PALMER PLANT MATERIALS CENTER

ANNUAL REPORT

1973

DEPARTMENT OF NATURAL RESOURCES

Division of Agriculture

James R. Stroh
PMC Manager

Joseph L. Stehlik
PMC Agronomist

Jesse G. Werner
PMC Farm Foreman

TABLE OF CONTENTS

Introduction

The development of Alaska's resources has increased substantially in recent years and with it has grown an awareness of the need for environmental protection. The impact upon the environment of the trans-Alaska pipeline, the accelerated highway construction program, urban and industrial expansion, the growing population's demand for gardens and landscaping--essentially all man's activities which change the environment--requires a concomitant effort to prevent or reduce damage to ecological systems or, to restore or replace them when they are damaged. Vegetation is a basic tool of this effort. The development of new plant materials and provision for their propagation and distribution to the public for use in environmental protection has been recognized as one of Alaska's requisite needs.

Representative Jalmar Kerttula of Palmer (now Senator) submitted House Bill 8 to the 1972 Legislature to establish a Plant Materials Center for the purpose of developing "... plant materials needed in soil and water conservation, agriculture and industry ...." The bill was passed and signed into law (Chapter 138 SLA 1972 AS 03.22) by Governor William A. Egan on June 20, 1972. Responsibility for the operations of the Center were given to the Department of Natural Resources under Commissioner Charles F. Herbert and through the Department's Division of Agriculture, William G. Lewis, Director. Operations were to be conducted cooperatively by a formal Memorandum of Understanding signed in December 1972 between the Department, the University of Alaska Institute of Agricultural Sciences, and the USDA Soil Conservation Service.

Commissioner Herbert appointed a seven-man Advisory Board to advise on policy for the PMC operations. The Board members were:

Commissioner Herbert
Director Lewis, Chairman
Dr. Donald H. Dinkel, University of Alaska
Dr. Roscoe L. Taylor, USDA Agricultural Research Service
Weymeth E. Long, USDA Soil Conservation Service
Byron J. Hollembaek, Alaska Crop Improvement Association
Harold J. Kelton, Alaska Association of Soil Conservation Subdistricts.

The objectives of the PMC and the scope of its activities are extensive. Initially, it will assemble, evaluate, select and increase both native and introduced species of grasses, legumes, forbs, shrubs, and trees. The more promising material will be tested throughout the State for adaptability and applicability to the environmental problems encountered. Genetically pure stocks of seed and propagules will be maintained, including agricultural seeds. Plant materials will be cooperatively released to the public by the Department, the Institute, and the SCS. These new plants, and others presently available to the consumer, will form the foundation of Alaska's developing seed and nursery production industry. Cooperation with many state, federal, local, research, and private agencies will be necessary to successfully accomplish these objectives.

Funds to begin operations were made available by Governor Egan on January 1, 1973. Shortly thereafter, Director Lewis, assisted by Dr. C. E. Logsdon and Sig Restad of the Institute of Agricultural Sciences and W. E. Long and Cliff Marcus of the Soil Conservation Service, began inspecting available property and eventually entered into negotiations to purchase 285 acres of cleared land with several buildings located 11 miles

south of Palmer. Upon Commissioner Herbert's approval, the purchase was concluded February 23 with occupancy commencing June 1. The owner, Shirley A. Beaver, granted access to the property in early March by the Division staff to begin cleaning debris and preparing the land for spring seeding.

The initial staff of the PMC consisted of four permanent full-time persons. Joe Stehlik, Produce Inspector with the Division of Agriculture, was transferred to PMC operations March 12 as Agronomist. Ann Hanson was transferred from the Division to the PMC clerk's position May 16. Jesse Werner was employed May 14 as Farm Foreman. Jim Stroh, USDA PMC Manager at Bridger, Montana, was loaned to the State of Alaska on June 10 through the Federal Intergovernmental Personnel Act to serve as Manager. Four temporary laborers were also employed intermittently during the year.

This report covers the technical operations and accomplishments for the 1973 calendar year including plant collections assembled, seed production studies initiated, production of Foundation grains, physical improvements to land and buildings, purchases of equipment, and a brief discussion of weather conditions and how they affected operations. Also included is a report on the 1973 fiscal year operations and expenditures.

Weather

The Plant Materials Center is located in the Knik River Valley 67 feet above sea level. It is surrounded by the Chugach Mountains on the South and East, the Talkeetna Mountains on the North and the Knik Arm of Cook Inlet on the West. The local geophysical factors that contribute to the unique weather conditions at the PMC are: its low elevation, its nearness to 6300 foot Pioneer Peak, the long slope of Lazy Mountain, and the Knik River trough.

In brief, temperatures at the low elevation tend to be cooler. Pioneer Peak totally blocks out the sun for 60 days in December and January and casts shadows in late fall and early spring. On windless days this normally leads to even lower temperatures. Local cloud cover surrounding Pioneer Peak often shadows the area and also leads to cooler temperatures.

The area is sheltered from the brisk northeast Matanuska River winds by the long slope of Lazy Mountain about 10 miles to the North. This usually leads to very calm days at the PMC.

When winds pass over the Chugach Mountains from the Prince William Sound area, a warming trend follows and precipitation or low clouds are normally produced. These "Chinook" winds often warm the area as much as 60° in a 24-hour period in the wintertime.

Accurate recording of these unique climatic conditions will assist PMC personnel in establishing what conditions are normal for the area. This will greatly aid in preparing seedbeds, planting, irrigating, harvesting and work schedules--in essence the entire operation.

In 1974 a weather station will be installed. Instruments will include a hygro-thermograph which continously measures and records relative humidity and temperatures; a rain and snow gauge for measuring precipitation; an anemometer for determining wind velocities; a weather vane for determining wind direction; a soil temperature-moisture probe that measures the actual moisture content and temperature of the soil at 3-, 6-, 18-, 28-, and 38-inch depths, and an instrument shelter to protect the hygro-thermograph.

