

# AGRICULTURE

## DAY 3



## Kuskokwim Native Association

February 24, 1981

Representative Terry Gardiner  
House Resources Committee  
Alaska State Legislature  
Pouch V  
Juneau, Alaska 99811

Attention: Mary Hakala

Dear Representative Gardiner,

The Kuskokwim Native Association is pleased to respond to Mary Hakala's request for information about our Agriculture Program.

The Kuskokwim Native Association, which is the non-profit Native organization for the Mid-Kuskokwim River area, has operated its Agriculture Program for the past five (5) years. The program currently operates for following projects:

1. The Aniak Farm: demonstrational/experimental farm mentioned.
2. The Village Technician Project: which provides practical gardening services to the villages of the Kuskokwim Native Association Region,
3. And currently under development; a Poultry Project, which will prove the feasibility of raising chickens in this area.

The KNA Agriculture Program has been highly successful in meeting the goals that were originally established for the Program. The Aniak Farm has demonstrated, with its successful testing and experimentation of various varieties of vegetables and grains, the potential and feasibility of agricultural development in the area.

The Aniak Farm has recently moved to a new site, and 1981 will be its first planting year. Twenty-five (25) acres have been cleared, fourteen (14) of which will be planted this year with a variety of vegetables and grains. The farm also has two (2) greenhouses; one which will complete this summer (1981). Funds for the completion of the unfinished greenhouse and the construction of a storage building were requested as a component of a proposal that was sent to the KNA area Legislative Representatives and Senators, in December 1980. This proposal is attached to this letter, as Attachment A.

Construction of the storage building is also expected to be completed this summer, which will provide the Farm with storage necessary for its 81 crops. In past years, without sufficient storage space, year around Farm produce has not been available for regional residents or for other marketing outlets.

The feasibility of marketing Aniak Farm produce has not yet been explored. A marketing approach outline was completed by the U of A Agriculture Experiment Station in 1980. This outline indicated the feasibility of marketing produce in this area, based on Aniak's geographical location, and the growing potential of the area. A complete marketing analysis based on the marketing approach outline is required, before the successful marketing of Aniak produce can occur.

The development of a Marketing Analysis requires Legislative funding, and is included in KNA's Legislative funding request. (Attachment B) As a part of this Marketing Analysis, the KNA Agriculture management structure will be analyzed and restructured. This restructuring is necessary for several new projects and developments that are occurring within the program, which will shift and add responsibilities of Agriculture staff members.

The second major component of KNA's Agriculture Program is the Village Technican Program. The Program was funded in conjunction with a Poultry Project, by the 1980 State Legislature. The Poultry Project component of this appropriation has, until recently, primarily focused on research and planning. This research was necessary to provide a base for a successful Poultry Project. With the research nearing completion, construction of poultry facilities is scheduled to occur shortly after break-up. Upon completion of the facilities, poultry will be brought into the area. The Aniak Farm will be planting rapeseed to use as poultry feed.

The Village Technican Program component has been a highly successful program. The Village Technican travels to the villages, working with gardeners on preparing their soil, fertilization, vegetable and grain varieties, weeding and harvesting. In addition to this, he travels to the villages during the winter months, with a media presentation for the communities and schools. This presentation provides the gardeners with basic gardening information necessary for successful growing seasons.

There is an increasing interest in agriculturally related programs, both on the State and Regional level, and a growing awareness of the rich agricultural potential of this area. In addition to this, an increasing number of residents are participating in community and private gardens. These factors contribute to demands for more specialized guidance assistance and technical than the KNA Agriculture Program is qualified to provide.

Based on this, KNA requests funding necessary for an Extension Agent position for this area. This request is attached as Attachment C. An Extension Agent, working through KNA, would provide technical assistance needed for current and developing agricultural projects in this area. The need is for an Extension Agent in this area becoming increasingly more obvious, and the priority of this request cannot be overstated.

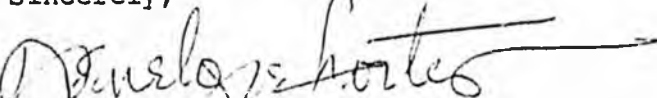
Recently the KNA Board of Directors evaluated the Agriculture Program and its various components. At that time the original goals and objectives were reviewed and the Programs present focus was discussed. In reviewing and restructuring goals, the Board recognized that prior to any new development, other than farming and poultry, certain facets required completion and/or assistance. The KNA Board then directed the KNA staff to prepare the attached proposal, -and request funding for these priority program items from the Legislature. These Agriculture projects, as previously individually discussed, include:

- \* Completion of solar greenhouse and storage facility. Included is the purchase of a farm vehicle, and the repair of the harvester. (Attachment A)
- \* Marketing/Management Analysis for the Aniak Farm/ KNA Region (Attachment B)
- \* Extension Agent position for the KNA area. (Attachment C)

We ask that the House Resources Committee review these priorities and recognize the necessity of their funding, for the continuing success of the KNA Agriculture Program.

Thank you for your consideration in this matter.

Sincerely,



Penelope Horter  
Executive Director

enclosure: 1980 Agriculture Annual Report

CC: Glenn Fredericks, Board of Director, President  
Representative Tony Vaska  
Representative Vern Hurlbert  
Senator John Sackett  
Senator George Hohman

Priority # 1 - Completion of Aniak Farm Facilities

The KNA Agriculture Program has been successful in meeting its originally outlined goals and objectives. Based on this success, KNA feels it is timely to evaluate and assess the past five years performance, so that any future expansion will occur in a well-based and organized manner.

As a part of this evaluation, several Projects were identified as unfinished and requiring completion. These Projects are primarily buildings whose construction began, but was not completed because of a lack of funds. This is the case for three (3) of the Aniak Farms' buildings, including:

I. Vegetable Storage Facility:

Materials for the construction of a Storage Facility were funded by the BIA. Building Construction was begun, but was not completed. Materials have been secured for the completion of the facility, but funds for labor are not available. The building will continue to sit unfinished until such funds are allocated.

The Vegetable Storage Facility is necessary for the storage of vegetables for marketing during fall and winter months. At the present time, without storage facilities, marketing possibilities are untapped for Farm produce. This is a loss, both economically for the Farm, and to potential consumers. Included in the construction of the Vegetable Storage Facility are materials necessary to properly equip, light, heat, cool and humidify the Storage Facility bins, electrical equipment and installation is also required.

