revegetate all the major stream crossings on the Access Corridor. Initial results of this project, which used a seed mix composed entirely of native species, is promising.

Steese - White Mountain Mining District

In June, 1988, the Plant Materials Center (PMC) in cooperation with the Bureau of Land Management (BLM) Steese-White Mountain Mining District, established revegetation test plots on recontoured mining 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 layout, seed and fertilize the plots.

All of the plots looked relatively good after the first winter and second growing season except for the Birch Creek #1 plot. This plot was planted on a bench approximately four feet above the mean water level in a small side channel of Birch Creek. During high water, the creek changed its course and the side channel became the main channel. As a result, 75 percent of the plot was lost due to erosion.

The performance of the accessions varied between varieties and sites. However, the following accessions performed the best: 'Nugget' Kentucky Bluegrass, Big Bluegrass 387931, two native wheatgrasses, Agropyron boreal and A. yukonense, 'Nortran' Tufted Hairgrass and 'Arctared' and 'Boreal' Red Fescue. The plots will be evaluated on an annual basis through 1991 at which time a final report will be prepared describing the performance of the plots and making recommendations for revegetation of mine tailings for the area.

A cooperative agreement was signed with BLM for additional mine site revegetation work for the 1989 season. BLM staff selected mine tailings left from the 1930s in the Maze area along Nome Creek for the test site. Three treatments were tested and each treatment was replicated three times. Ten different revegetation species were planted in adjacent plots for one treatment. Another treatment consisted of seeding a site with a mix of the ten species. All sites were fertilized and the final treatment consisted of an application of fertilizer only.

Plant establishment varied considerably and was very localized. The seeded species appeared to grow best at sites that contained some fines, in depressions where a more favorable moisture regime would exist, and also at those sites where the native vegetation had already become established. Performance of the seeded species cannot be effectively evaluated until the plantings have gone through at least one winter and preferably two to three growing seasons.

The native vegetation responded favorably to the fertilizer. Plants receiving fertilizer were greener than those plants growing nearby that did not receive fertilizer. Seed production may have been increased in some of the forbs and some of the willows showed a current annual growth of 20-24 inches compared to 2-4 inches for the previous year.

Although these sites need to be evaluated for a couple of years before any conclusions can be drawn, the plants do appear to benefit from fertilizer by increased growth and also possibly by increased seed production. The best treatment for these sites may be to periodically apply fertilizer to enhance native plant cover.

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 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 containing high organic content supported a 65 percent moss and vascular plant cover in addition to the seeded grass species.

These plots will continue to be monitored for three more growing seasons. After the final evaluation, a final report will be prepared.

Fairbanks Division Of Mining Demonstration Plantings

The Plant Materials Center and the Fairbanks Office of the Division of Mining (DOM) established demonstration revegetation plantings on recontoured mining tailings in the Fairbanks area. Division of Mining selected two sites each with four to five acres that would be left undisturbed for several years for the demonstration plantings.

The A. J. Taylor mine site was naturally divided into two segments by a creek. Most of the site was scarified and then each segment was divided into three plots. Each plot received one of the following treatments: seed and fertilizer, fertilizer only, or no treatment at all. The unscarified area was divided into two plots, one of which was fertilized; the other was untreated.

At the end of the growing season, the scarified plots that received seed and fertilizer exhibited the highest plant cover. The existing vegetation in the unscarified plot which received fertilizer showed a pronounced increase in growth compared to the vegetation in the unfertilized plot.

The second site provided several diverse areas for the revegetation demonstration. The remnants of the settling pond contained a broad area of moisture-saturated mineral soil which was seeded with Egan Sloughgrass. Floods that occurred in midsummer before the grass became well established, eliminated any trace of the planting.

Another area planted was composed primarily of overburden. The area was divided into six plots, two were unscarified, one of which was fertilized, the other was left untreated. The remaining four plots were scarified, one was seeded with no fertilizer, one was seeded with fertilizer, another was not seeded but fertilized and the fourth plot was a control.

Additional isolated areas that consisted primarily of mine tailings were seeded and fertilized.

The seed mix that was used for all of the plantings consisted of Arctared Red Fescue, Gruening Alpine Bluegrass, Norcoast Bering Hairgrass, Alyeska Polargrass, Sourdough Bluejoint and Caiggluk Tilesy Sage. The plots were fertilized with 20-20-10 fertilizer which was applied at a rate of 450 pounds to the acre.

Both native vegetation and the seeded grasses benefited from the fertilizer. The plots that exhibited the highest plant cover were those that had been seeded and fertilized.

The plantings at these two sites demonstrate that a wide variety of substrates can support seeded grasses. As these sites are observed over the next few years, hopefully people will recognize that placer mine revegetation is possible with minimal effort.

Interior Alaska Evaluation & Demonstration Planting

Over the years, a variety of efforts have been made to establish an Interior Plant Materials Center (PMC). 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 in the Eielson Agricultural Development. A farmer has provided up to five acres of newly cleared and prepared land for a variety of plots which will evaluate revegetation plant materials, grains and horticultural plants.

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

Evidently, the soils in the Eielson Agricultural Project are nutrient poor and crops are heavily dependent on fertilizer. Since our plots are fertilized at the time they are planted and then left without any further fertilizer applications, it will be very interesting to watch how these plots perform over the next few years. No trends in performance can be reported for the first year's growth. Evaluations will need to be conducted over the next several years before any recommendations can be made.

Branching Out Into Southeast Alaska

After trying for many years to establish evaluation plots in Southeast, the North Latitude Revegetation and Seed Production Project finally was able to develop a cooperative agreement with two mining companies in the Juneau area. Green's Creek Mine on Admiralty Island, and Echo Bay Mining Company in Juneau agreed to pay travel and per diem for PMC staff to come to their sites and establish spring and fall evaluation plots. The PMC provided seed and labor.

Green's Creek Mine

Because Green's Creek Mine is within the boundaries of Admiralty National Monument, the U. S. Forest Service limited the species that could be planted to those that were known to occur on the island. As a result, the plots contained only 15 accessions compared to 48 to 50 accessions that are normally planted. Two spring plantings were established at one site. In the fall, two more plantings were established at two different elevations. All plantings were fertilized with 20-20-10 fertilizer at a rate of 450 pounds per acre.

The spring plantings were evaluated at the same time that the fall plantings were planted. One of the spring plots had been disturbed during the summer and some of the plantings were completely destroyed. Data collected from the undisturbed plot indicated that the best performing accessions after one growing season were 'Boreal' and 'Pennlawn' Red Fescue. Evaluations will need to continue over the next three years before any recommendations can be made based on these plantings. A complete report will be prepared at the end of the evaluation period.

Echo Bay Mines

During the summer of 1989, a total of three plots, each containing 40 to 46 taxa, were established at Echo Bay Mine sites. Two spring plots and one fall plot were planted. One of the spring plots was planted at a sandy location near the office building. The other spring plot and the fall plot were planted near the mine portal in the Sheep Creek Valley. The Sheep Creek site was more gravelly than the office site.

Numerous accessions performed very well at both sites. It will be necessary to continue evaluating the plots to determine the best accessions for these sites.

Valdez Oil Spill Grant

On April 20, 1989, the PMC was notified that Governor Cowper accepted its proposal to assess oil spill damage to Beach Wildrye communities in Prince William Sound. The proposed study would have identified damage communities, rated damage and potential natural recovery, and if necessary, developed reclamation plans to restore these impacted communities.

Unfortunately, money was not released by the responsible state agency in a timely manner and the study was not attempted. Other unwarranted policies developed by the lead state agency, along with a significant reduction in the available funds, made the study unattractive to the PMC.

Perhaps in 1990 the study can proceed in a timely and acceptable manner.

Upper Susitna Demonstration & Evaluation Plots

The Plant Materials Center (PMC) 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.

The evaluation plots, consisting of 50 grasses and 1 forb planted in 4 x 10 foot areas, were replicated three times; a fourth plot contained rod rows, 20 feet long, of the same collection of plants as the broadcast plots. 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; each 20 foot section received different fertilizer applications.

The plants germinated and became well established, but in many cases the plants were obscured by timothy and hemp nettle. 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. The site was disked and large clumps of vegetation were removed by hand from each of the plots before planting. We were concerned that if the herbicide had not effectively killed the weeds, we would lose our plantings again.

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. The plots were evaluated in September. Although one plot was quite weedy, the plots overall were much cleaner than the 1987 planting. Evaluations were made and will continue over the next three years. Another broadleaf herbicide treatment may be necessary to sufficiently control weeds over the evaluation period.

Our test sites are not irrigated and the lack of precipitation prevented germination from occurring in any of the plots for at least one month after planting. Even so, most of the accessions performed quite well during the first growing season. We will be able to make seeding recommendations based on the results from these plots in a couple of years.

Kuparuk Arctic Pendant Grass Study

In 1985, the Plant Materials Center and ARCO Alaska, Inc., established a cooperative agreement to evaluate revegetation techniques with an emergent grass species, Arctophila fulva. During the past four field seasons, two PMC staff have spent two to three weeks each season in the Kuparuk Field wetlands, transplanting Arctophila and evaluating the success of the plantings. Various planting locations and planting techniques have been tested and have met with a wide range of success.

During 1987 and 1988, general laborers conducted the plantings while being supervised by PMC staff. An ARCO contractor supplied laborers the first year, and the PMC supplied four laborers from their staff during 1988. This phase of the study evaluated the ability of general laborers to harvest and transplant Arctophila. The primary focus of the investigation has centered on the issue that if Arctophila can be transplanted successfully, then is it economically feasible, and/or what is the cost of transplanting Arctophila with an unskilled labor force?

No new plantings were conducted during the 1989 season. However, data was collected on the survival of the various plantings conducted over the years. Analysis of the data should begin to answer some of the questions, and will be presented in a final report that will be completed in early 1990.

Kenai Wetland Restoration Plots

In April, 1989, the PMC was contacted by an engineering company and requested to restore an area of illegal fill on a wetland. The PMC responded with a plan acceptable to both the Corps of Engineers and the Alaska Department of Fish and Game.