Presently the soil temperature-moisture probe and the anemometer are in operation. The soil temperature-moisture probe was donated to the PMC by the Soil Conservation Service.

Observation of the weather at the PMC began in early May. The observations made were casual due to the fact that our weather station equipment had not arrived at the time. The following is a brief summary of weather conditions as observed by the Farm Foreman at the Plant Materials Center. Temperatures from May through October and precipitation records are from the Institute of Agricultural Sciences in Palmer.

May

Temperatures ranged from a low of 29°F. to a high of 70°F. Average daily high was 59.2°F. with an average daily low of 35.4°F. The average monthly temperature was 47.3°F. which was 1.8° above normal. Precipitation amounted to .11 inches. Recordable precipitation fell on the 24th, 25th, and 30th of the month. Southeast winds prevailed for most of the month with gusts to 40 mph occurring.

June

Temperature extremes were from a 34°F. low to a 70°F. high. Average daily high was 61°F. while the average low was 44.3°F. Average monthly

temperature of 52.7°F. was the normal for June. Precipitation amounted to .89 inches. Winds were out of the Southeast. High winds on the 9th resulted in damage to the irrigation system. One horizontal section of pipe was twisted by the wind and one half of the wheel system was moved about one quarter mile.

July

Temperature extremes recorded were from a low of 39°F. to a high of 73°F. The average daily high was 60°F. and an average low of 47.3°F. The average monthly temperature was 53.6°F. which was 3.5°F. below normal. Precipitation amounted to .42 inches. Due to dry conditions irrigation was used until July 23. Winds were light and most of the days were calm.

August

Temperature extremes recorded were from 31°F. low to a 73° high. The average daily low temperature was 44.8°F. and the average high was 61.6°F. The average monthly temperature was 53.2°F. which is normal for August. Precipitation amounted to 2.38 inches and fell on the first nine days of August. We recorded frost occurring on the 15th. Normally the first recordable frost is about August 25. Winds with a velocity of up to 20 mph accompanied the rain. Calm days prevailed the remainder of the month.

September

Temperatures ranged from a low of 29°F. to a high of 63°F. The average daily high was 54.5°F. with an average low of 38.8°F. The average monthly temperature was 46.6°F. which is 4.1°F. above normal. Precipitation was .77 inches and fell on 12 days from the 2nd to the 26th. Wet weather hampered

harvest efforts and caused some lodging in the grain. Moderate winds prevailed for most of the month with gusts to 15 mph.

October

Temperatures ranged from a low of 9°F. to a high of 50°F. The average daily high was 38.9°F. and the average low was 28.9°F. The average monthly temperature was 33.9°F. and this was 5° above normal. Precipitation for the month was 1.69 inches. Light snow fell on the 7th, 9th, 15th and 16th. Cloudy damp days prevailed until the 24th. A brief drying spell permitted harvest of the remaining barley. Moderate southeasterly winds prevailed.

November

Temperatures ranged from a low of -20°F. to a high of +38°F. The average daily high was 19.7°F. and the average low was 1.7°F. The average monthly temperature was 10.7°F. which is 5.2° below normal. Precipitation in the form of snow amounting to 4.2 inches fell during the month. Calm days and light winds prevailed during the month.

December

Temperatures ranged from a low of -24°F. to a high of 40°F. Average daily high temperature was 23.2°F. and average low was 14.1°F. The average monthly temperature was 18.6°F. which was 9.4° warmer than average. Precipitation amounted to .28 inches in the form of rain. High southeast winds prevailed for the last half of the month with winds recorded up to 50 mph on our newly installed anemometer.

Summary

Generally temperatures were average for the year with slightly cooler temperatures in July and warmer than normal temperatures for the latter half of December. Precipitation was down 4 inches from the normal of 16.5 inches. Less than 1 inch of snow cover remained on the fields at the end of the year. According to local residents the late spring wind velocity was considerably less than previous years.

Jesse G. Werner

Assembly of Plant Materials

The foundation of the plant development program lies in the assembly of material which conceivably, or obviously, has potential use in agriculture, industry or conservation. The diversity of Alaska's geographic, climatic, and geologic provinces presents unique opportunities for collecting plant species suited to solving the vegetative problems and needs of the state. At the start of a program which encompasses so broad a scope, including essentially every vegetative need within the state, all plant species indigenous to Alaska became eligible for collection, assembly, and evaluation. Such a prodigious task is approached with a sense of priority for needs of greatest demand. Initial collections by the Plant Materials Center include a broad spectrum of species with obvious potential use in the stabilization and revegetation of mechanically disturbed sites. Some of these species had previously been evaluated by other agencies for agricultural uses and the PMC will avoid duplicating those intents.

Collection and Assembly Procedures

Six collection trips were made from July through September 1973. The trips were made by automobile and most collections were from roadside sites representing sterile or droughty soils, occassional vehicular disturbance, or stresses induced by chemical and dust pollutants. A few collections, primarily shrubs or trees, were made on undisturbed sites. The six trips covered the following areas:

Kenai - Homer - Seward (2 trips)

Glennallen - Delta - Fairbanks

Glennalen - Tok - Delta

Glennallen - Valdez

Fairbanks - Circle

An attempt was made to sample a number of plants of a species representing that population at a given location. Only rarely were single plant collections made. If a species identification could not be made at the time of collection, an herbarium sample of the unknown plant was also collected and later identified in the laboratory.

Species which are native to Alaska but perhaps collected in Canada, Europe, or Russia and introduced into the U.S. by the USDA-ARS Plant Introduction Stations are also available for evaluation by the PMC. Inventories maintained by the PI Stations were reviewed and a number of accessions requested from that agency.

The collections were divided into two groups--herbaceous and woody--for this first Initial Evaluation pending the establishment of more meaningful "use" groups.

Results

Seed collections of herbaceous plants totaled 226 representing 96 species of 38 genera (Table 1). Seed collections of woody plants totaled 34 representing 20 species of 13 genera (Table 2). One collection of *Salix phylicifolia* cuttings was also made but the cuttings failed to survive. Seven collections of woody cuttings were made by Dick Barrett, Federal-State Laboratory, at the Nome Reindeer Farm in the late fall of 1973.