II. Solar Greenhouse:

The Solar Greenhouse was funded by the Department of Energy, for material costs only. Labor was provided by CETA workers. Partially due to the inexperience of the CETA carpenters, and partly due to financial limitations, the building was not completed.

The Solar Greenhouse, a demonstrational project, has already, even its incomplete state, proven its effectuality. Vegetables have been grown in the Greenhouse which were not previously grown in the KNA Region.

Funds are needed to complete this Project for labor and added material costs.

III. Equipment Storage Building:

A pole storage building for housing Agricultural equipment has been funded for construction by the Legislature. At the time of that appropriation, the building was designed to house only a portion of the agriculture programs' equipment. We now feel that the building should be constructed to house all the agricultural equipment, which includes two tractors and an assortment of smaller equipment, such as tillers.

Included in this request for funding, is funding for a pick-up for the Agriculture Program. This has become an increasing need for the Program, and is particularly now so, with the new Farm site in use. Transportation to and from the farm, located two miles from Aniak, is done by tractor, which should not be used for this purpose.

Priority #1 - Completion of Aniak Farm Facilities

Page Two

In addition to the need of a vehicle on a daily-use basis, a pick-up is needed to haul vegetables, other produce and agriculture materials to and from transportation outlets.

Also included in this proposal is funding necessary for the repair of the Aniak Farm harvester, which was damaged in shipping.

COMPLETION OF ANIAK FARM FACILITIES

I.	Labor needed to complete vegetable storage facility demonstration solar greenhouse.	
	Construction Foreman 125 hours @ 18.00/hour to complete Solar Greenhouse	\$ 2,225.00
	Construction Foreman 400 hours @ 18.00/hour to complete storage facility	\$ 7,200.00
	Carpenters 250 hours @ 12.50/hour to complete Solar Greenhouse	\$ 3,125.00
	Carpenters 800 hours @ 12.50/hour to complete Storage Facility	\$ 11,200.00
	Construction Helper 800 hours @ 6.00/hour to complete Storage Facility and Greenhouse	\$ 4,800.00
	Electrician to wire Storage Facility and Solar Greenhouse	\$ 3,360.00
	Employer Payroll Taxes, Workman's Compensation Insurance @ 13% of gross wages (\$ 31,910.00)	\$ 4,148.00
		<u>\$ 36,058.00</u>
II.	Equipment and Materials for Storage Facility and demonstration Solar Greenhouse.	\$ 28,610.00
III.	Expansion to equipment storage building (building materials)	\$ 6,000.00
IV.	Pickup Truck	\$ 8,000.00
V.	Repair of Harvester (estimated material & labor)	\$ 3,000.00
	Subtotal	<u>\$ 73,668.00</u>
VI.	Indirect Administrative Expenses 36.5% of \$73,668.00	\$ 26,889.00
	Total	<u><u>\$ 108,557.00</u></u>

PROJECT PROPOSAL

PRELIMINARY

Support and Advisory Services for the Kuskokwim Native Association for  
a 12-acre Commercial Garden and a Beginning Poultry Project

Submitted by:                    Agricultural Experiment Station  
   University of Alaska  
   Fairbanks, Alaska 99701

   Cooperative Extension Service  
   University of Alaska  
   Fairbanks, Alaska 99701

   Alaska Resource Methods  
   Box 81711  
   Fairbanks, Alaska 99708

Submitted to:                    Kuskokwim Native Association  
   Aniak, Alaska

February 19, 1981

## INTRODUCTION

The following personnel and budget are proposed to begin the commercial phase of vegetable production in Aniak, Alaska and to provide advice and instructions during the beginning phase of the poultry project. The personnel suggested have expertise in vegetable production and marketing in remote, sub-arctic areas. Personnel from the Kuskokwim Native Association should acquire sufficient knowledge and expertise after working intensively with them to be able to carry on the vegetable production operation and its expansion with only occasional advisory help in future years. Additionally, the poultry project should have a viable start and a reasonable future if those interested follow recommendations and suggestions which will be forthcoming, during the visits of the animal specialist.

The team will concentrate on the efficient production, quality control, and effective marketing of produce from a 12-acre area. The break-down of crops and necessary fertilizer and herbicides are suggested below. Suggestions have not been made for the poultry project at this time. It is understood that the Kuskokwim Native Association wishes to place a small number of birds in several of the Kuskokwim Valley villages. This is considered a reasonable plan and advice and instructions will proceed accordingly.

<u>CROPS</u>	<u>ACRES</u> <sup>a</sup>	<u>FERTILIZER</u> <sup>b</sup>	<u>SEED</u>	<u>HERBICIDE</u> <sup>c</sup>
Potatoes	4.2	79 bags	10,060 lb	10 gal Premerge
Carrots	2.3	43 bags	7 lb	16 lbs Dactal
Cabbage <sup>d</sup>	.1	21 bags	6 oz	1 qt Treflan
Onions <sup>e</sup>	.8	15 bags	720 lb	6 lbs Tenoran
Turnips	.7	13 bags	5 oz	5 lbs Dactal
Rutabagas	.5	10 bags	6 oz	4 lbs Dactal
Broccoli <sup>f</sup>	1.4	27 bags	6 oz	1.5 qt Treflan
Cauliflower <sup>d</sup>	1.0	19 bags	4 oz	1 qt Treflan
Tomatoes <sup>d</sup>	147	11 lb 10-52-17 <sup>f</sup>	441 seeds	-
	plants	3 lb 0-48-0		
		1/4 lb MgSO <sub>4</sub>		

<sup>a</sup>The acreages are in fractions. This can be adjusted in the spring to obtain roughly the same ratios among crops. It does not have to be this exact.

<sup>b</sup>Specify potassium as sulphate of potash. All fertilizer is 10-20-20 applied at 1500 lbs of nitrogen per acre. Bags weigh 80 lb.

<sup>c</sup>Herbicide may not be required the first year on new lands but most likely will be in the future. Diazonon for cutworms, aphids, and root maggot control may also be needed. 9 gal should be sufficient for all crops.

<sup>d</sup>Grown from transplants.

<sup>e</sup>Grown from sets.

<sup>f</sup>Soluble, greenhouse type.