The plan utilized a seed mix containing native species adapted for wet sites. The mix relied heavily on 'Egan' American Sloughgrass, a cultivar released by the PMC. Initial results appear promising. Unfortunately, during the scheduled evaluation in September, 1989, the Kenai River was running high and was covering the plots. The flooding prevented the plots from being evaluated satisfactorily.

An effort will be made to evaluate the site in 1990 and again in 1991.

Fort Richardson Off-Road Vehicle Trail Restoration Project

This project, initiated in June 1988, was requested and funded by the U. S. Army at Fort Richardson and the Corps of Engineers Cold Regions Research Laboratory at Hanover, New Hampshire. Its basic purpose is to demonstrate alpine restoration of the trail system damaged by unauthorized civilian off-road vehicles (ORV), and to develop techniques for large-scale alpine revegetation.

The results of this study will be useful as Southcentral Alaska expands its winter recreation areas.

This project will provide results on alpine streambank revegetation, alpine wetland revegetation and revegetation of extremely dry, gravely, alpine sites. Off-road vehicle use continued during the first year of this project and damaged a portion of the plot area, however, the study has not been severely impacted at this time.

Although an occasional ORV passes through the sites, very little additional damage has occurred to the plots. Evaluations occurred in September, 1989 and some trends in performance of the grasses appear to be emerging. 'Norcoast' Bering Hairgrass and 'Arctared' Red Fescue have been the most consistent and best performing varieties at all of the sites. 'Gruening' Alpine Bluegrass has also performed reasonably well, but it has received lower ratings because the grass blade tips have been chlorotic. Results from the evaluation plot, which was planted with 50 different varieties, suggest that there is another species, 'Nortran' Tufted Hairgrass, that should be included in future trials.

The plots will continue to be evaluated for two more growing seasons, and at that time a final report will be prepared.

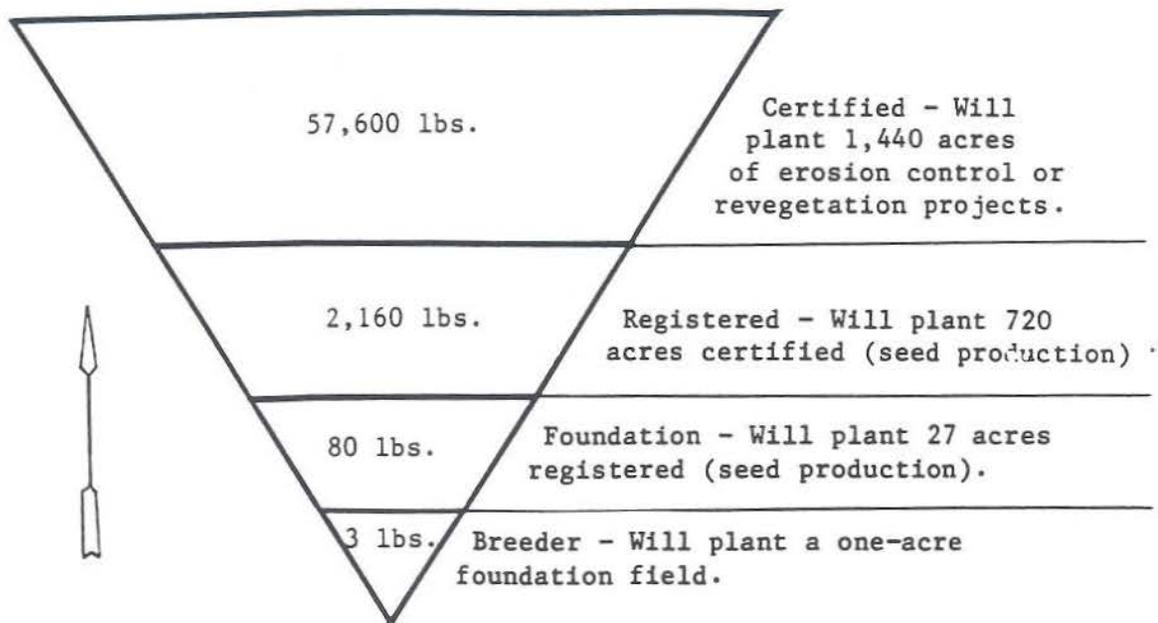
Foundation Seed Program

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, 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.

Figure 3 - Seed Increase Pyramid



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

Table 1 - Revegetation and Turf Varieties in Production in 1989

| Variety | Class | Acres |
|-----------------------------|------------|-------|
| 'Nugget' Kentucky Bluegrass | Foundation | 5.0 |
| 'Arctared' Fescue | Foundation | 5.0 |
| 'Norcoast' Bering Hairgrass | Foundation | 3.0 |
| 'Polar' Brome | Foundation | 2.9 |
| 'Tundra' Glaucous Bluegrass | Foundation | 0.1 |
| 'Kenai' Polargrass | Foundation | 2.0 |
| 'Sourdough' Bluejoint | Foundation | 1.4 |
| 'Gruening' Alpine Bluegrass | Foundation | 1.0 |
| 'Egan' American Sloughgrass | Foundation | 1.0 |
| 'Nortran' Tufted Hairgrass | Foundation | 1.0 |
| 'Alyeska' Polargrass | Foundation | 1.0 |
| 'Egan' American Sloughgrass | Breeder | 1.0 |
| 'Gruening' Alpine Bluegrass | Breeder | 1.0 |
| 'Service' Big Bluegrass | Breeder | 1.0 |
| 'Caiggluk' Tilesy Sage | Breeder | 1.0 |

**Table 2 - Cereal grain seed & oil seed varieties in storage at the Plant Materials Center,
December, 1989**

| Barley | | Wheat | | Oats | | Rye | | Rapeseed | | Buckwheat | |
|---------------|-------|--------------|------|--------------|------|---------|------|----------|------|-----------|------|
| Variety | Tons | Variety | Tons | Variety | Tons | Variety | Tons | Variety | Tons | Variety | Tons |
| Lidal | 15.0 | Chena | 9.2 | Toral | 6.3 | Bebrai | 0.9 | Candle | 3.0 | Oly | 0.1 |
| Otal | 8.4 | Ingal | 4.7 | Ceal | 2.1 | | | | | | |
| Thual | 5.4 | Vlgal | 1.9 | Nlp | 2.3 | | | | | | |
| Weal | 5.2 | Nogal | 1.4 | Golden Rain | 0.1 | | | | | | |
| Datal | 4.3 | 1397 | 0.5 | Freedom | .05 | | | | | | |
| Finnaska | 1.0 | 66116243344 | 0.3 | Total | 10.9 | | | | | | |
| Pokko | 0.6 | Norstar | 0.07 | | | | | | | | |
| Arra | 0.4 | Gasser | 0.04 | | | | | | | | |
| Eero | 0.3 | Froid | 0.03 | | | | | | | | |
| Edda | 0.05 | Roughrider | 0.03 | | | | | | | | |
| Paavo | 0.03 | Total | 18.3 | | | | | | | | |
| Tibet Hulless | 0.03 | | | | | | | | | | |
| Galt | 0.01 | | | | | | | | | | |
| Otra | trace | | | | | | | | | | |
| Step toe | trace | | | | | | | | | | |
| Total | 40.7 | | | | | | | | | | |

**Table 3 - Grass Varieties in Storage at the Plant Materials Center
December, 1989**

| Variety | Pounds |
|-----------------------------|--------------|
| 'Engmo' Timothy | 1,836 |
| 'Arctared' Fescue | 1,118 |
| 'Nugget' Kentucky Bluegrass | 475 |
| 'Polar' Brome | 528 |
| 'Norcoast' Bering Hairgrass | 260 |
| 'Alyeska' Polargrass | 422 |
| 'Egan' American Sloughgrass | 175 |
| 'Gruening' Alpine Bluegrass | 346 |
| 'Sourdough' Bluejoint | 63 |
| 'Nortran' Tufted Hairgrass | 100 |
| 'Tundra' Glaucous Bluegrass | 36 |
| 'Kenai' Polargrass | 87 |
| 'Service' Big Bluegrass | 183 |
| Total | 5,689 |

Table 4 - Cereal Grains Sales & Receipts, 1987 - 1989

| Type | 1989 | 1988 | 1987 |
|--------------|------------|------------|------------|
| Barley | 2,100 lbs | 3,750 lbs | 12,750 lbs |
| | \$ 653.24 | \$1,074.09 | \$2,478.28 |
| Oats | 1,600 lbs | 1,200 lbs | 7,978 lbs |
| | \$ 486.15 | \$ 355.40 | \$2,097.37 |
| Wheat | 275 lbs | 300 lbs | 150 lbs |
| | \$ 75.16 | \$ 70.82 | \$ 24.13 |
| Rye | 134 lbs | -0- | 320 lbs |
| | \$ 30.72 | -0- | \$ 51.15 |
| Rapeseed | 180 lbs | -0- | 119 lbs |
| | -0- | -0- | -0- |
| Buckwheat | 300 lbs | -0- | -0- |
| | \$ 57.00 | -0- | -0- |
| Total | 4,589 lbs | 5,250 lbs | 21,317 lbs |
| | \$1,302.27 | \$1,500.31 | \$4,650.93 |

Table 5 - Grass Seed Sales & Receipts, 1987 - 1989

| Variety | 1989 | 1988 | 1987 |
|-----------------------------|-------------|------------|---------------|
| 'Nugget' Kentucky Bluegrass | 505 lbs | 550 lbs | 855 lbs |
| | \$4,543.70 | \$4,547.60 | \$6,840.00 |
| 'Arctared' Red Fescue | 60 lbs | 100 lbs | 200 lbs |
| | \$ 205.60 | \$ 936.00 | \$2,000.00 |
| 'Sourdough' Bluejoint | 30 lbs | 6 lbs | -0- |
| | \$ 810.70 | \$ 209.94 | \$ -0- |
| 'Engmo' Timothy | 25 lbs | 50 lbs | 50 lbs |
| | \$ 75.50 | \$ 151.00 | \$ 225.00 |
| 'Alyeska' Polargrass | -0- | -0- | 95 lbs |
| | -0- | -0- | \$1,000.00 |
| 'Gruening' Alpine Bluegrass | 30 lbs | 10 lbs | Not Available |
| | \$ 400.50 | \$ 130.20 | |
| 'Egan' American Sloughgrass | 21 lbs | 2 lbs | 10 lbs |
| | \$ 181.20 | \$ 17.58 | \$ 80.00 |
| 'Norcoast' Bering Hairgrass | 20 lbs | -0- | -0- |
| | \$ 221.80 | -0- | -0- |
| 'Nortran' Tufted Hairgrass | 133 lbs | -0- | -0- |
| | \$2,169.23 | -0- | -0- |
| 'Polar' Brome | 160 lbs | -0- | -0- |
| | \$ 466.40 | -0- | -0- |
| Total | 984 lbs | 718 lbs | 1,210 lbs |
| | \$ 9,074.63 | \$5,992.32 | \$10,145.00 |

Three new grass fields were established during the 1989 growing season; Foundation-class 'Gruening' alpine bluegrass, and new breeder blocks of 'Egan' American sloughrass and Beach Wildrye. Except for 'Tundra' glaucous bluegrass, yields were good on fields two or more years old. Over 28 acres were devoted to grass seed production at the PMC for 1989, the highest acreage in the PMC's history.