Additional collections of woody plant cuttings will be made in the spring of 1974 and added to the present seed collections available for the 1974 Initial Evaluation Planting.

James R. Stroh

Joseph L. Stehlik

Table 1. Herbaceous species assembled at the Palmer PMC in 1973 for initial evaluations to be established in 1974.

Species	Number of Accessions
Achillea borealis	1
" lanulosa	1
" millefolium	1
" sibirica	1
Agropyron boreale	1
Agropyron macrourum	1
" spicatum	2
" subsecundum	1
" trachycaulum	5
" violaceum	5
Agropyron yukonense	2
Agrostis species	1
Alopecurus aequalis	2
" arundinaceus	2
" pratensis	4
Aquilegia brevistyla	1
Arctagrostis latifolia	1
Artemesia Tilesii	2
Astragalus aboriginum	1
" americanus	1
Astragalus eucosmus	1
" Williamsii	1
Beckmannia erucaeformis	1
Brassica species	1
Bromus inermis	2
Bromus inermis X pumpellianus	2
Calamagrostis canadensis	2
" inexpansa	1
" nutkaensis	1
" purpurascens	1
Calamagrostis species	2
Carex Gmelini	1
Compositae species	1
Conioselinum chinense	1
Dalea alopecuroides	4
Deschampsia beringensis	1
" caespitosa	2
Elymus arenarius	17
" arvalensis	1
" innovatus	3

Table 1. Herbaceous species assembled at the Palmer PMC in 1973 for initial evaluations to be established in 1974. Continued.

Species	Number of Accessions
Elymus karatoviensis	1
" *sibiricus*	15
Epilobium angustifolium	1
" *latifolium*	1
" species	6
Festuca altaica	4
" *rubra*	1
Galega officinalis	1
Glyceria grandis	1
Hedysarum hedysaroides	1
Hedysarum species	2
Lathyrus cicera	1
" *maritimus*	3
" *palustris*	3
" *sativus*	4
Ligusticum scoticum	1
Lotus ornithopodioides	1
Lupinus arcticus	1
" *luteus*	1
" *nootkatensis*	6
Lupinus species	5
Oxytropis campestris	3
" *gracilis*	1
" *Maydelliana*	1
" *nigrescens*	1
Oxytropis sericea	1
" species	5
Poa alpina	9
" *arctica*	1
" *brachyanthera*	1
Poa Canbyi	3
" *compressa*	7
" *glauca*	6
" *interior*	1
" *lanata*	1
Poa nemoralis	3
" *nevskii*	1
" *palustris*	7
" *pratensis*	6
" *stenantha*	1

Table 1. Herbaceous species assembled at the Palmer PMC in 1973 for initial evaluations to be established in 1974. Continued.

Species	Number of Accessions
Poa species	1
Polemonium species	1
Polygonum persicaria	1
Potentilla biennis	1
" *multifida*	1
Psoralea bituminosa	1
Sanguisorba officinalis	4
Tetragonobolus purpureus	1
" *requieni*	1
Trifolium arvense	1
Trifolium hybridum	2
" *pratense*	1
" *repens*	1
Vicia cracca	1
" *dasycarpa*	1
Vicia pannonica	2

Table 2. Woody species assembled at the Palmer PMC in 1973 for initial evaluations to be established in 1974.

Species	Number of Accessions
Arctostaphylos uva-ursi	1
Betula papyrifera	2
Betula nana	1
Cornus species	2
Dryas Drummondii	1
" *octopetala*	1
Empetrum nigrum	1
Larix laricina	1
Picia glauca	3
" *sitchensis*	1
" species	1
Rosa species	2
Salix Barclayi	1
" *commutata*	1
" *phylicifolia*	1
" species	9
Sambucus racemosus	2
Sorbus species	1
Vaccinium vitis-idaea	1
Viburnum edule	1

Initial Evaluation Plantings

Initial Evaluations constitute the first step in the development of new plant materials. The procedures used permit a large number of plants to be screened for adaptation and performance, and the most promising accessions selected for further development. Evaluations of several hundred accessions each year are possible. Herbaceous species are seeded in single rows approximately 20 feet long. Woody species require a minimum of 10 plants for Initial Evaluations. The performance of each herbaceous accession is observed for a minimum of four years and woody accessions for 10 years. Observations are recorded on approximately 40 growth characteristics of each accession throughout the life of a planting.

Collections of native and introduced plant material assembled at the Palmer Plant Materials Center during the past year will be planted in Initial Evaluations in the spring of 1974. Over 250 collections were made in 1973 and more will be made before the planting season. Land for this planting was summer fallowed during the past season and is in good condition for spring seeding.

James R. Stroh

Joseph L. Stehlik

An Evaluation of 16 Grass and Legume Species For Seed Production in The Matanuska Valley

Certain grass and legume species used in conservation seedings and forage production plantings in Alaska are recommended in an interagency publication M7-N-22612, "A Vegetative Guide for Alaska". Only a few of the 20-odd species listed are being grown for seed in the State. The rest are either imported from outside or are not commercially available anywhere. The current annual demand for grass and legume seed in Alaska, exclusive of private landscaping, is approximately 60,000 to 70,000 pounds. This amount is expected to increase dramatically with the implementation of environmental protection seedings.

The purpose of this study is to determine the seed production potential of 16 commercial species recommended for Alaska. Seed production of each species must be high enough to return a profit to the producer at prices that are competitive with imported seed of the same species and variety.

Methods and Materials

The study was planted June 21, 1973 in Field 1D on the Plant Materials Center. Each entry was seeded in four rows spaced three feet apart in plots 12 by 30 feet and replicated three times in a randomized complete block design. Seeding rates were approximately 10 lbs./acre. Legumes were inoculated with appropriate rhizobia. No fertilizer was applied during the seedling year, nor was it necessary to irrigate the planting. The area was hand hoed to control weeds during the growing season.