Horticultural crops are not good new-land crops. Soils will be cool, organic matter low, and ground conditions most likely rough. Because the 12 acres will be on new lands, fertilizer recommendations have been increased to 1500 pounds of nitrogen per acre for all crops. The ground must be as free as possible of sticks. The rotovator is a very good method of preparing the seed bed, but it cannot be used if a large number of sticks and debris are present. The ground should be worked as early as possible in the spring. A chisel or cultivator would be best. If there are too many sticks, a heavy disk may be appropriate.

In addition to the 12-acre horticultural crop area, a green manure crop should be planted on an additional number of acres. This ground will be used to plant potatoes the following year. For example, if 8 acres of potatoes are planned for 1982, 8 acres of a green manure crop such as spring rye, oats, common buckwheat or annual rye grass should be planted.

The new lands, if worked properly, will be an appropriate area on which to plant the 1 acre of barley and 1 acre of rapeseed suggested for the 1981 season. Rapeseed is marginal on new lands, but with proper cultivation, fertilization and weed control can be grown with a reasonable yield. The recommended fertilizer, seed and herbicides are shown below.

<u>CROPS</u>	<u>ACRES</u>	<u>FERTILIZER</u>	<u>SEED</u>	<u>HERBICIDE<sup>a</sup></u>
Barley	1	4 bags of 20-10-10 <sup>b</sup>	72 lb	1 qt 2-4,D
Rapeseed	1	6 bags of 20-10-10	6 lb	1 qt Treflan
Oats	8	9 bags of 20-1-10	170 lb	2 at 2-4,D

<sup>a</sup>Herbicides may not be needed the first year on new lands.

<sup>b</sup> Specify potassium as sulphate of potash. Bags weigh 80 lb.

It may be desirable to continue the variety testing work. However, variety trials should not be a part of the 12-acre commercial area. Due to the fact that soils will be cool, the two best producing early varieties of each crop should be selected and used for the commercial crops. In later years, later maturing varieties can be used.

The crop mix suggested and the marketing plan are predicated on the availability of storage facilities. A facility (preferably two facilities) which will hold 80-100 tons of produce will be needed. If a smaller storage facility, or none at all, is available, the crop mix will be adjusted to accommodate the harvest season market demand only.

The land use plan suggested for the cleared 25 acres is as follows:

- 12 acres - Commercial garden area
- 1 acre - Barley
- 1 acre - Rapeseed
- 8 acres - Green manure (oats,)
- 3 acres - Work and clean the ground without planting any crop

The 3 acres remaining would be a good area in which to plant test plots in 1982. Be working the soil and doing a good job of removing sticks, the area should be in reasonable condition by that year.

## PROPOSED PERSONNEL

### Horticultural and Production Advisor

The Agricultural Experiment Station of the University of Alaska will provide advisory services concerning horticultural crop growth and production methods and costs.

Dr. Donald Dinkel, Professor of Plant Physiology, has extensive research and applied experience in horticultural crop production and will be available for advice. He will be making three trips to Aniak during planting, mid-season, and at harvest. He plans to spend a total of 2 weeks in the Aniak area and can also help in other villages along the Kuskokwim River.

Dr. Carol Lewis, Associate Professor of Resource Management, has worked with the Kuskokwim Native Association in the past and has continued to follow the progress of the Aniak Garden Project. She will be able to aid in production techniques to improve the efficiency of the garden operation. She also can help to set up a bookkeeping method to record the costs and returns from produce sold. Dr. Lewis will plan to make three trips to Aniak in conjunction with those made by Dr. Dinkel for a total of 2 weeks time.

### Small Animal Advisor

The Cooperative Extension Service of the University of Alaska has agreed to supply support services for the small animal program. Dr. Ken Krieg, who is an animal specialist stationed in Fairbanks, would be involved in the poultry program in the Kuskokwim Valley. He would be able to assist in Aniak as well as other River villages. Three trips would be made. The first would occur when the chicks arrive, the other two as the chicks begin to mature. He could plan to spend possibly a week in the Kuskokwim each trip. Dr. Krieg can supply information on rations, general care, and housing.

### Horticultural Support

In addition to Dr. Donald Dinkel's technical advice, it will be advisable to have a part-time, on-site person to help with crop production during the first growing season if a grower manager has not been hired or if it is desirable to have someone to work with the new grower manager. The person hired would be experienced in commercial

horticultural crop production and in working with persons with relatively little experience in producing these crops. It is planned that the person would make three trips to Aniak for a period of 2 to 2½ weeks each. These would occur during field preparation and planting, approximately mid-season to estimate crop yields, and during the harvest period.

#### Marketing Support

Mr. John S. Lewis of Alaska Resource Methods in Fairbanks developed the marketing and pricing approach in 1979 for a truck farm in Aniak. It is now necessary to implement that plan. Modifications will be made to accommodate the desire of the Kuskokwim Native Association to wholesale the produce in Aniak and utilize the remainder ~~to~~ market ~~fresh~~ at retail prices to River villages or to Bethel. Mr. Lewis will help set up the wholesale market outlets in Aniak during an early spring visit. After yields have been estimated, he will return to Aniak to aid in determining and negotiating the amounts of produce which will be delivered each delivery period and help with obtaining commitments from persons outside Aniak to purchase produce at retail prices. Mr. Lewis will make two more trips. The first will be when the marketing begins. He will help with packaging, scheduling, arranging transportation, assessing quality and delivery to stores and retail buyers. A fourth trip will follow up the marketing efforts. At that time, the system employed will be evaluated in terms of effectiveness and applicability to the Aniak and Kuskokwim area. This will require 3 months of his time.

BUDGET

Agricultural Experiment Station

Salaries:

Dinkel (2 weeks)	\$2,502.40	
Leave allowance @ 16%	400.38	
Benefits @ 18.3%	<u>531.21</u>	\$ 3,433.99
Lewis (2 weeks)	\$1,854.40	
Leave allowance @ 16%	393.56	
Benefits @ 18.3%	<u>296.20</u>	\$ 2,544.16
Overhead @ 38.8%		<u>1,960.71</u>
Total		\$ 7,938.86

Travel and Per Diem:

Airfare: Dinkel 3 trips @ \$282	\$ 846.00
Lewis 3 trips @ \$282	846.00
Per Diem: Dinkel 10 days @ \$50/day	500.00
Lewis 10 days @ \$50/day	500.00
Charter: Dinkel 5 hours @ \$100/hr	500.00
Lewis 2 hours @ \$100/hr	<u>200.00</u>
Total	\$ 3,392.00