Cereal grains increased for 1989 included 'Thual' hulless barley and 'Freedom' hulless oats. Foundation seed stocks of most other grain varieties has remained high.

Spring and early summer weather was generally favorable for crop growth. Irrigation was necessary for newly sown fields due to dry, sunny days. The early maturing grasses were harvested under favorable conditions; however, after August 18, nearly constant cloudy, moist weather caused deterioration in grain quality, with the growth of late tillers, and with the appearance of ergot in the barley and rust in the grasses. A short break in the wet weather allowed the barley to be harvested on September 19, and although the moisture content was high, the crop was dried with little damage. Results from pre-clean testing indicate an 81% germination rate.

Flooding from the Matanuska River became a growing problem in 1989. Fields two and five were unuseable and portions of fields three and six were saturated so that they would not support farm machinery. This seasonal flooding began in the summer of 1986, and has repeated each year, eliminating approximately 100 acres from agricultural production.

Foundation seed sales for 1989 were mixed. Cereal grain sales totaled 4,589 pounds; down slightly from 5,250 pounds in 1988. Grass seed sales for 1989 totaled 984 pounds; up from 718 pounds in 1988. Receipts for all 1989 seed sales totaled \$10,376.90; up from \$7,492.63 in 1988.

North Latitude Vegetable & Landscape Crop Improvement Project

The North Latitude Vegetable and Landscape Crop Improvement Project is comprised of two programs. They are the Horticulture Development Program and the Potato Disease Control Program. The combination was made in an effort to streamline PMC operations. For clarity, the activities of each project are reported separately in this report.

Horticulture Development Project

This project is responsible for trials of vegetable, small fruit, and ornamental plants. Both introduced and native plants are evaluated in the trials. Cultural and production techniques may also be evaluated. The project co-sponsored the Alaska Greenhouse and Nursery Conference and Polar Grower Trade Show with the University of Alaska Cooperative Extension Service and Alaska Horticultural Association.

Strawberry Plant Production Trial

In 1988, the PMC and University of Alaska Fairbanks began a joint study on the potential of strawberry plant production in Alaska. Six California strawberry varieties were grown in this study. The effects of Alaska's cool temperatures in August and September, and the long summer photoperiod were evaluated.

Mother plants were heeled in peat moss and greened up in a lathhouse before being transplanted to the field. The mother plants were transplanted on 1 and 2 June, and were irrigated with a sprinkler system, cultivated and disbudded as required.

Daughter plants were harvested on 15 September and 27 September. Three of the varieties were expected to produce fifteen daughter plants per mother plant. At the PMC, these varieties produced an average of 4.4 plants/mother plant. The other three varieties were expected to produce ten daughter plants per mother plant; at the PMC they produced an average of 4.02 plants/mother plant. The 1988 Annual Report indicated that the study would continue in 1989, but since the production of daughter plants was lower than expected, the project was terminated.

Blueberry Applied Agricultural Research Account (AARA) Grant Study

Several growers have requested information on techniques to improve the fruit production of native stands of blueberries. In 1988, the project 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 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 different fertilizer and pruning treatments. Ten grams of elemental nitrogen, phosphorus and potassium per meter square 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.

In 1989, no additional fertilizer was applied and no additional pruning occurred to control the regrowth of competing vegetation in the plots. Observations made in 1989, indicated that the fertilized, pruned plots set less fruit than any of the unpruned plots. In 1989, the fertilized, pruned plots set more flower buds than any of the unpruned plots. The first reliable harvest to determine the effects of the pruning and fertilization treatments will be the 1990 harvest.

Due to circumstances beyond our control, 1989 yield data was collected for only one of the plots. Yield data will be collected on all plots for at least the 1990 and 1991 seasons.

The results of the study will help to determine the length of time these treatments have an effect on stands of native Alaska blueberries. Interim reports will be available in 1990 and 1991. The final report will be prepared upon completion of the study.

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. This study's goal is to systematically evaluate small fruit varieties in 13 locations in the railbelt area. Fruit types planted in the trials in 1988 include four varieties of amelanchier or serviceberry, four black currant varieties, two red currant varieties, six raspberry varieties and three half-high blueberry varieties. In 1989, seven raspberry varieties and two amelanchier varieties were planted in the plots. One raspberry variety, 'Heritage', did not perform well in 1988 and was replanted in 1989, with replacement plants from the supplier.

Information to be collected in this study includes winter hardiness rating, date of bud break, bloom dates and harvest dates and yields. A summary report of winter hardiness, 1989 fruit production and harvest dates is being compiled. The plants in this study will be observed for five years. A final report will be prepared upon completion of the study.

Vegetable Variety Trials

The 1989 vegetable variety trials were a cooperative effort between the Plant Materials Center, University of Alaska Fairbanks Cooperative Extension Service, and Agriculture and Forestry Experiment Station. Vegetable crops and varieties for commercial production were emphasized in the trials. All trials were grown at the Matanuska Farm in Palmer. Varieties of broccoli, cabbage, carrots, lettuce and potatoes were planted in the trials.

The Plant Materials Center was responsible for the storage cabbage and the fresh market cabbage trials. Transplants for both cabbage trials were grown by Paul Giaouque, Gold Nugget Farm, Palmer, Alaska. Ten storage cabbage varieties were seeded on 17 April 1989, and hand-transplanted to the field on 12 May 1989. Three of the varieties produced marketable-size heads which were harvested between 22 September and 6 October 1989. Twelve fresh market cabbage varieties were seeded on 24 April and hand transplanted on 18 and 19 May 1989 to the field. Eleven of these varieties produced marketable-size heads that were harvested between 17 July and 6 October 1989.

The complete report of the cooperative trials is available in Vegetable Variety Trials, Matanuska Valley, Alaska 1989, published by the University of Alaska Fairbanks Agriculture and Forestry Experiment Station.

Off-site Plant Trials

The PMC has established plant trials throughout Alaska. Trials are located in Fairbanks, Delta, Kenai, Kodiak, Trapper Creek and in the Manillaq area. Cooperators assisting with the trials include the Cooperative Extension Service, individual cooperators, local governments and native corporations. Ornamental trees and shrubs and small fruits have been planted at these sites.

In 1989, two new sites were established. One is located in Nenana and the other in Unalaska. The Unalaska site could not have been established without the assistance of Markair, which shipped the plants for no charge to Unalaska. The trial is a cooperative effort with the Unalaska Pride organization. The Nenana trial is a cooperative effort with the Cooperative Extension Service and individual cooperators.

The Kodiak site was reestablished at the Kodiak fairgrounds. Ornamental trees and shrubs and small fruits were also planted at these sites. Evaluation lists of the plants on each site are being prepared.

Alaska Greenhouse & Nursery Conference

The 8th Annual Alaska Greenhouse and Nursery Conference was held February 23 and 24, 1989 in Fairbanks at the Westmark Hotel. The Polar Grower Trade Show, held in conjunction with the conference, had thirteen commercial exhibits and three non-profit exhibits. The commercial exhibitors came from Alaska, California, Illinois, Minnesota, Montana and Canada. One hundred fifty people attended the conference.

The conference was sponsored by the Alaska Plant Materials Center (PMC), the University of Alaska Cooperative Extension Service and the Alaska Horticultural Association (AHA). Guest speakers at the conference included Tom Haught, a Technical Sales Representative for Ethyl Corporation, Orange, California; and Erric Ross, a Technical Representative for W. R. Grace, Portland, Oregon. Mr. Haught discussed "Plastic Culture in Horticulture" and Mr. Ross's presentation was on "Diagnosing Ornamental Plant Problems".

Alaska speakers were also featured at the conference. University of Alaska Fairbanks staff made presentations on the "Effects of Mulches on Ornamentals in Fairbanks" by Dr. Pat Holloway, Assistant Professor of Horticulture; "How Light and Temperature Affect Plant Growth and Development" by Dr. Meriam Karlsson, Assistant Professor of Horticulture; "The Marketing of Products" by Dr. Laura M. Milner, Assistant Professor of Marketing; and "The Role of Palmer AFES Laboratory in Soil Testing and Plant Tissue Analysis" by Dr. Rudy Candler, Laboratory Supervisor. Mr. Ken Childress, Senior Sales Engineer with Transalaska Data Systems spoke on "Bar Coding Horticultural Products"; Molly McCafferty, City Gardener, City of Ketchikan, discussed "Ketchikan's Beautification Program"; and Susan Miller, supervisor of the Anchorage Beautification Program, presented "Flower Bed Design with Annuals". Many other speakers from Alaska made informative presentations.

Plant Sales & Distribution

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. 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 must use them as stock plants or for food production. As growers propagate these plant materials, the demand on the PMC to supply them has decreased.