Field notes were recorded periodically on seedling vigor, percent

stand, and height at the end of the growing season. No material was harvested in 1973.

The soil in the study area is a Susitna silt loam, a Typic Cryofluvent, coarse-loamy, mixed, and acid.

Entries included in this study are:

Agropyron dasystachyum, thickspike wheatgrass 'Critana'

Agropyron desertorum, desert wheatgrass 'Nordan'

Agropyron riparium, streambank wheatgrass 'Sodar'

Agropyron sibiricum, siberian wheatgrass P-27

Alopecurus arundinaceus, creeping foxtail 'Garrison'

Astragalus cicer, cicer milkvetch 'Lutana'

Bromus inermis, smooth brome 'Manchar'

Bromus inermis X *pumpellianus*, brome 'Polar'

Festuca o. duriuscula, hard fescue 'Durar'

Festuca rubra, red fescue 'Arctared'

Festuca rubra, red fescue 'Boreal'

Medicago falcata, sicklepod alfalfa P-14488

Phleum pratense, timothy 'Engmo'

Poa glaucantha, upland bluegrass 'Draylar'

Poa pratensis, Kentucky bluegrass 'Newport'

Poa pratensis, Kentucky bluegrass 'Nugget'

Trifolium hybridum, alsike clover 'Aurora'

Trifolium pratense, red clover 'Alaskland'

Results-Establishment Year

Adequate emergence and stand establishment was obtained in 14 of the 18 accessions seeded. Durar hard fescue, Draylar upland bluegrass, Engmo timothy, and Aurora alsike clover produced poor stands (Table 3). Seedling vigor was good to excellent for all accessions. The foliage heights at the end of the growing season differed among accessions but were typical of the species represented. Both Nordan crested wheatgrass and P-27 Siberian wheatgrass produced a few seed heads. These did not reach anthesis by October 1.

The roots of sample plants of the four legumes were examined on September 17 for nodulation. Alaskland red clover and Aurora alsike clover were well nodulated while P-14488 sicklepod alfalfa and Lutana cicer milkvetch had no nodules. Neither of the latter two legumes showed nitrogen deficiencies, however.

Delay of delivery of machinery precluded fertilization of the study in the fall. By the time the proper equipment had arrived, the soil was too wet to incorporate the fertilizer. The soil was frozen before any broadcasting equipment arrived. The study will be fertilized in the spring of 1974.

James R. Stroh

Table 3. Seed Production Study. Seedling vigor, percent stand, and height on October 1 of 18 accessions of grasses and legumes seeded on June 21, 1973. Averages of three reps.

Accession	Seedling Vigor	Stand	Height
	1/	%	in.
Nordan crested wheatgrass	10.0	83	10.7
Manchar smooth brome	10.0	100	10.7
Newport Kentucky bluegrass	10.0	78	3.7
Lutana cicer milkvetch	10.0	99	2.7
Alaskland red clover	9.7	95	4.0
Boreal red fescue	9.3	91	3.3
P-14488 sicklepod alfalfa	9.3	83	3.7
Garrison creeping foxtail	9.0	73	7.0
Critana thickspike wheatgrass	8.7	98	7.3
P-27 Siberian wheatgrass	8.7	99	10.0
Polar brome	8.0	93	5.3
Nugget Kentucky bluegrass	7.7	97	2.0
Durar hard fescue	7.3	8	2.7
Sodar streambank wheatgrass	7.0	93	6.3
Draylar upland bluegrass	7.0	7	3.0
Engmo timothy	7.0	17	4.3
Arctared red fescue	6.7	90	2.3
Aurora alsike clover	6.7	18	2.3

1/ Rating 1 to 10 with 10 best.

Seed Production

Introduction

Foundation seed production until now has been the burdensome task of the Matanuska Experimental Station requiring more time and greater acreages each year. So in 1972, the Legislature, in establishing the Plant Materials Center, made seed production one of the PMC's responsibilities, directing it to increase as well as maintain basic grain and grass seed supplies of recommended Alaskan varieties. We hope through our seed production program we can encourage the State's young seed industry to grow and meet the ever increasing demand for certified seed both in and out of Alaska making more Foundation seed available to more seed growers in commercial quantities. All released grain and grass varieties in the State will eventually be grown, processed, and maintained annually for Foundation seed stock by the Plant Materials Center and distributed through the Alaska Crop Improvement Association.

The Plant Materials Center will also grow and maintain a supply of seed stocks for research programs in the State such as those conducted by the University of Alaska.

Seed production at the Plant Materials Center was given low priority in this first year's operation because of our lack of equipment and because so much of our time was committed to physical improvements of PMC facilities. Processing of requests, time in shipping, manufacturing shortages, and a lack of field help are all contributive factors to this year's limited production. Through contractual and exchange agreements, however, the PMC did plant and harvest 45 acres of small grains that included six acres of

Foundation seed. Most of the 1973 seed production, though, was not for increase but rather the result of an 'Edda' barley cover crop planted to control weeds in a 1974 grass field and used to reimburse local farmers for services rendered during this year's growing season. Two additional acres were planted to 'Lidal' barley for seed increase but processed with the Edda as grain feed because of a seed contamination problem.

Foundation Seed Increase

Two plots were planted this year for Foundation seed increase--a five-acre field of 'Weal' barley and a one-acre field of 'Nip' oats.

Weal barley, *Hordeum vulgare*, is a new hooded variety developed jointly by the University of Alaska and the U.S. Department of Agriculture and released primarily as a component for mixed annual forages. Weal is considered to be an early maturing, shatter resistant variety especially suited to Alaska's interior, although some shattering was observed in our field after several days of winds late in the season. Analysis of Weal in our plot showed 14.7% protein in the grain.

Nip, *Avena sativa*, our other seed increase plot, is a black hulled oat variety familiar to most Alaskan grain growers as an all purpose grain and forage crop. Nip was introduced to Alaska from Sweden in the late 1950's and has shown to be early maturing as well as resistant to lodging and shattering. Our analysis of Nip showed 15.3% protein in the grain.