Total Agricultural Experiment Station \$11,330.86

Cooperative Extension Service

Travel and Per Diem:

Airfare: Krieg 3 trips @ \$282	\$ 846.00
Per Diem: 15 days @ \$50/day	750.00
Charter: 10 hours @ \$100/hr	<u>1,000.00</u>
Total Cooperative Extension Service	\$ 2,596.00

Horticultural Support Services

Fees:

\$4,500 per month including 12.5% overhead  
2 month period \$ 9,000.00

Travel and Per Diem:

Airfare: 3 trips @ \$282	\$ 846.00
Per Diem: 80 days @ \$50/day	<u>4,000.00</u>
Total	\$ 4,846.00
Total Horticultural Support Services	\$13,846.00

Marketing Support Services

Fees:

Alaska Resource Methods @ \$6,000 per month  
including 15% overhead  
3 month period \$18,000.00

Travel and Per Diem:

Airfare:	4 trips @ \$282 (Aniak,	\$ 1,128.00
	4 trips @ \$76 (Bethel)	304.00
Per Diem:	40 days @ \$50/day (Aniak)	2,000.00
	10 days @ \$67/day (Bethel)	670.00
Charter:	20 hours @ \$100/hr	<u>2,000.00</u>
Total		\$ 6,102.00
Total Marketing Support Services		\$24,102.00

TOTAL PROJECT COSTS \$51,874.86

PROPOSAL TO THE STATE LEGISLATURE  
FOR AN EXTENSION AGENT FOR THE KNA REGION  
SUBMITTED BY THE KUSKOKWIM NATIVE ASSOCIATION

We understand that it has become a high priority of the State Legislature to develop the Agricultural potential of the State of Alaska. It has also become a high priority of the Mid-Kuskokwim River area, to develop the Agricultural potentials and regional food production of our area. The Mid-Kuskokwim River area is indeed rich in Agricultural possibilities, and the resources necessary for their development. KNA's experimental/demonstrational Farm, located in Aniak, has provided factual concurrence with what regional residents have been proving in their own gardens for years.

The Kuskokwim Native Association Agriculture Program currently operates the following projects:

- \* The Aniak Farm: the demonstrational/experimental farm mentioned,
- \* A Village Technician Project: which provides practical gardening services to the villages of the KNA Region,
- \* And currently under development: a Poultry Project, which will prove the feasibility of raising chickens in this area.

These Projects, while soundly based and progressing smoothly, all require varying amounts of technical agricultural/agronomical expertise, which KNA cannot provide. Too, the escalating cost of food and the ever-increasing costs of air freighting food into the area, is turning more and more regional residents to the growing of their own food. This of course, increases the requests for technical information, which again, we are not able to provide.

When technical expertise was needed in the past, but not available, the KNA Agriculture Program staff had no choice but to attempt to apply their own staff knowledge to the areas requiring expertise. While the KNA Agriculture Program strives to provide guidance and necessary information to regional residents that arise, these requests are of such a nature to require someone with an extensive agricultural educational background.

This proposal is a request for funding for an Extension Agent to be placed in the KNA Region. This agent could provide technical services to the residents of the KNA Region, working through KNA, and using it as a regionally based vehicle for meeting agriculturally related needs of the area.

At one time, an Extension Agent was located in Aniak, servicing the villages of the KNA Region. Since that time, when funding for an Extension Agent was cut off, the area has relied on the Extension Agent operating out of Bethel. However, the distance of the location of the Extension Agent from our area, and the large geographical area she is expected to serve, creates problems in providing adequate service for the Mid-Kuskokwim River area. Furthermore, her particular area of expertise, homemaking, while an obvious need, is not the expertise our area most demands.

The Extension Agent placed in the KNA Region, would be responsible for working closely with the KNA Agriculture Program, and providing technical expertise and assistance to individuals in Aniak, and the ten (10) other villages of the KNA Region.

The technical agriculture assistance requested by regional residents, could be adequately addressed by the placing of an Extension Agent in the KNA area. A person educated and experienced in the agricultural field is required to work throughout the area, with all the various Agricultural programs and new developments. We request your consideration in the appropriation of funds for an Extension Agent in the Mid-Kuskokwim River area. We appreciate your consideration in this request for funding necessary for this vitally important program.

PROPOSAL TO THE STATE LEGISLATURE  
FOR AN EXTENSION AGENT FOR THE KNA REGION  
SUBMITTED BY THE KUSKOKWIM NATIVE ASSOCIATION

BUDGET FOR AN EXTENSION AGENT FOR THE KNA REGION:

<u>Staff Costs:</u> 1 Extension Agent beginning Assistant Professor which assumes a Masters Degree and three or more years professional experience. Fringe benefits include.	\$46,717
<u>Secretarial Support:</u> 1/2 to 2/3 time	15,182
<u>Travel:</u> Village travel/ 3 trips to Anchorage/ one to Fairbanks	4,200
<u>Equipment:</u> Initial year start-up, then major investment time - includes projector and audio capabilities	4,000
<u>Supplies:</u>	1,000
<u>Services:</u> Contractual/Agricultural Specialist	2,500
	<hr/>
SUBTOTAL:	\$73,599
KNA Indirect 36.5% of \$67,099.00 *	= 24,491
TOTAL BUDGET	<hr/> <hr/>
	\$98,090.00

\*The Indirect rate is not applicable in Equipment and Services.

ANA AGRICULTURE LEGISLATIVE PROPOSAL 1981

BUDGET SUMMARY

Attachment A - Completion of Aniak Farm Facilities	\$ 108,557.00
Attachment B - Marketing Analysis	51,375.00
Attachment C - Extension Agent	98,090.00
	<hr/>
Total Funding Required of the 1981 Legislature	\$ 258,522.00

\$61,000 total appropriation

25% (\$15,250) was paid in October

Requests for payment are  
expected in March

Called for completion date is 6/30/81

MARY HAKALA

Proposal

Community Gardening project in Ambler.

Submitted by

Mauneluk Association

Box 256

Kotzebue, Alaska 99752

To

Department of Community and Regional Affairs

Pouch B

Juneau, Alaska 99811

July 30, 1980

## AMBLER AGRICULTURE PROJECT

This proposal is in response to a solicitation to bid that appeared in the Bering Straits newspaper July 25, 1980.

Mauneluk Association proposes to plan and deliver services, equipment, buildings and supplies to the village of Ambler for gardening on a self-sufficient basis.