The 1989 plant sales were:

| | |
|------------------------------|----------------------------------|
| 'Holland Long Bunch' Currant | 75 1-0 plants |
| 'Swedish Black' Currant | 75 1-0 plants |
| 'Friedrichsenii' Potentilla | 30 rooted cuttings plants |
| 'Pioneer' Strawberry | 50 plants |
| 'Sitka' Strawberry | 50 plants |
| 'Skwenta' Strawberry | 100 plants |
| 'Talkeetna' Strawberry | 100 plants |
| 'Long' Barclay Willow | 120 cuttings |
| 'Oliver' Barrenground Willow | 100 cuttings |
| 'Rhode' Feltleaf Willow | 120 cuttings |
| 'Roland' Pacific Willow | 100 cuttings |
| 'Wilson' Bebb Willow | 100 cuttings |
| Feltleaf Willow | 1,300 cuttings (special project) |

Potato Disease Control Program

Potatoes have been grown and sold in Alaska since prior to the establishment of the Matanuska Colony. Alaska grown potatoes have had an average annual value exceeding \$ 2,000,000 through the last decade. Alaska's production of quality potatoes has kept over \$ 20,000,000 from being exported during the last ten years.

Commercial potato production is highly capital intensive. High yields of good quality potatoes are required to assure a fair return on investment. Many production problems that would limit yield, such as untimely frost or rain, are beyond grower control. A successful grower manages the production factors which are under his control. Planting high quality seed can make the difference between a good harvest and a poor one.

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. Inspections for disease incidence are the function of the certification program.

Seed quality is based primarily on the amount and types of diseases present. Seed-borne diseases were significantly reducing the Alaskan growers' yields during the late 1970s. Good seed of the varieties of potatoes grown in Alaska were not available locally. Importing seed from outside the state carries with it the potential to introduce pests and diseases not now known to occur in Alaska. The Potato Disease Control Project was initiated to help overcome these problems. The project assists the industry by producing seed potatoes free from diseases and monitoring the health of the seed and commercial fields. The maintenance of a prosperous potato industry is accomplished by providing quality seed, monitoring disease incidence and education.

Disease-Tested Seed Potato Production

In 1989, the project produced 9,000 disease-tested plants of 36 varieties. Six varieties accounted for 60% of this total. The varieties most in demand were Shepody, Bake-King, Iditared, Superior, Alaska 114 and Green Mountain.

Approximately 1,000 plants were made available to ten growers for production of Generation 1 (G1) seed. The remaining plants were grown in greenhouses at the Plant Materials Center (PMC), and produced 1,200 pounds of G1 seed to meet the orders placed in 1988.

Disease-tested seed amounting to 3,000 pounds of nine russet-skinned varieties were field grown to provide seed for trials to be conducted by the Cooperative Extension Service in 1990.

The potato project performed over 8,000 tests to ascertain the health of the materials produced. Each tuber or 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.

TUBER INTRODUCTION

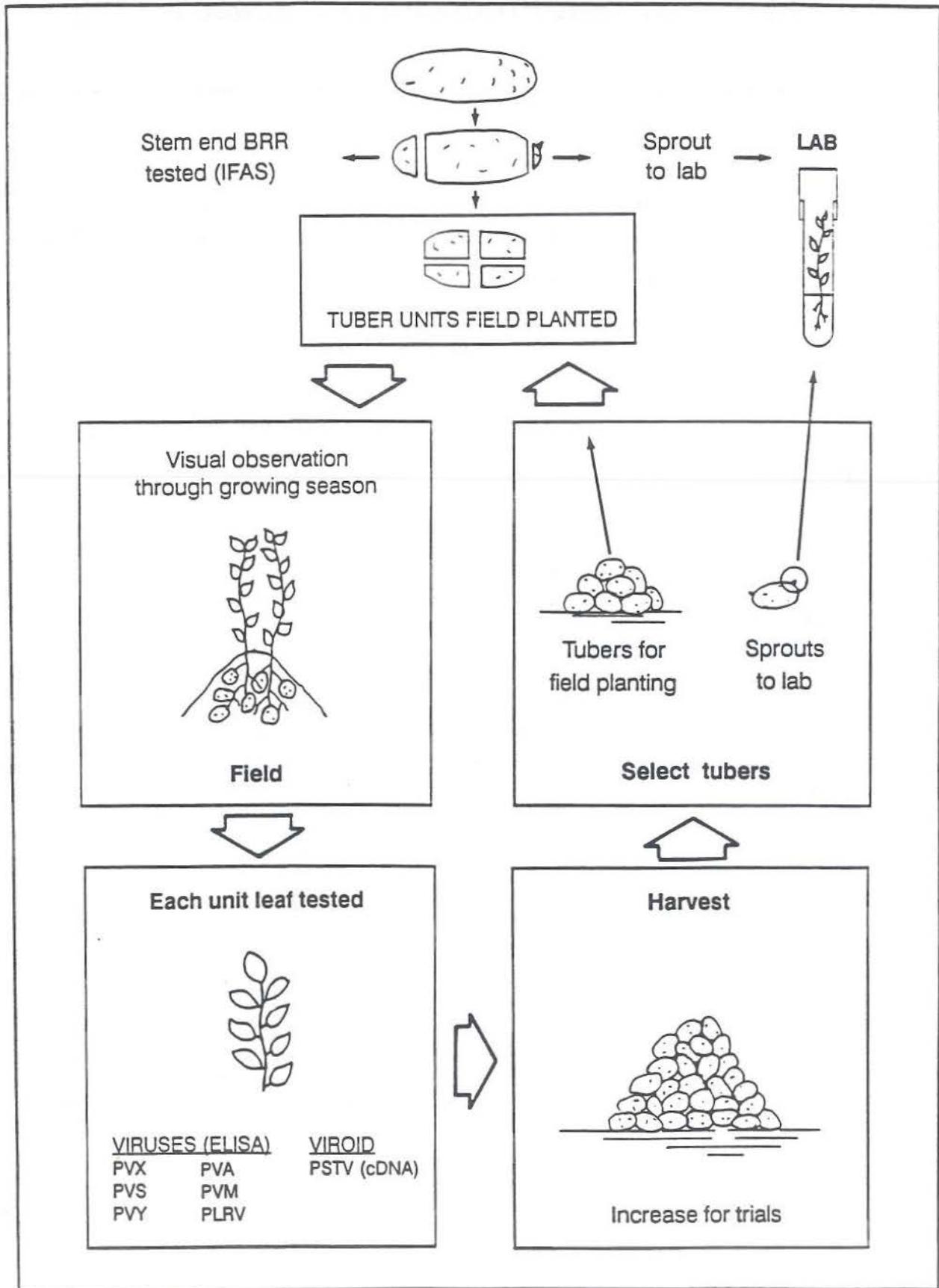


Figure 4

Alaska Seed Potato Production & Disease Testing

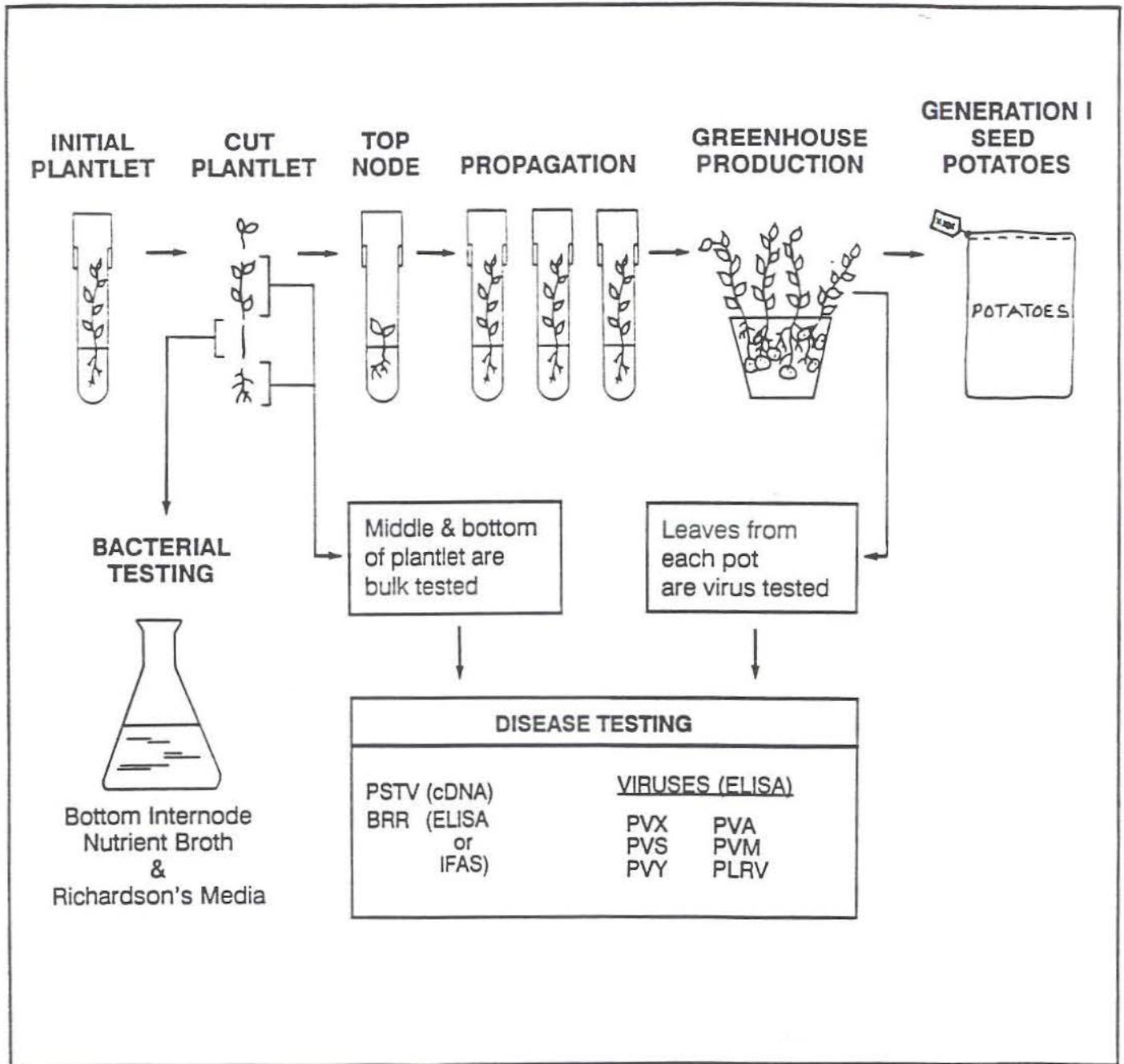


Figure 5

Seed Potato Certification

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.