Seed sources for Nip have dwindled in recent years to a point where the variety could easily be lost, and it is now the responsibility of the PMC to increase the Nip variety as well as maintain its genetic purity. Sources for Weal, of course, released February 29, 1972 have not been

established except for small amounts of Foundation seed available for seed increase through the University Experiment Station.

Seedbed preparation of plot soils (Niklason and Susitna silt loams) began during the last half of April. Plots were located in the lower half of Field 2 and each plot was plowed and then disked at least once. The Foundation seed for these two plots was supplied by the University Experiment Station and planted May 18 with a John Deere seed drill at a 100 lb./acre rate. The seed drill was thoroughly cleaned between plots. Fertilizer was applied with a Barber drop spreader at 240 lb./acre rate or the equivalent of 51 pounds total N (nitrogen)--51 pounds P_2O_5 (phosphate)--24 pounds K_2O (potash) actual per acre. Seedlings in both plots were apparent 10 days after planting. Both plots were sprinkler irrigated only once, July 20 through 23, at six-hour settings to a depth of four inches. This is a total of 1.08 inches of water per setting.

Once seedlings in the Weal plot were approximately six inches high, an herbicide combination was applied to that plot for weed control--Premerge, a dinitrophenol, at 1-1/2 qts./acre and Esteron 99, a low-volatile ester of 2, 4-D at 1 pt./acre. Lambsquarters, chickweed, and mustard were the most abundant weeds. The plot of Nip oats was not sprayed.

Both the Weal and Nip plots were harvested by the 24th of October and the Weal dried in a local dryer. The Nip oat seed was dried at the PMC. Both grains were then bagged and stored for cleaning in January.

Late harvest, wet weather and fall winds account for much of the low Weal yields. Low yields in the Nip plot were caused by heavy weed competition.

Small amounts of Foundation Weal barley for seed increase purposes are available to the public through the Alaska Crop Improvement Association in Palmer.

Potato Variety Maintenance Planting

Potato breeder blocks were established this summer at the request of the University of Alaska for the maintenance of six varieties used in their potato research program. All "seed" tubers used in this planting were provided by Dr. Curtis Dearborn, USDA. Each variety was planted May 24 in a 3' x 27' block of moderately deep Niklason soil and fertilizer applied as recommended by Dr. Dearborn--5 lbs./100 linear row foot of 15-32-15. Fertilizer was applied 21 days after planting and no irrigation water applied during the growing season. All cultivation was by hand hoe.

The potato tubers, averaging 1-1/2 to 2 inches in diameter, were dug August 28 with a hand shovel, 96 days after planting, and stored in clean burlap sacks to dry. No frost damage to the tubers was found, although leaves and stems of every variety showed frost deterioration. The 'Alaska Frostless' variety demonstrated the most frost resistance.

Joseph L. Stehlik

Table 4. Total pounds and bu/acre of Weal barley and Nip oat Foundation seed produced at the PMC in 1973 including acres planted and rate of seeding.

Variety	Acres planted	Seeding rate	Clean seed produced	Yield
		lbs./acre	total lbs.	bu./acre
Weal Barley	5	100	8307	35
Nip Oats	1	100	1017	32

Table 5. Pounds and tons/acre yield of six potato varieties grown at the PMC for breeder "seed" increase in 1973.

Variety	Yield pounds	Calculated Tons/acre
Alaska Red	24.75	7.49
Alaska Frostless	33.50	10.13
Alaska 114VF	21.35	6.43
AK 37-8	36.50	11.04
AK 35 Snowchip	34.25	10.37
AK 25-1	21.00	6.35

Physical Improvements

The Plant Materials Center came into physical existence on February 23rd of this year with the State's purchase of 285 1/2 acres on the Bodenburg Loop Road some 11 miles south of Palmer. Since then, the PMC staff has been improving and modifying the one-time dairy operation into a workable plant materials unit that will serve both seed and plant producers as well as governmental agencies requesting plant material assistance.

Land

Ground on the Plant Materials Center is generally flat, sloping gradually in a south and southwesterly direction toward the Knik River and drains in that direction from three major drainage troughs crossing the property to form a 10 to 15 acre lake during the spring runoff in most years. However, the extensive flooding once caused by the spring dumping of Lake George above the Knik Glacier, hopefully, is no longer a threat.

Stumprows left from the original land clearing still cover about 20 acres of the farm, mostly in an east-west direction in the southern 120 acres. Another 10 acres of the birch-spruce woods is still standing. About 12 acres of the stumprows were repiled this fall for burning. The remaining stumprows and the standing 10 acres will be removed over a three-year period because of the cost and effort involved. The removal of these rows is necessary to allow our rolling irrigation system to move freely from one field to another and to increase our cultivated acreage. Approximately 14 acres of cottonwood in the southwest corner of the property will not be involved in the stump clearing but rather remain in its natural state to provide a testing area for shade-requiring plants.

Soils on the PMC are all silty loams and range through the Chena, Kalifonsky, Niklason, and Susitna series.