### BACKGROUND

In recent years there has been a resurgence of gardening in the village of Ambler. This has been due in part to the high prices of imported vegetables and the efforts of Kobuk Valley Educational services in cooperation with the Marston Foundation. There are a number of family gardens, ranging in size from one hundred (100 sq. ft.) to several hundred square feet. Three (3) miles outside of Ambler a multi-acre gardening site is being developed. Small quantities of cold crop vegetables (i.e. cabbage, potatoes, carrots, turnips) are now being grown locally. The amount grown is constrained by the size of the gardens and the amount of storage space available. Through this appropriation the size of the gardens will be increased. Currently under construction is a community storage facility scheduled to be completed this Fall.

### NEED

On June 13th a public meeting was held in Ambler to discuss the future development of gardening and possible uses of the appropriation. At this meeting a list was developed outlining the communities needs:

1. Tilling equipment, bigger than roto-tillers but smaller than bulldozers.
2. Equipment storage facilities
3. Fertilizer (organic and commercial)
4. Greenhouses
5. Expansion of "family" and "truck" gardening.

Due to the unavailability of prices on equipment, supplies and facilities, the exact type of equipment and supplies were not detailed out.

### PROGRAM NARRATIVE

This program has been divided into two (2) phases. The first phase of the plan will be to develop a cost breakdown for the five (5) items listed in the needs assessment and to assist in the development of a community agriculture development plan. These items will be presented at a community meeting in the Fall for their consideration.

The second phase will involve the purchase of the specific equipment and supplies that the community has chosen, delivery to the village, and training in the use of the equipment.

BUDGET

Equipment	\$23,000
tilling tractors	
accessory implements	
pumps and supplies	
Equipment Shelter	10,000
Fertilizer	6,000
commercial	
equipment to produce organic	
Greenhouses	12,000
design, materials labor	
Planning, Administration and training	<u>10,000</u>
TOTAL	61,000



Summary of  
Village Gardening Project

Villages Involved: English Bay, Port Graham and Tatitlek

Project Goal: Increased self-sufficiency in providing food for villages, and improved nutrition.

Project Objectives:

Provide workshops on

- a) choosing and fertilizing land.
- b) planting, cultivation and harvest of vegetables.
- c) greenhouses.
- d) nutritional and safe preservation of home-grown and wild plants and berries.

Budget Summary

Quarter-time Project Coordinator	\$ 5,688
Travel for Project Coordinator	5,615
Travel for Extension Service Staff	3,365
Miscellaneous Office Expenses	1,364
Indirect	<u>3,968</u>
Proposed Budget	<u>\$ 20,000</u>

Agency Requesting Funding: The North Pacific Rim.

CHUGACH REGION  
VILLAGE GARDENING PROJECT PROPOSAL

The North Pacific Rim is the non-profit human services Native Corporation for the Chugach Region, serving seven coastal communities. It is governed by a Board of Directors composed of one representative from each community in the Region. Three of these communities are villages interested in starting gardening in the villages. English Bay, Port Graham and Tatitlek are all villages which depend substantially on local fish, game and vegetation for their food. They have asked The North Pacific Rim to obtain funds for and aid them in developing a village gardening project. The increasing costs of food and fuel, and a growing interest in better nutrition are prompting villagers to seek ways to become self-sufficient in providing healthy foods for their families..

Project Objectives

The overriding and long range goal of the project is to increase the self-sufficiency of villagers insofar as providing food for themselves and their families. In order to realize this goal, the aim of the project is to provide villagers of all ages with the necessary knowledge of village gardening methods and means.

The project has four immediate objectives designed to achieve this goal:

1. To teach villagers how to choose and fertilize land.
2. To teach villagers how to plant, cultivate and harvest vegetables.
3. To provide information on additional ways of enhancing the growing season, including greenhouses.
4. To teach villagers how to preserve home grown vegetables and gathered plants and berries for winter use.

Project Description

In order to realize these objectives, we have designed a project that combines education, supervision, jobs and experience, centering on vegetable gardens in each village.

Our proposal includes travel funds for Cooperative Extension Service people to give on-the-spot training in planting, cultivation, harvesting, and preserving.

It also provides a salary for one 1/4 time Project Coordinator to oversee the project. Working with both the villages and the Extension Service, the Project Coordinator will expedite workshops and other activities. This person will also explore other educational possibilities, such as starting a 4-H program. Funding for the Coordinator's travel to the villages and to two of the Alaska Rural Development Council meetings is included in the budget.

#### Number of People Participating

Of thirty households in English Bay, over half have one or more members interested in the workshops, with a similar number of families in Port Graham expected to be involved. In Tatitlek, a village consisting of seventeen households, we anticipate the involvement of at least one member of eight to ten households.

#### Area Description

##### Location and Economy

All three villages are coastal communities with the ocean on one side and mountains on the other. Access is only by air or boat, weather permitting.

Port Graham and English Bay are on the Kenai Peninsula, south of Kachemak Bay in Cook Inlet. A recent Kenai Borough Census reports that English Bay has a population of 127 and Port Graham has a population of 250. They are both governed by traditional councils. During the summer, a number of people from the villages are involved in commercial fishing. Port Graham also has a cannery which provides some local employment. Both villages have a grocery store. English Bay's store opened in March 1980. These stores employ one person throughout the year. In addition to these jobs, there are also part-time Community Health Aides and Health Outreach Workers, and a few maintenance positions. The majority of people in the villages are unemployed during the winter months.

Tatitlek. The village of Tatitlek has a population of approximately 80 people. The village is governed by an IRA Council. Tatitlek lies between Cordova and Valdez on the Prince William Sound. The village does not have a store. Groceries must be ordered out of Cordova and airfreighted in, or else brought in on the mail boat which runs once every two weeks during the winter months.

Until Fall of 1980, the villagers were relying on private generators for power. These were run only in the evenings, precluding use of freezers for winter food storage. However, two new generators were recently installed and now provide continuous power to the village.

#### Income .

According to a 1980 survey done by The North Pacific Rim, 35% of the households in Port Graham have members unemployed. In English Bay, the rate is even higher at 46%. Better than 60% of the households in all three villages reported incomes of \$15,000 or less. In English Bay and Port Graham, more than 50% had incomes of \$10,000 or less. Currently, electricity, fuel oil, and supplemental groceries constitute the major cash expenditures for most households. Cash is an important factor in the village economies, but by no means the sole, or even predominant element.