Diseased plants typically appear different from healthy plants, however the symptoms of some diseases can be masked or obscured by growing conditions such as physiological maturity, fertility levels, and cool temperature. The particular variety's resistance to a disease also plays a part in symptom expression.

The term "latent" is used to describe the situation where a disease is present, but symptoms are not expressed. The idea that a disease can be present and go undetected is cause for concern. The use of laboratory tests for the detection of Potato Virus X, which can be latent, has been shown to be an effective procedure for indicating the relative infection level of the disease. Laboratory procedures which would allow the detection of latent Bacterial Ring Rot are being developed but are not commonly being used.

Alaska's Certified Seed Program is administered by the Alaska Seed Growers, Inc. The inspections are conducted by the Potato Disease Control Project. Inspections were performed during the 1989 growing season on 119 lots planted to 48 acres. There were 27 varieties grown as certified seed. Certified seed potatoes were grown in the Matanuska Valley, Tanana Valley, Fairbanks and Bartlett Hills area near Talkeetna. Each lot was inspected according to certification standards for disease and varietal purity.

Educational Program

Dr. Ed Jones, retired Potato Certification Specialist from Cornell University, was brought to Alaska in mid-August to instruct growers and inspectors on the finer points of finding Bacterial Ring Rot (BRR) symptoms in potato fields. The Division of Agriculture, in cooperation with the Alaska Seed Growers, Inc., provided travel funds for his visit. Dr. Jones and his wife Barbara, who is a potato specialist in her own right, inspected all seed fields as well as some of the table stock production fields. No BRR was found in any seed. Observation of an inoculated plot on a table stock farm indicated that the disease was more difficult to find in the variety Green Mountain than in the variety Bake-King. Symptom expression was not as readily observed.

Dr. Jones also presented information to growers on the Seed Production Program at Cornell's Uihlein Farm which is located in upstate New York, at a meeting held in Palmer.

Matanuska Valley Demonstration Plot

A demonstration planting of 48 varieties was planted at Nugen's Ranch on May 19, 1989. This planting was made to allow growers the opportunity to observe the growth characteristics and tubers of the varieties on a side by side basis. The plot was comprised of 16 russet, 13 red, and 19 white/buff skinned cultivars. Local growers were invited to observe the planting prior to harvest on September 26. Tuber defects and disease were noted. Total yield was recorded. Time from planting to harvest was 126 days.

Skin set, shape and yield appeared acceptable for seven of the russeted varieties; Alaska Russet, Allagash, Belrus, Hilite, Lemhi, AF465-2 and Norgold "M". The red-skinned varieties were all relatively equal in regard to feathering. Red Pontiac and Sangre were a bit tougher. Redsen had the brightest color and uniformly smaller size. The white/buff were a mix of early and processing varieties. Sable, Jemseg, Conestoga, Avon and Cherokee were uniform in size. Carlton had excessive hollow heart. Monona produced only small tubers. Mirton Pearl yielded well but had deep eyes and poor shape.

Copper River Native Association Trials

Seed of 12 varieties was planted at the Copper River Native Association plots in Copper Center. Observations of quality and total production were recorded by the Copper River Agriculture Specialist. The varieties Green Mountain, Yukon Gold, Kennebec, and Chieftain produced the largest total yields. Approximately 40 people in the Copper Center area benefited from this program.

Alaska State Fairground Educational Plot

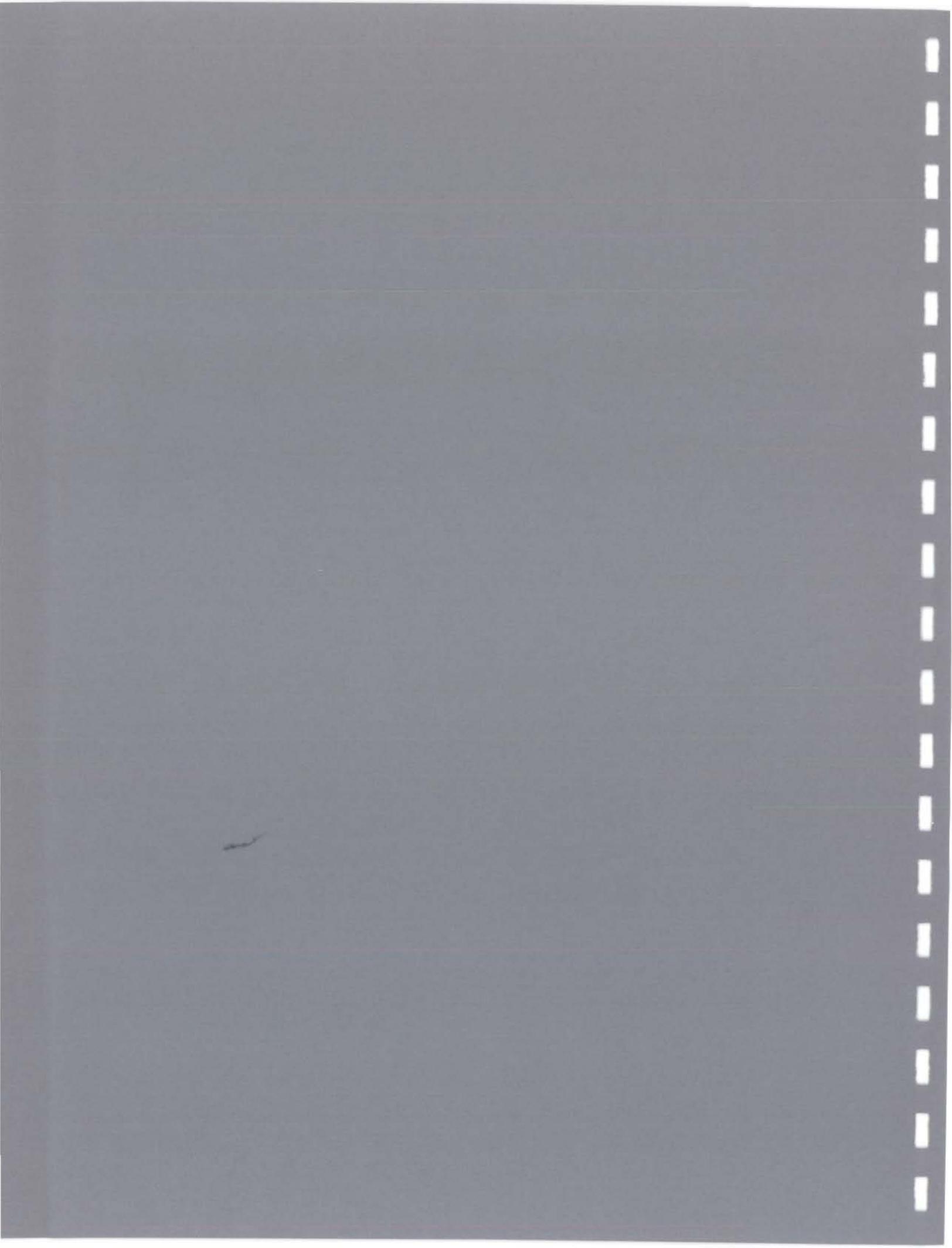
A small plot was established at the fairground near Palmer for educational use during the annual State Fair. The common Alaska cultivars, as well as some novelty potatoes, were planted in twenty-foot long rows. Hills were dug and displayed at the end of the rows during the fair.

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 1989 Authorizations, Expenditures & Program Receipts

Authorizations

Authorization FY 89 PMC Total \$ 556,100.00
 North Latitude Revegetation & Seed Production Project
 Project Total 314,200.00
 Personal Services 251,100.00
 Travel 4,100.00
 Contractual 48,400.00
 Supplies 10,600.00
 Equipment -0-

 North Latitude Vegetable & Landscape Crop Improvement Project
 Project Total 241,900.00
 Personal Services 214,700.00
 Travel 4,400.00
 Contractual 19,600.00
 Supplies 3,200.00
 Equipment -0-

 Special Appropriations FY 89
 PMC Flood Control Project 50,000.00

Authorization FY 90 PMC Total \$ 566,600.00
 North Latitude Revegetation & Seed Production Project
 Project Total 320,800.00
 Personal Services 260,400.00
 Travel 2,600.00
 Contractual 47,200.00
 Supplies 10,600.00
 Equipment -0-

 North Latitude Vegetable & Landscape Crop Improvement Project
 Project Total 245,800.00
 Personal Services 219,600.00
 Travel 3,900.00
 Contractual 19,100.00
 Supplies 3,200.00
 Equipment -0-

General PMC Operating Budgets for the Past Ten Fiscal Years

| | FY 80 | FY 81 | FY 82 | FY 83 | FY 84 | FY 85 | FY 86 | FY 87 | FY 88 | FY 89 | FY 90 |
|----------------------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|----------|
| Authorization | 343,000 | 361,900 | 743,100 | 725,900 | 912,300 | 863,400 | 888,500 | 733,700 | 596,700 | 556,100 | 566,600 |
| Personnel | 13 | 13 | 21 | 21 | 25 | 19 | 21 | 17 | 16 | 16 | 16 |
| Full Time | 7 | 7 | 10 | 10 | 12 | 10 | 10 | 9 | 7 | 7 | 7 |
| Part Time | 6 | 6 | 11 | 11 | 13 | 9 | 9 | 8 | 9 | 9 | 9 |

- 40 -

When comparing personnel figures listed for FY 89 and FY 90 to those in FY 80, bear in mind that the Potato Disease Control Project and the Horticultural Development Project were added in FY 85 and FY 82 respectively. Total FY 80 allotted man hours equalled 112 man month. FY 89 and FY 90 man months only totalled 121 as many of the seasonal positions are two to three month assignments.