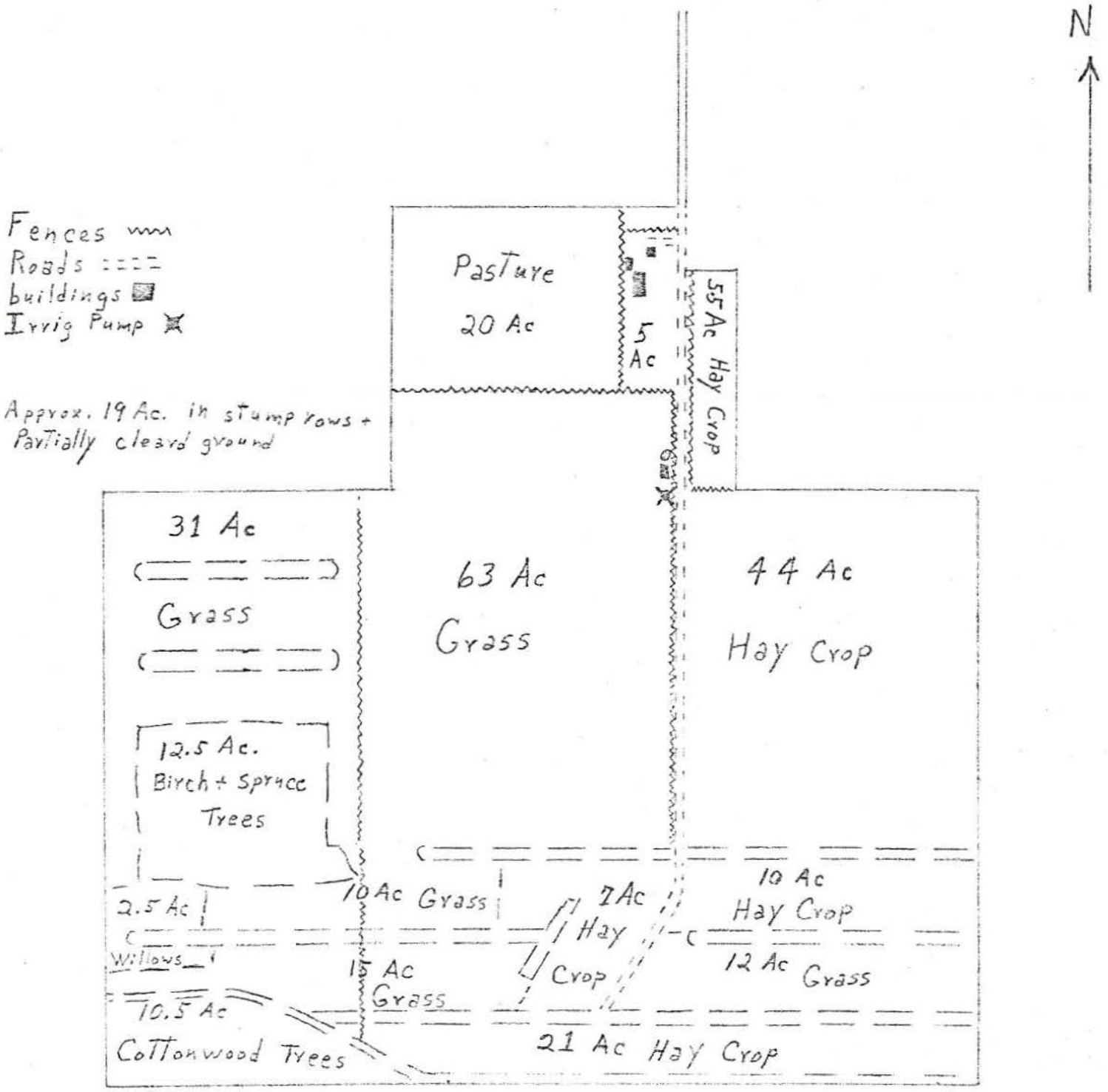
The Niklason series classified taxonomically by the latest USDA soils classification system (7th approximation supplement) as a Typic Cryofluvent, coarse-loamy over sandy or sandy skeletal, mixed, acid group is a well-drained soil, shallow to moderately deep with well-sorted layers of water-laid silt and fine sand over coarse gravel. The Niklason series soils are very strongly acid and range in depth from 15 to 27 inches. Niklason silt loam accounts for approximately 46% of PMC acreage.

The Susitna series, termed Typic Cryofluvent, coarse-loamy, mixed, acid, is also a well-drained soil series similar to the Niklason series having water-laid silt and fine sand layers from 27 to 40 inches in depth over coarse gravel and also strongly acid. A Susitna silt loam covers approximatley 38% of the PMC farm.

The Chena series, a Typic Cryorthent, sandy, skeletal, mixed soil group is an excessively drained soil with a thin layer of silty, very firm sandy material over loose gravel. This series is very strongly acid, droughty, and too shallow for deep tillage. The PMC has approximately 13% Chena silt loam.

The Kalifonsky series, the last and least of the PMC soil series, covers about 3% of the farm area with Kalifonsky silt loam. It is described as a Typic Cryaquept, coarse-silty over sandy or sandy skeletal, mixed, acid group which is a poorly drained silty soil ranging in depth from 24 to 30 inches over coarse gravel and strongly acid.