#### Soil

A Cooperative Extension Agent based in Homer has done soil tests in the English Bay area. The tests reveal the soil to be silty loam, high in acidity and organic matter. Some fertilizers have already been tested in a garden in English Bay in past years, and the Cooperative Extension person reports that fertility problems seem correctable with lime and fertilizer. Like most coastal areas, the villages receive a lot of rainfall. Most of the land that would be used for growing is not level, varying from a 5% to 10% slope, with sufficient drainage. Although the growing season is short, measures can be taken to prolong it.

The Soil Conservation Service has done extensive soil testing in the Port Graham area. The soils around the village are very similar to English Bay soils, although the slope runs from 8% to 15%. It is predominantly Sarkar

with a strongly acid topsoil, volcanic ash and bedrock at 5" to 20". A large peat deposit is available in the area for those plots requiring increased organic content. The Soil Conservation Service was optimistic about gardening possibilities in the village.

#### Agency Involvement

The North Pacific Rim will be administering the program. The Human Resource Development Department within the Rim plans to coordinate its summer CETA employment with the gardening education. This would involve village youth who then might be local coordinators. In addition to the Cooperative Extension Service conducting workshops on various facets of gardening, food preparation and preservation, TNPR Health Department will be coordinating the nutrition dimension of the project. As part of the Health Department's four-year plan, in 1981 and 1982 they will be implementing a nutrition education and training program, including nutrition awareness for homemakers, school age children and for expectant mothers.

We plan on drawing upon the University of Alaska Agriculture people for training, research and direction, as well.

The Cooperative Extension Service, beyond the on-site training, has already been and will continue to be a major resource and information center. They will provide the staff to conduct workshops, and this proposal will supply the travel funds for the agents. Both Extension Service offices and people in Homer and in Fairbanks have been very interested in our project.

#### Local Interest

Local interest is the primary reason for seeking funding and initiating a gardening project. TNPR has not previously been involved in village agriculture, and has developed this proposal at the request of the communities.

#### Completion Date

Because funding is not anticipated until late in the summer of 1981, the project is focused on the summer of 1982. We expect to wrap up all the canning and preservation by November 1982.

### Public and Community Benefits

The benefits we perceive resulting from this project are:

1. General education on gardening methods.
2. A greater awareness of land use possibilities.
3. A large step away from dependence on shipped-in groceries and towards increased self-sufficiency.
4. On-the-job training and exposure to possible vocational fields for youth.
5. Increased use of renewable resources.
6. Improved nutrition.

While one or two family gardens have been attempted in the past in Port Graham and English Bay with limited success, gardening has not been undertaken in Tatitlek for several decades. Essentially, this is a research and pilot gardening program. This particular program should provide sufficient education and training, with staff support for implementation in order for the villages to continue village gardening on their own with minimal assistance in the future.

VILLAGE GARDENING PROJECT

PROPOSED BUDGET

Salaries and Wages: Project Coordinator

1/4 time, 12 months: \$1,567 x 12 x .25 \$ 4, 701

Fringe Benefits @ 21% 987

Staff Travel & Per Diem

Travel:

six 4 day trips, Anchorage to English Bay \$ 960  
and Port Graham @ \$160 each

six 3 day trips, Anchorage to Tatitlek 1,710  
@ \$285 each

three 1 day trips, Anchorage to Homer 270  
@ \$90 each

one trip Anchorage to Juneau @ \$280 280

one trip, Anchorage to Fairbanks @ \$175 175

Per Diem:

42 days in villages @ \$35/day 1,470

5 days in Fairbanks @ \$67/day 335

5 days in Juneau @ \$83/day 415

\$ 5,615

Miscellaneous Expenses:

Research Materials, Subscriptions \$ 350

Telephone 350

Office Supplies 264

Copying 300

Postage 100

1,364

\$12,667

Extension Service Travel & Per Diem

Travel:

Four 3 day trips, Homer to English Bay and Port Graham @ \$70 each	\$ 280	
Four 3 day trips, Anchorage to Tatitlek @ \$285 each	1,140	
One 5 day trip, Fairbanks to English Bay and Port Graham @ \$335	335	
One 4 day trip, Fairbanks to Tatitlek \$455	455	

Per Diem:

33 days in villages @ \$35/day	<u>1,155</u>	
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\$3,365

TOTAL DIRECT COST

\$16,032

Indirect:

\$12,667 @ 30%	\$3,800
\$3,365 @ 5%	<u>168</u>

TOTAL INDIRECT COSTS

3,968

PROPOSED BUDGET

\$ 20,000

RESOLUTION 81-4

Port Graham Village Council

WHEREAS, the Village of Port Graham is a non-road connected community accessible only by air and water in good weather, and

WHEREAS, the Village of Port Graham desires to improve the overall nutrition and diet of the community, and

WHEREAS, local gardening would accomplish this purpose, and

WHEREAS, education in the areas of fertilization, cultivation and preservation is needed in order to effectively undertake gardening in the Village of Port Graham,

THEREFORE BE IT RESOLVED THAT

the legislature appropriate the necessary funds for the Chugach Region Village Gardening Project.

Dated this 12 day of Feb., 1981.

Mr. Ue. R. Megawick SR

Mr. Simon J. Sander

RESOLUTION 81- 1

English Bay Village Council

WHEREAS, the Village of English Bay is a non-road connected community accessible only by air and water in good weather, and

WHEREAS, the Village of English Bay desires to improve the overall nutrition and diet of the community, and

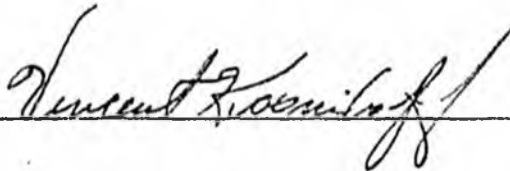
WHEREAS, local gardening would accomplish this purpose, and

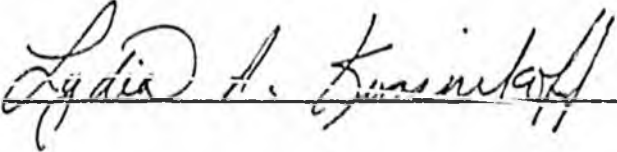
WHEREAS, education in the areas of fertilization, cultivation and preservation is needed in order to effectively undertake gardening in the Village of English Bay,

THEREFORE BE IT RESOLVED THAT

the legislature appropriate the necessary funds for the Chugach Region Village Gardening Project.