1989 Calendar Year Monthly Expenditures to the Nearest Dollar

| | Jan. | Feb. | March | April | May | June | July | Aug. | Sep. | Oct. | Nov. | Dec. |
|--|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| PMC Totals | 35,174 | 41,265 | 47,328 | 50,799 | 24,799 | 58,755 | 30,145 | 70,370 | 55,444 | 49,949 | 39,363 | 36,506 |
| Personal Services | 31,421 | 34,188 | 36,423 | 39,291 | 18,043 | 51,133 | 29,388 | 59,472 | 50,572 | 38,201 | 34,581 | 32,080 |
| Travel | -0- | -0- | 453 | 431 | 274 | -0- | 720 | 911 | 1,155 | 1,956 | 627 | 338 |
| Contractual | 3,040 | 4,806 | 8,011 | 7,878 | 5,566 | 5,237 | 37 | 6,826 | 2,834 | 4,834 | 3,153 | 4,024 |
| Supplies | 712 | 2,271 | 2,441 | 3,199 | 916 | 2,385 | -0- | 3,161 | 883 | 4,944 | 1,002 | 64 |
| North Latitude Revegetation and Seed Production Project | | | | | | | | | | | | |
| Totals | 15,939 | 24,075 | 24,538 | 19,203 | 5,183 | 27,561 | 14,971 | 39,256 | 27,786 | 27,530 | 22m390 | 20,750 |
| Personal Services | 13,650 | 22,063 | 17,335 | 13,222 | 928 | 24,034 | 14,934 | 33,259 | 25,170 | 21,024 | 18,930 | 18,751 |
| Travel | -0- | -0- | -0- | 329 | 274 | -0- | -0- | -0- | 381 | 860 | 627 | 125 |
| Contractual | 1,809 | 1,681 | 5,223 | 4,236 | 3,238 | 2,050 | 37 | 3,135 | 1,987 | 3,139 | 2,166 | 1,810 |
| Supplies | 480 | 331 | 1,980 | 1,416 | 743 | 1,477 | -0- | 2,862 | 248 | 2,507 | 667 | 64 |
| North Latitude Vegetable and Landscape Crop Improvement Project | | | | | | | | | | | | |
| Totals | 19,235 | 17,190 | 22,790 | 31,596 | 19,616 | 31,194 | 15,174 | 31,114 | 27,658 | 22,419 | 16,973 | 15,756 |
| Personal Services | 17,771 | 12,125 | 19,088 | 26,069 | 17,115 | 27,099 | 14,454 | 26,213 | 25,402 | 17,177 | 15,651 | 13,329 |
| Travel | -0- | -0- | 453 | 102 | -0- | -0- | 720 | 911 | 774 | 1,096 | -0- | 213 |
| Contractual | 1,232 | 3,125 | 2,788 | 3,642 | 2,328 | 3,187 | -0- | 3,691 | 847 | 1,709 | 987 | 2,214 |
| Supplies | 232 | 1,940 | 461 | 1,783 | 173 | 908 | -0- | 299 | 635 | 2,437 | 335 | -0- |

Program Receipts

Receipts Calendar Year 89

Technical Assistance

| | |
|-----------------------|-----------|
| U. S. Navy | 10,637.00 |
| Greens Creek Mine | 357.00 |
| Echo Bay Mine | 821.00 |
| Wishbone Hill | 1,570.00 |
| National Park Service | 8,901.00 |
| Bureau of Land Mngmt. | 2,047.00 |

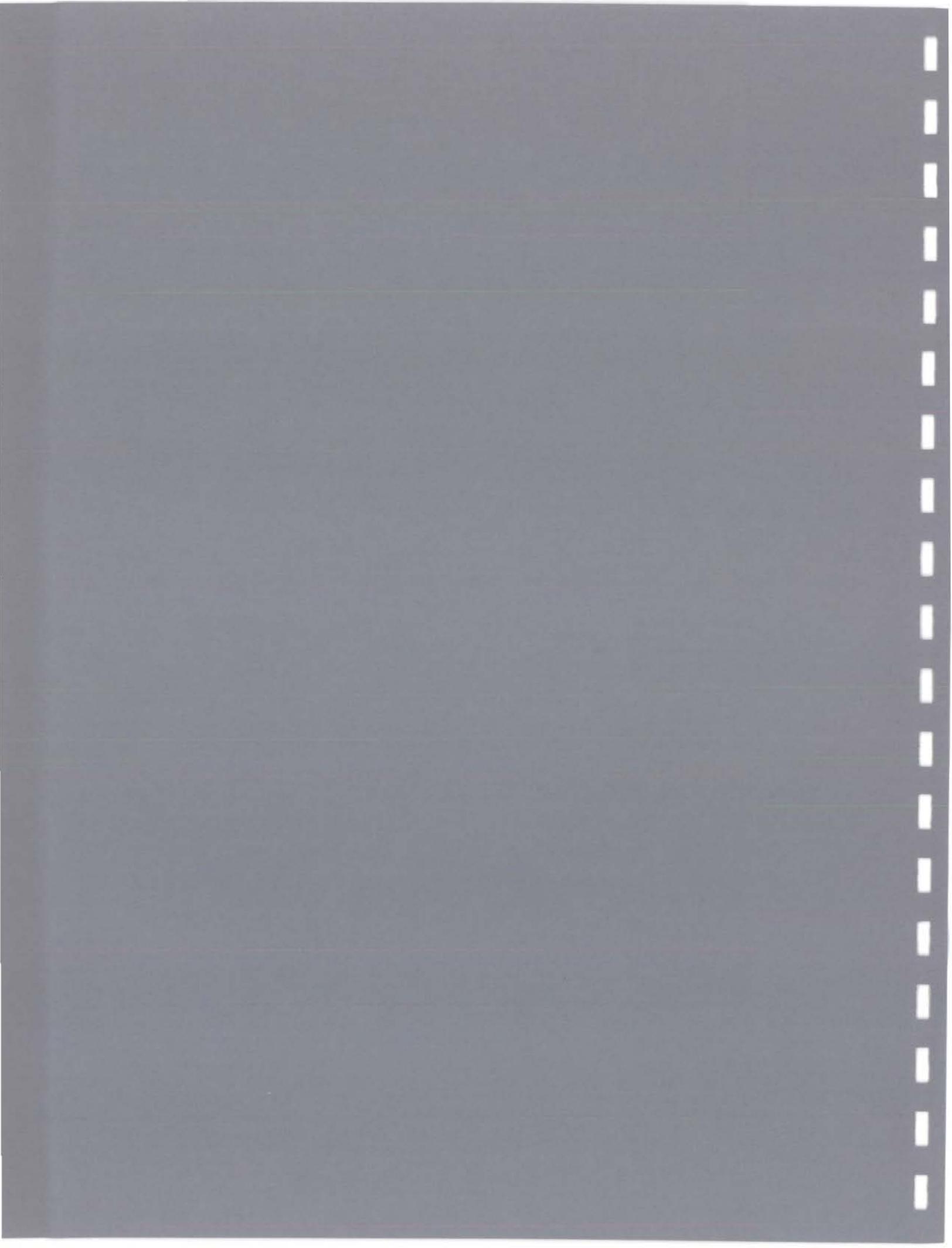
Sales

| | |
|---------------------------|----------|
| Grass, Grain, Potato Seed | 7,074.00 |
|---------------------------|----------|

| | |
|----------------|-----------|
| Total Receipts | 31,407.00 |
|----------------|-----------|

Appendix B

New & Pending Crop Releases



New Crop Cultivars Developed by the Alaska Plant Materials Center

- 'Long' Barclay Willow - 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 - '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 - 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 - '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 - '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 - '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.
- 'Gruening' Alpine Bluegrass - 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.
- 'Caiggluk' Tilesy Sage - 'Caiggluk' Tilesy Sage 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 allow for more species diverse seed mixes. This is the first native broadleaf species brought into commercial production in Alaska.

'Service' Big Bluegrass - 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.

Pending Releases

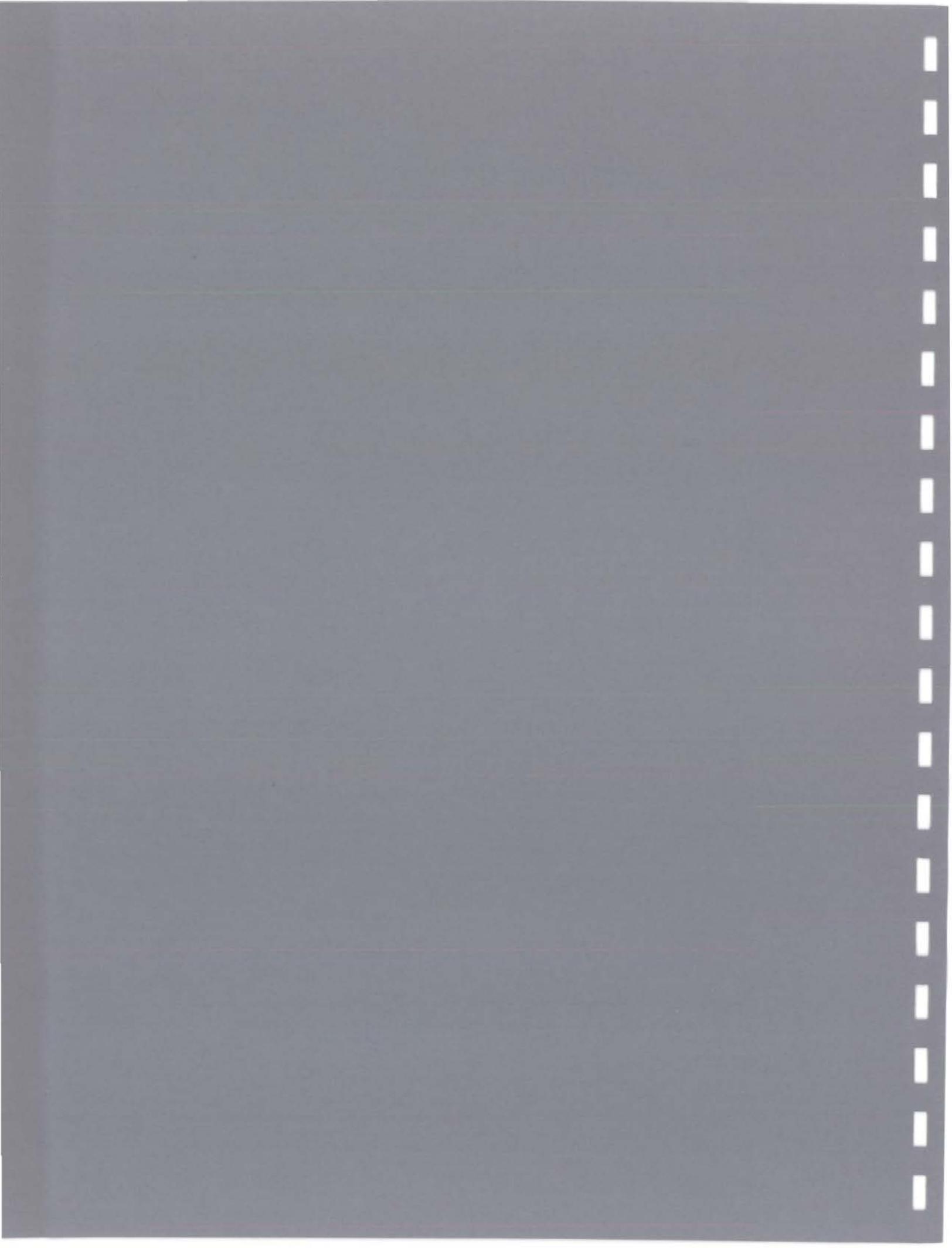
Beach Wildrye - The Plant Materials Center is presently in the final evaluation stages on two collections of Beach wildrye. Both may be released for commercial production. The first is a collection from Norway that has exhibited hardiness throughout most southwestern and southcentral coastal Alaska. This collection is capable of producing viable seed in commercial quantities. The second collection of Beach wildrye originated on Kodiak Island and does not produce seed, a trait common to native stands of the species. Commercial production of this collection would be limited to vegetative production.