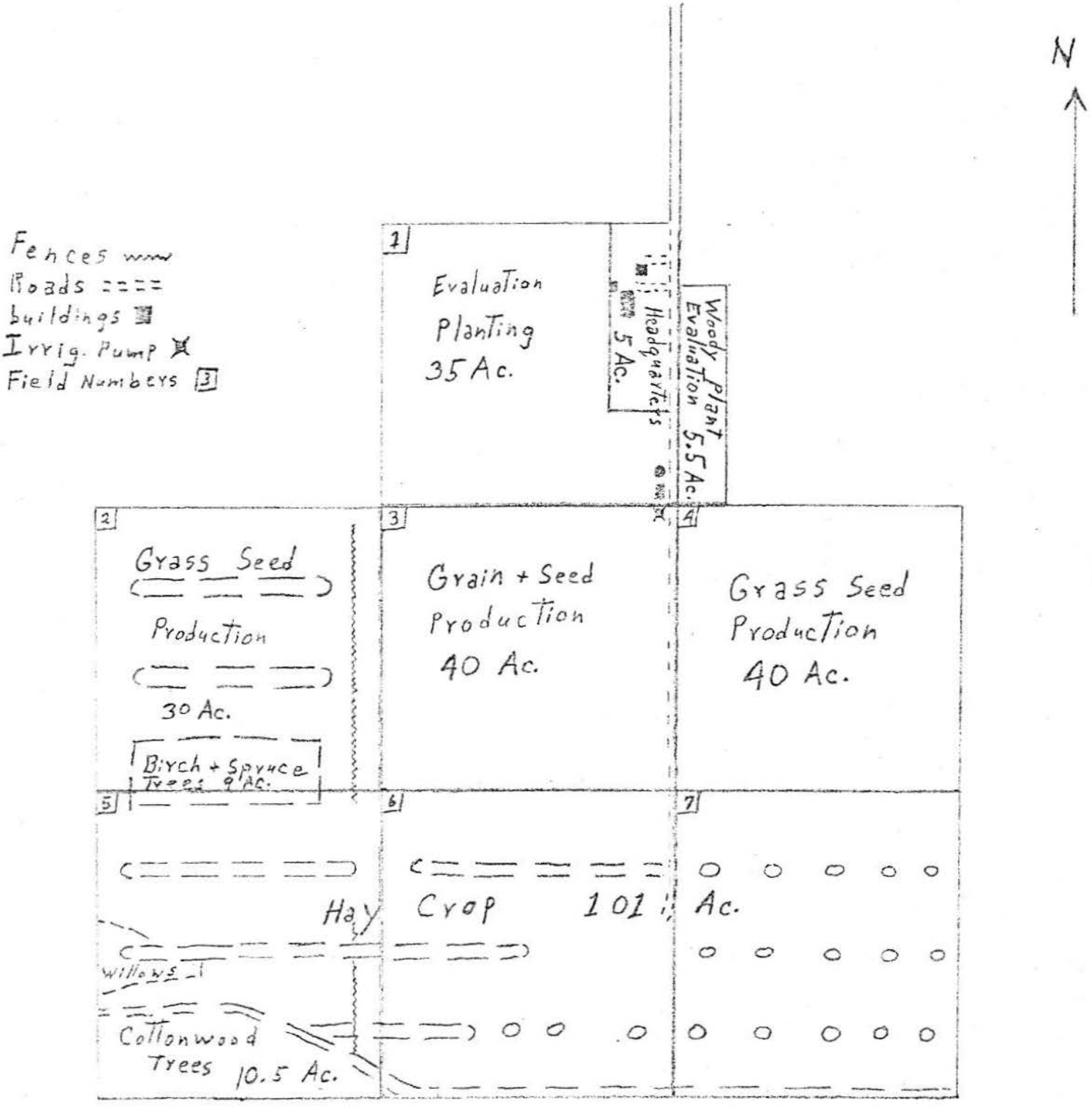
LAND USE MAP
P.M.C. DATE OF PURCHASE



R.D. Cowles

LAND USE MAP

P.M.C. DEC. 31 1973



R. D. Cowles

Buildings

Clearing the property of machinery and materials collected by previous owners, including seven quonset frames not sold with the farm and dismantling a large dryer/conveyor section left from a once active pellet mill, was the first job necessary for the conversion. Necessary, too, was the cleaning of 18 inches of animal waste from the floor of the 6400 square foot barn. Once the floor was cleaned such dairy equipment as stantions, floor mats, milktanks, and milklines were removed to make room for new equipment assembly. The crowned concrete floor of the barn, which had gutters to remove waste, was hammered out and repoured flat so that equipment could be stored under the seven foot ceiling. A tool room has been made out of an old milkroom in the barn with benches and a heating unit added.

Two 1000-gallon fuel tanks were buried north of the barn for refueling equipment with gasoline and diesel fuel. A shelter will be installed over the pumps this coming summer.

An old two-story block house has been converted into an office which will serve our needs for the next few years. Walls and ceilings were washed and painted, fluorescent lights were added both upstairs and downstairs, the kitchen and bathroom floors were repaired and covered with linoleum, the kitchen cabinets were repainted, and new cabinets were built in the bathroom to replace the bathtub. The old septic tank and drainfield for the office were replaced because of damage sustained in the '64 earthquake. Stormdoors and plastic film windows have been added to reduce heat loss and the woodburning boiler converted to oil fuel.

A simple laboratory has been created in the basement for seed germination and purity trials, and cabinets and lighting added over the countertop. Two small growing benches were built in the boiler room to germinate seed and root cuttings until the temporary greenhouse is finished. The temporary plastic greenhouse is being constructed against the outside southern wall of the office and an April 1 deadline scheduled for its completion. It will be used mostly for woody plant propagation.

The milkhouse, the third building situated on the farm, has also been cleaned out and made suitable for seed storage, but because of its design is limited in space. A new sewer system was installed for this building and will serve as the lavatory and shower for field workers. The lavatory itself will be completed in '74.

This is a brief sketch of what physical improvements have been made at the PMC since it began last February. Most of our efforts have been directed to just cleaning up the mess that was here when we took over and in converting the three buildings on the farm to fit seed and plant production needs. Credit must be given to our farming neighbors who helped keep our fields cultivated, to the Institute of Agricultural Sciences for the loan of a tractor while ours were on order, and to the Soil Conservation Service for its help in procuring surplus equipment and materials.

Joseph L. Stehlik

Equipment

The operation of a Plant Materials Center requires the use of a considerable amount of diverse and specialized equipment. The basic type of equipment is farm machinery used in the planting, culture, management, and harvesting of a wide variety of plant species. This machinery must be sufficiently versatile that it can be used for small experimental plots as well as large production fields. Also, most pieces of machinery must be so constructed that precise and repeatable operations can be accomplished. In addition, considerable shop equipment is necessary in support of the farm machinery for preventive maintenance and repairs.

A second type of equipment peculiar to a PMC is seed processing equipment. This equipment is quite specialized, and, the greater the number of seed crops grown, the more kinds of machines are required. Specialized seed conveyance equipment is also needed to move the seed from machine to machine within the cleaning plant.

Laboratory and office equipment are used in support of the primary functions of plant development, production, and seed processing. The laboratory equipment is used in quality control of seed processing, plant identification, disease and insect identification and control, weather monitoring, plant performance evaluations, and preparation and processing of experimental plant materials.

Procurement Procedures

Approximately 90% of the equipment needed to operate the PMC was purchased with FY 1973 funds. Once the staff was organized in March,

specifications for over 100 items were prepared and submitted to the Commissioner's office in Juneau by mid-May for processing. Bid waivers, waivers to exceed bid deadlines, waivers to exceed fund encumbrance deadlines and waivers to exceed delivery deadlines were granted by the Department of Administration to ensure the purchases from the $108,000 allocated in FY 1973. Equipment items exceeding $100 each and considered accountable property are listed in Table 6.