Dated this 3 day of Feb, 1981.

  
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THE NORTH PACIFIC RIM  
RESOLUTION 81- 2

- WHEREAS, the Chugach Region has three villages which are non-road connected communities accessible only by air and water in good weather, and
- WHEREAS, the villages of English Bay, Port Graham and Tatitlek desire to improve the overall nutrition and diet of the communities, and
- WHEREAS, local gardening would accomplish this purpose, and
- WHEREAS, education in the areas of fertilization, cultivation and preservation is needed in order to effectively undertake gardening in the villages of English Bay, Port Graham and Tatitlek, and
- WHEREAS, the North Pacific Rim is the non-profit corporation serving the Chugach Region, and
- WHEREAS, the North Pacific Rim Board of Directors consists of one representative of each Chugach Region community and directs the activities of the North Pacific Rim, and the villages herein mentioned have requested and are supportive of the Gardening Project,

THEREFORE BE IT RESOLVED THAT  
the Alaska legislature appropriate to the North Pacific Rim  
\$20,000 for the Chugach Region Village Gardening Project.

Dated this 19 day of February, 1981.

Carol Beant

Jail E. Daurig

ROYUKON

MEMORANDUM:

DEVELOPMENT

CORPORATION, INC.



TO: Rep. Jerry Gardner  
FROM: John Quirk, Executive Director  
SUBJECT: Agriculture

DATE: 2/12/81

Agriculture in the region during 1980 was divided into the following areas:

1. Education
2. Gardening and food preservation
3. Grains, grasses and red meat
4. Equipment--operation and maintenance

The first report will be a recap of the educational activities only. The follow on reports will cover the other subjects.

Classes were conducted in twenty villages in all or part of the following villages:

1. Bedding Plant Production (all villages) 37 credit 222non-credit  
(number of students)
2. Basic Gardening (all villages)     credit 13non-credit
3. Fundamentals of Machinery Services and Operation (all villages)  
2 credit 42 non-credit
4. Food Preservation (all villages) 70 non-credit
5. Small grain and potato Harvest (one village) 13 non-credit
6. Welding (ten villages sent students) 56 credit
7. Forestry 10 non-credit 20 credit
8. Data Collection (six villages)

The bedding plant, gardening, and food preservation class population consisted of local grade and high school teachers, students, and villagers. There were three main objectives:

1. Introduce bedding plant, gardening, and food preservation to rural school educators.
2. Teach local villagers the basic elements of bedding plant production.
3. Introduce new varieties of vegetables to rural Native Alaskans to supplement their diet. Some of the new varieties were--kale, spinach, brussel sprouts, broccoli, cauliflower, swiss chard, mustard greens, kohlrabi, celery, squash, flowers etc.

People in each village have received initial training in machinery operation and maintenance. This needs to be a continuing process to insure proper utilization and maintenance of the equipment for two more years in most of the villages. All the villages used most of their equipment. This year should see all the equipment in use.

Welding classes were held in Galena, Kaltag, and Nulato. Proper accommodations are available in Galena. Students came from ten villages to the class. The classes in Kaltag and Nulato was for local residents. Ten people from each village were taught or upgraded their welding skills. Many of the local residents became certified welders.

Small grain and potato harvest was conducted in Galena only. Grain and potato's were grown of sufficient quantity to warrant a class.

The data collection class produced a comprehensive survey of the twenty villages that has been distributed to all the villages and many government agencies.

An intensive training program in gardening used the workshop approach and did result in successes that was evidenced by the produce displayed at the Galena and McGrath Fairs. Village people have been requesting more intensified training for the coming years. Interest continues to grow in agriculture as evidenced by a recent survey.<sup>1</sup> Teachers and other interested villagers were encouraged to take credit courses and start small programs in the local schools. (Thirty-seven?) students did take the bedding plant course. Instructional monies was not available for a credit course in Gardening so the workshop emphasis was on non-credit participation. The developmental approach portrayed in the Department of Labor grant for training in Subsistence Agriculture was utilized and the objectives completed.<sup>2</sup> In fact, some of the objectives in the second year of training was initiated.

The second year of the plan will be started in the Spring of 1981 under a State Grant. The budget was reduced by 50%. This will reduce or retard the completion of the objectives. Steps are being initiated at this level to start a cooperative effort with other State agencies to help in the completion of the second year objectives.

Training in vocational agriculture in rural Alaska has started in the Interior of Alaska in twenty villages. Teachers, students, and villagers were involved in credit and non credit work to start training Rural Native Alaskans to Train themselves. Your advice, help, and participation is requested.

<sup>1</sup>Koyukon Development Corporation Survey Results 1980, Koyukon Development Corporation, page 4

<sup>2</sup>Basic Subsistence Agriculture for Native Alaskans Grant, Koyukon Development Corporation, August 17, 1979, page 5

# DEVELOPMENT CORPORATION, INC.

TO:

FROM: John Quirk, Executive Director

SUBJECT: Agriculture Report # 2, 1980

DATE: 2/18/81

GALENA CENTER  
BOX 72  
GALENA, ALASKA 99741



Gardens were grown in all twenty villages. Training in bedding plant production and basic gardening was conducted once in each village. Resources of KTC were not available for additional workshops. Follow up was conducted during the course in machinery assembly and operation.

The cleared area for gardens in most villages is small. Some villages have a drainage problems, perma frost, and cold soils. Experiments have been conducted in Galena in:

1. Potato
2. Hot house
3. Heated soil
4. Cold frame
5. Raised beds
6. Seep irrigation
7. Wide beds

Intensified gardening in potato's, cabbage, and broccoli was tried. This is the second year on potato's. The potato eyes were planted  $\frac{1}{2}$  inch apart or closer over fertilized soil. A six inch deep trench was dug. Cow manure and commercial fertilizer was put in the trench. Four inches of dirt was put over the fertilizer. The eyes were planted and covered with 2 inches of dirt. During the growing season four light side dressings of potash 4-6 inches out was placed by the sides of the plants. Potato's were watered daily after bloom. The harvest yielded 50# on a 15 foot row. This equals to 38 bushel's per acre. This is the second year that potato's have responded with a very good yield.

In another demonstration plot four hills of potato's were planted the last week in April - as soon as the ground could be spaded. Medium size tubers were available on the 4th of July for dinner. If the seed is available, it is advisable to plant early potato's.