Release is expected for either or both in 1990 or 1991.

Violet Wheatgrass - This native accession has undergone evaluation by the PMC since 1979. It has exhibited superior hardiness throughout Alaska, especially on dry, gravelly sites.

Appendix C

List of Publications & Presentations



Publications

- Campbell, W. L. 1987. Potatoes Alaska! Spudman. January and February 1987. 4 pp.
- Campbell, W. L. 1988. Potato Disease Control Technical Report 1984 - 1988. State of Alaska, Division of Agriculture, Plant Materials Center. 14 pp.
- Moore, N. J. 1986. Recommendations for Reclamation Species and Techniques. Alaska Miner. April, 1986. 2 pp.
- Moore, N. J. 1986. Evaluation of Conservation Species at Fort Richardson, 1983-1986. State of Alaska, Division of Agriculture, Plant Materials Center. 11 pp.
- Moore, N. J., P. Brna, W. Evans, and S. J. Wright. 1986. Field Guide for Streambank Revegetation. State of Alaska, Division of Agriculture, Plant Materials Center. 15 pp.
- Moore, N. J. 1986. Final Report for the Bank Revegetation Program, Bethel Small Boat Harbor. State of Alaska, Division of Agriculture, Plant Materials Center. 23 pp.
- Moore, N. J. 1986. Final Report for Evaluation of Conservation Species at Fort Richardson, 1983 - 1986. State of Alaska, Division of Agriculture, Plant Materials Center. 11 pp.
- Moore, N. J. and P. J. Brna. 1987. Streambank Revegetation With Woody Plants. Alaska Fish and Game. 19:2. 4pp.
- Moore, N. J. 1987. Plant Profile 'Roland' *Salix lasiandra*. The Public Garden. The American Association of Botanical Gardens and Arboreta, Inc. January, 1987. 1 p.
- Moore, N. J. et. al. 1989. Directory of Alaska Native Plant Sources. Municipality of Anchorage Coastal Management Program, and Alaska Department of Natural Resources, Division of Agriculture, Plant Materials Center. 23 pp.
- Moore, N. J. and S. Wright. (in press) Studies on the Techniques for Revegetation with *Arctophila Fulva* (for years 1986, 1987 and 1988). State of Alaska, Division of Agriculture, Plant Materials Center. 53 pp, 30 pp and 16 pp.
- Ross, D. R. 1987. Controlled Release Fertilizer Trials on Four Containerized Woody Plants. State of Alaska, Division of Agriculture, Plant Materials Center. 9 pp.

- Ross, D. R. and E. J. Heyward. 1989. Foundation Seed Production Technical Report. State of Alaska, Division of Agriculture, Plant Materials Center. 24 pp.
- Wright, C. I. and K. Eberhardt. 1982. Survey of Greenhouse and Nursery Production in Alaska, 1982. State of Alaska, Division of Agriculture, Plant Materials Center. 12 pp.
- Wright, C. I., J. Bunker and K. Eberhardt. 1983. Strawberry Plant Market Survey and Production Feasibility Study. State of Alaska, Division of Agriculture, Plant Materials Center. 53 pp.
- Wright, C. I. 1986. Summary of Vegetable Variety Trials. State of Alaska, Division of Agriculture, Plant Materials Center. 14 pp.
- Wright, C. I. 1987. Pruning Principles for Nursery Stock. State of Alaska, Division of Agriculture, Plant Materials Center. 5 pp.
- Wright, C. I. 1988. Freidrichsenii-Old Alaskan Stand-by That's Got It All Together. The Anchorage Times. Gardening Supplement. May 14, 1988.
- Wright, C. I. 1988. Rhubarb. The Anchorage Times. Gardening Supplement. May 14, 1988.
- Wright, C. I. 1988. A Better Mouse Trap? Alaska NAFEX Newsletter. December, 1988. Vol. 3. No. 10.
- Wright, C. I. 1989. Summary of Vegetable Variety Observations 1987. State of Alaska, Division of Agriculture, Plant Materials Center. 5 pp.
- Wright, C. I. 1989. Rhubarb Variety Trials. State of Alaska, Division of Agriculture, Plant Materials Center. 1 pp.
- Wright, C. I. 1989. Summary of Vegetable Variety Observations, Palmer, Alaska, 1988. State of Alaska, Division of Agriculture, Plant Materials Center. 10 pp.
- Wright, S. J. 1985. Willow Varieties for Alaska. State of Alaska, Division of Agriculture, Plant Materials Center and USDA Soil Conservation Service. 7 pp.
- Wright, S. J. 1986. Release Notice 'Egan' American Sloughgrass. State of Alaska, Division of Agriculture, Plant Materials Center. 2 pp.
- Wright, S. J. 1986. Release Notice 'Gruening' Alpine Bluegrass. State of Alaska, Division of Agriculture, Plant Materials Center. 2 pp.

- Wright, S. J. and N. J. Moore. 1986. 1986 Progress Report for the Conservation Plant Project. State of Alaska, Division of Agriculture, Plant Materials Center. 87 pp.
- Wright, S. J. 1986. Initial Data and Observations Obtained From the 2C Access Spur and Mine Site D Herbaceous Evaluation Plots Located in the Kuparuk Unit. State of Alaska, Division of Agriculture, Plant Materials Center. 10 pp.
- Wright, S. J. 1986. Beach Wildrye (Elymus arenarius) Sprigging on Shemya Air Force Base, Lateral Clear Zone - A Qualitative Study in Response to Questions Arising From Contract DACA 85-86-C-0042. State of Alaska, Division of Agriculture, Plant Materials Center. 37 pp.
- Wright, S. J. 1987. Final Report on Demonstration and Advanced Conservation Plantings at Kalsin Bay, Kodiak, Alaska 1982-1986. State of Alaska, Division of Agriculture, Plant Materials Center. 16 pp.
- Wright, S. J. 1987. Final Report on Evaluation of Advanced Herbaceous Conservation Species at Usibelli Coal Mine, Healy, Alaska 1983 - 1986. State of Alaska, Division of Agriculture, Plant Materials Center. 11 pp.
- Wright, S. J. 1987. Final Report of Initial and Advanced Conservation Plantings at Ruby, Alaska 1984 - 1986. State of Alaska, Division of Agriculture, Plant Materials Center. 16 pp.
- Wright, S. J. 1987. Evaluation of Conservation Species at Premier Coal Mine Near Palmer, Alaska 1983 - 1986. State of Alaska, Division of Agriculture, Plant Materials Center. 14 pp.
- Wright, S. J. 1987. Final Report on Evaluations of Advanced Herbaceous Conservation Species at Diamond Alaska Test Pits Near Tyonek, Alaska 1983 - 1987. State of Alaska, Division of Agriculture, Plant Materials Center. 13 pp.
- Wright, S. J. 1987. Reclamation In Alaska. 1987 Annual Meeting of the Alaska Miners Association Technology Short Course. State of Alaska, Division of Agriculture, Plant Materials Center. 13 pp.
- Wright, S. J., L. H. Fanter, and J. M. Ikeda. 1987. Sand Stabilization Within the Lateral Clear Zone at Shemya Air Force Base, Alaska Using Beach Wildrye, Elymus arenarius. State of Alaska, Division of Agriculture, Plant Materials Center and U. S. Army Corps of Engineers, Alaska District. 16 pp.