Table 6. Accountable Equipment Purchased By The PMC In FY 1973.

Item	Cost
Farm Equipment	
bench grinder	$ 109.50
blade, grading	*
canopy, truck	330.00
chain saw	189.95
combine	*
concrete mixer	1233.00
cultipacker	*
cultivator, rotary	*
cultivator, tool bar	*
disc harrow	*
dumpy level	609.00
farm trailer 10 ton	496.99
flail chopper	*
fuel tanks (2) 1000 gal. ea.	500.00
furnace, gas	303.22
grain auger 34 ft.	767.30
grain drill	*
grain dryer	*
grass seeder, Brillion	*
hay rake, side delivery	598.60
planter	*
plot thresher	4250.00
plow	*

Table 6. Accountable Equipment Purchased By The PMC In FY 1973. Continued.

rototiller	*
septic tank, 1000 gal.	350.00
shower	167.60
sickle mower 4 ft.	417.97
sickle mower 7 ft.	541.82
space heater	247.27
spike-tooth harrow	*
sprayer (2 ea.)	*
tool chest 16 drawer	349.88
tractor, AC 160	4504.40
tractor, AC 185	40,388.40*
tractor, IH 140	4190.20
water heater	104.95
subtotal	$ 60,650.05

Seed Cleaning Equipment

air-screen cleaner M2-B	$ 706.00
air-screen cleaner 29D	4800.00
bag closer	574.00
conveyor, air-lift	5295.92
conveyor, belt 19 ft.	1096.00
conveyor, vibrating	610.00
debearder	3752.00
disc separator	2400.00
gravity separator	2603.00
indent cylinder	2800.00
office tester	383.00
platform scale	288.00
scalper S549A	2100.00
vacuum cleaner	445.00
subtotal	$ 27,352.92

Table 6. Accountable Equipment Purchased By The PMC In FY 1973. Continued.

Laboratory Equipment	
balance	$ 320.00
camera, 35 mm w/acc.	495.71
germinator	228.50
grain moisture tester	125.60
grain scale	638.00
head thresher	1045.00
hygrothermograph	254.50
instrument shelter	155.00
projector, 35 mm	222.79
refrigerator-freezer	279.95
stereo microscope	524.45
subtotal	$ 4289.50
Office Equipment	
adding machine	$ 164.00
bookcases 4-shelf (2 ea.)	574.00
cabinet, filing 4-drawer (2 ea.)	211.08
calculator, electronic	504.00
desk, exec.	155.19
desk, exec.	169.25
desk, typing	183.09
table 72" x 36"	139.45
tables 60" x 30" (2 ea.)	240.80
table, drafting	194.90
typewriter, selectric	582.02
subtotal	3117.78
Grand Total	$ 95,410.25

* Unit costs for these items are not available. Their total cost is included in the $40,388.40 for the tractor, AC 185.

None of the farming or seed processing equipment was received before October 1. Farming operations and weed control work on the Center was carried out by neighboring farmers, or their loaned equipment, who received in-kind payments of hay, silage or grain for the work they performed. The primary purpose of farming activities in 1973 was control of weeds. Approximately 80% of the equipment purchased had been received by December 31. Much of the farm and seed processing equipment remained to be installed or assembled before it could be used.

James R. Stroh

Fiscal Expenditures-1973

The 1972 legislature appropriated $358,000 for initial PMC operations in FY 1973. By far, the largest portion of these funds, 90%, was expended for the purchase of land upon which the PMC would operate and for equipment peculiar to the operation.

The first personnel were assigned to the PMC in March 1973 and full staffing was completed by mid-June. Only 3% of the budget was expended for personal services this fiscal year.

Allocation and expenditure of funds for FY 1973 is presented in Table 7 by object codes. A balance of $13,604.86 (3.8%) remained unexpended at the end of the year.

James R. Stroh

Table 7. Allocation and Expenditure of Funds for FY 1973.

Object Code and Name	Allocation	Expenditure
000 Unallocated Funds		
010 Payroll Reserves		$ 1667.00
Total		$ 1667.00
100 Personal Services	$15,849.00	
111 Regular Compensation		$ 9727.39
121 Fed. Ins. Contri. Act		569.05
122 State Contri. PERS		849.96
125 Group Health Ins.		143.30
126 Work. Comp. Ins.		54.47
171 Public Liab. Ins.		50.58
Total	$ 15,849.00	$ 11,394.75
200 Travel	$ 600.00	
211 Instate Transportation		$ 21.00
Total	$ 600.00	$ 21.00
300 Contractual Services	$ 6,900.00	
310 Communication Svc.		$ 230.20
340 Repairs, Etc.		28.30
350 Transportation of Things		47.46
360 Equipment Rental		440.48
380 Professional Fees		2120.00
Total	$ 6,900.00	$ 2,866.44
400 Commodities	$ 8,000.00	
410 Clothing		$ 72.25
440 Fuel, non-vehicular		82.39
450 Materials, maint. & constr.		3656.51
460 Equip, parts & supplies		144.32
470 Prof. Sci. Supplies		81.10
480 Office Supplies, stat.		115.50
490 Other Supplies		3788.62
Total	$ 8,000.00	$ 7,940.69

Table 7. Allocation and Expenditure of Funds for FY 1973. Continued

Object Code and Name	Allocation	Expenditure
500 Equipment	$ 108,000.00	
510 Transportation Equip.		4755.00
520 Furniture & Equip.		4668.45
530 Special Equip.		87626.60
560 Shop Maint. Equip.		3532.85
590 Other Equip.		1272.36
Total	$ 108,000.00	$ 101,854.26
600 Land, Bldg, Improvmt.	$ 220,000.00	
610 Land Acquisition		220,000.00
Total	$ 220,000.00	$ 220,000.00
Grand Total	$ 359,349.00	$ 345,744.14
Balance		$ 13,604.86