- Wright, S. J. 1988. Final Report of Advanced Conservation Grasses at Terror Lake Hydro Electric Project, Kodiak, Alaska. State of Alaska, Division of Agriculture, Plant Materials Center. 13 pp.
- Wright, S. J. 1988. Final Report on Evaluation of Conservation Species at Valdez Creek Mine Near the Susitna River off the Denali Highway 1985 - 1987. State of Alaska, Division of Agriculture, Plant Materials Center. 12 pp.
- Wright, S. J. 1988. Initial Demonstration and Advanced Conservation Plantings at the City of Kenai Evaluation Plot 1984 - 1987. State of Alaska, Division of Agriculture, Plant Materials Center. 12 pp.
- Wright, S. J. 1988. Initial Demonstration and Advanced Conservation Plantings at Mile Post 1408 Near Delta, Alaska 1983 - 1987. State of Alaska, Division of Agriculture, Plant Materials Center. 15 pp.
- Wright, S. J. 1988. Advances in Plant Material and Revegetation Technology in Alaska. Proceedings of the High Altitude Revegetation Conference. Colorado State University. Fort Collins, Colorado. 38 pp.
- Wright, S. J. 1988. Advances in Revegetation Technology Following the Completion of TAPS. Renergy - Alaska Oil and Industry. Vol. 7. No. 6. June, 1988.
- Wright, S. J. 1989. Final Report of Data and Observations Obtained From the 2C Access Spur and Mine Site D Herbaceous Evaluation Plots Located in the Kuparuk Unit. State of Alaska, Division of Agriculture, Plant Materials Center. 13 pp.
- Wright, S. J. 1989. 1988 Interim Report of Initial Data and Observations Obtained From the Red Dog Mine Evaluation and Demonstration Plots. State of Alaska, Division of Agriculture, Plant Materials Center. 16 pp.
- Wright, S. J. 1989. Final Report of Data and Observations Obtained From the Chena Flood Control Project Evaluation Plots Located Near North Pole, Alaska. State of Alaska, Division of Agriculture, Plant Materials Center. 14 pp.
- Wright, S. J. 1989. Final Report of Data Obtained From the Fairbanks Evaluation and Demonstration Plots. State of Alaska, Division of Agriculture, Plant Materials Center. 12 pp.

Wright, S. J. 1989. Advances in Plant Materials Technology and
Revegetation Technology in Alaska. Reclamation, a Global
Perspective. American Society for Surface Mining and
Reclamation. Calgary, Alberta Canada. 10 pp.

Wright, S. J. 1989. Release Notice - 'Caiggluk' Tilesy Sage. State
of Alaska, Division of Agriculture, Plant Materials Center. 2 pp.

Wright, S. J. 1989. Release Notice - 'Service' Big Bluegrass. State
of Alaska, Division of Alaska, Plant Materials Center. 2 pp.

Presentations During 1989

- Campbell, W. Seed Certification/Sources 11th Annual Potato Growers Conference, Matanuska Susitna Community College, Palmer, Alaska. March 8, 1989.
- Moore, N. J. Revegetation Plant Materials: Techniques for Handling, Processing and Planting Seed and Revegetative Material. Course lecture for ALRF 393 Ecology of Disturbed Lands, 1989.
- Wright, C. I. Cabbage and Broccoli Variety Trials in Palmer. 1989 Vegetable Growers Conference, Palmer, Alaska. March 9, 1989.
- Wright, C. I. Small Fruit and Ornamentals for the Talkeetna Area. Cooperative Extension Service Talkeetna Winter Workshops. Susitna Valley High School. March 29, 1989.
- Wright, C. I. Horticulture and Agriculture in Alaska. Problems of Horticulture in the U. S. S. R. North-East Conference. Institute of Biological Problems of the North, Magadan, U.S.S.R. November 28-31, 1989.
- Wright, C. I. Lawn Establishment and Maintenance in Alaska. Problems of Horticulture in the U. S. S. R. North-East Conference. Institute of Biological Problems of the North, Magadan, U.S.S.R. November 28-31, 1989.
- Wright, C. I. Ornamental Plants for Alaska. Problems of Horticulture in the U. S. S. R. North-East Conference. Institute of Biological Problems of the North, Magadan, U.S.S.R. November 28-30, 1989.
- Wright, C. I. Pruning Practices. University of Alaska Anchorage. Grounds Crew Lecture. Anchorage, Alaska. December 19, 1989.
- Wright, S. J. Developing Reclamation Plans. U. S. Bureau of Mines/University of Alaska Anchorage. Anchorage, Alaska. March 14, 1989.
- Wright, S. J. Certified Seed Production in Alaska. Yukon Livestock and Agriculture Association. Whitehorse, Yukon. March 18, 1988.
- Wright, S. J. Mine Reclamation and Revegetation. Alaska Miners Association. Fairbanks, Alaska. March 30, 1989.
- Wright, S. J. Commercial Use of Native Plant Material. University of Alaska Cooperative Extension Service. Talkeetna, Alaska. April 12, 1989.
- Wright, S. J. Mine Revegetation Using Native Species. Bureau of Land Management. Fairbanks, Alaska. April 27, 1989.

Presentations During 1989

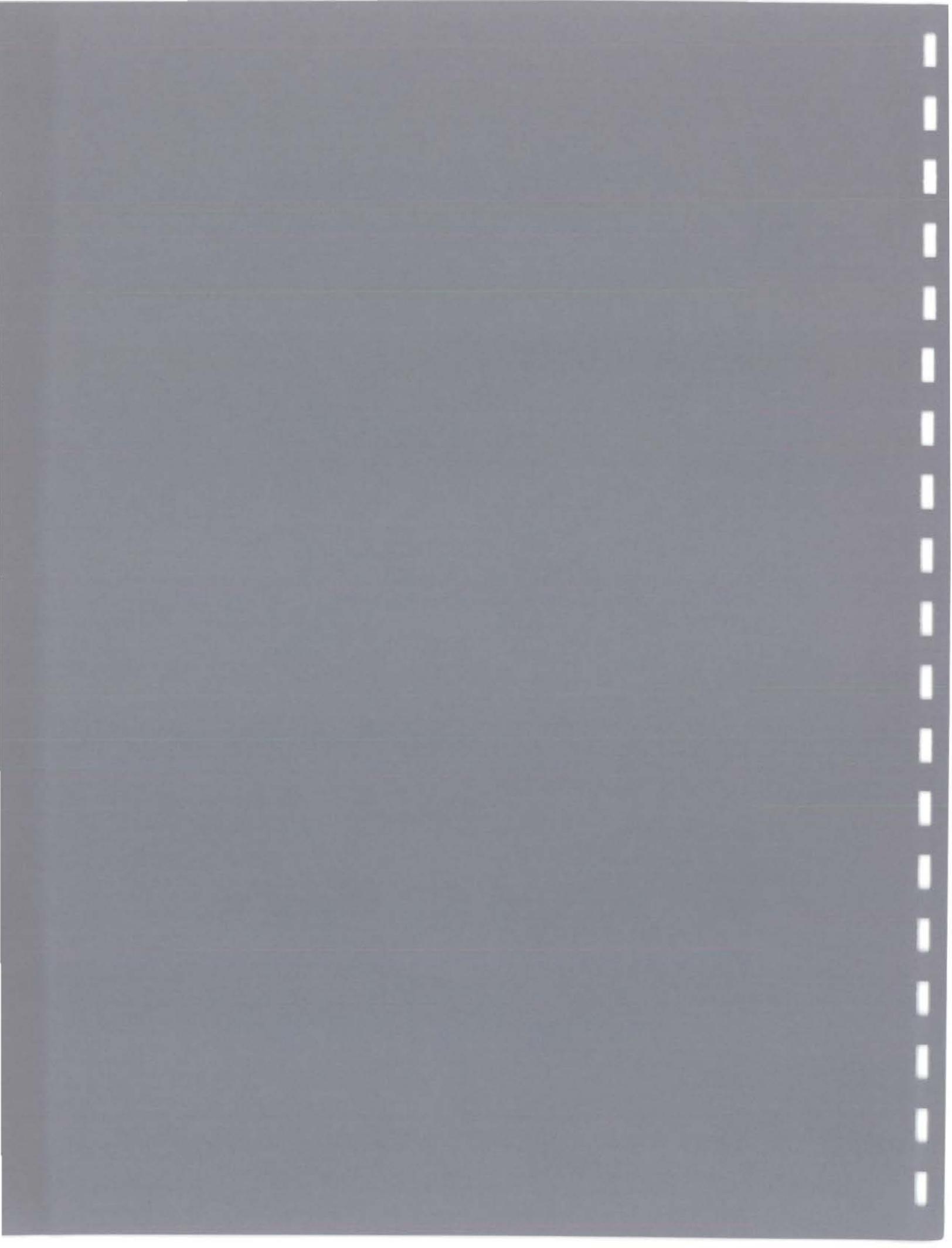
- Wright, S. J. Revegetation in the Arctic. U. S. Army Corps of Engineers. Anchorage, Alaska. May 19, 1989.
- Wright, S. J. Sand Control on Adak Naval Air Station. American Society of Agronomy, Annual Meeting. Las Vegas, Nevada. October 17, 1989.
- Wright, S. J. The Plant Materials Center - Who We Are and What We Do. University of Alaska Agricultural and Forestry Experiment Station. Palmer, Alaska. December 6, 1989.

Tours - Field Days

- Moore, N. J. and C. I. Wright. Interpretive Walk for 4th Grade Class. Anchorage School District. Johnson Creek Trail.
- Moore, N. J., C. I. Wright, W. L. Campbell, D. R. Ross. PMC Programs: Presentations and Tour for 6th Grade Participants of Outdoor School.
- Campbell, W. L., N. J. Moore, D. R. Ross, D. Sheaver, K. Vanzant, C. I. Wright, S. J. Wright. Annual PMC Open House. August 12, 1989.
- Plant Materials Center Staff, Division of Agriculture, T. Pyrah. Picnic and Tour of PMC Operations for A. Nesterenko, Deputy Director, Institute for Arable Lands. A. Yuzhakov, Head of Agrochemistry Laboratory, and I. Sharkov, Head of Plant Nutrition Cycle Laboratory. July 31, 1989.
- Plant Materials Center Staff. Tour of Plant Materials Center. Murray, D. F., Curator, U. of A. Fairbanks Herbarium, and Argus, G., Taxonomist, Museum of Natural Sciences, A. Galanin, Taxonomist, Main Botanical Garden, A. C. Skvortsov, Moscow, I. M. Krasnoborov, Vice Director of Central Siberian Botanical Garden, Novosibirsk, I. C. Koropachinsky, Director, Central Siberian Botanical Garden, Novosibirsk. August, 9, 1989.

Appendix D

Acknowledgements



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Nugen's Ranch
Pyrah's Pioneer Peak Farm
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Spring Valley Farm
Unalaska Pride/Marty Norton
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Wasilla Soil and Water Conservation District
Bob Watkins Family

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