Three acres of potato's was planted on new ground using the potato planter. The yield was approximately  $3\frac{1}{2}$  ton per acre.

The broccoli and cabbage was planted 12 inches apart. The heads were smaller but the yields in quantity was  $2\frac{1}{2}$  times as much on similar plants 2 feet apart.

Raised beds were constructed over perma frost soil. A mixture of peat and silt soil was placed in beds 12 inches thick over the tundra. Broccoli, cauliflower, lettuce, beets, spinach, onions, and there vegetables were planted.

The over all yields were very good. On one of the raised beds a portable visqueen cold frame was made for an early start for lettuce, radish, onion, and spinach. Edible portions were harvested the last week in May. Lettuce and spinach was harvested untill the September frost. Raised beds can make gardening meaningful on a limited scale in former non productive areas. The limit is the amount of peat and silt soil you can haul. Cold frames can greatly extend the growing season.

The soil was heated with 1½ mil visqueen over wide beds during germination for peas, beans, and carrots. After the seeds sprouted the visqueen was taken off. On wide beds where the visqueen was left on, most of the plants died. The wide beds had been fertilized before planting. There appears to be too much concentration of toxic gases in the wide beds left under visqueen. It is our opinion that not much is gained by using visqueen over wide beds.

Seep irrigation was used by Royce Purington in Nulato. This is his second year to use seep irrigation on part of his garden. Again the Vegetables with seep irrigation were handier and had a vastly increased yield over the rest of the garden. The initial expense is buying the seep hose. With proper care it will last for years.

Commercial hot caps were used on tomato's, squash, broccoli, and cauliflower. The transplants can go out a couple of weeks earlier and survive. This increases the yield over those plants set out later. This year gallon plastic jugs with the bottom cut out and home made hot caps using old visqueen will be used instead of commercial hotcaps. When tomato plants become too tall for the hot caps, a one season hot house was constructed out of willow boughs and pieces of visqueen. Ripe tomato's were eaten, canned, and dried in late August and September.

In summary, when cleared land is not available, or perma-frost is a problem, close planting and or raised beds can increase yields and allow you to garden on tundra. Heated soil with visqueen, hot caps, temporary hot houses, cold frames and seep irrigation can extend the season and increase yields.

## DEVELOPMENT

## CORPORATION, INC.

TO: *Representative Jerry Gardner*

FROM: John Quirk, Executive Director

SUBJECT: Agriculture Report #3  
Grains, Grasses, and Red Meat



GALENA CENTER  
BOX 72  
GALENA, ALASKA 99741

DATE: 2/24/81

Past surveys indicate that approximately 1/3 of the people in the area were interested in training for growing grains, grasses, and red meat. A plan was developed in the fall of 1979 to answer these needs. The resources necessary to accomplish this did not materialize in the Spring of 1980. The plan was modified and reduced to be functional within the available resources.

Jim Barger, Agriculture instructor for the Galena Center, distributed quantities of oat, barley, and wheat seed in Bettles, Allakaket, Huslia, Nulato, McGrath, Takotna, and the Holy Cross area. A frost in the middle of July in the Bettles and Allakaket area retarded the growth of the grain. The grain was not fully matured when harvested in the fall. Reports from the other were inadequate to be reliable data. By the time the equipment was distributed, ground selected, worked up, and seeded at best they would get a green manure crop.

Oats and barley was planted in Ruby at four different locations, again the grain was planted late in June due to heavy rain on the first three attempts to plant, in May and early June. Time is a critical element when available people are limited.

Test plots and fields of grain were planted in Galena. The new equipment had to be assembled, serviced, and calibrated. Most of the grain was planted on new ground in a dry lake and inside the dike. To save time the ground was rototilled once then seeded and fertilized the same day on cold soil. The overall results were very good. Test plots were planted 2' by 5' of canadian barley varieties on May 16, 1981. They were fertilized at the rate of 300# 11-22-22 per acre inside the dike on river silt soil.

Test Plot #	Headed Out	Hand Threshed	Yield bu. per acre
1	7/1/80	8/8/80	13.6
2	7/1/80	8/8/80	61.7
3	7/1/80	8/8/80	29.5
4	7/15/80	8/22/80	49.9
5.	7/15/80	8/22/80	63.99
7	7/1/80	8/8/80	34.49
13	7/15/80	8/22/80	31.70
14	7/1/80	8/8/80	56.7
15	7/15/80	8/22/80	56.3
16	7/15/80	8/22/80	36.75
17	7/1/80	8/8/80	31.76
18	7/15/80	8/22/80	87.57

A total of 19 plots were planted. A local person inadvertently dug up and planted a garden in the other plots.

The seeds were saved and will be planted this year. Some of the varieties are very early maturing and have promise of a substantial yield. More information is available on source and type at the KDC office.

One half acre of chena wheat was planted on May 16, 1980. It was fertilized at the rate of 150 # per acre with 11-22-22 it was combined on October 2, 1980, the yield was 30 bushel per  $\frac{1}{2}$  acre. The wheat was combined with a high moisture content. Some of it has been dried and hammered for flour. Local residents are using the whole wheat flour for bread, pancakes, and cookies. Comments have all been favorable.

Four and one half acres of lidal barley was planted on May 17, 1980. It was fertilized with 11-22-22 at the rate of 100# per acre. Common goose grass started to take over the barley during the rains in late May. Thirty pounds of nitrogen per acre was applied when the rains stopped. The barley was combined on September 4, 1980. The yield averaged 100 bushel per acre.

Six acres of moore oats was planted on dry lake that has been farmed for three years. It was fertilized at the rate of 50 pounds per acre of 11-22-22. It grew chest high with large heads. Winds in late August caused heavy lodging. It was combined on September 20, 1980. Three hundred bushels was combined. More than three acres could not be combined.

A small plot (10' x 30') of Hinoats was planted in the same field at the same time. It had shorter straw and matured two weeks earlier. It did not lodge. It yielded  $1\frac{1}{2}$  bushels.

Athabasca oats was planted on May 29, 1980 on new ground with minimum tillage, middle was very wet. No fertilizer was available until the second week in June. The oats was short like the Hinoats and had good heads. It was combined on September 29, 1980. Yield was 90 bu. per acre. Considered a very good yield in spite of the adverse conditions.

Three and one half acres of weal barley were planted under the same conditions in the same field. It was combined on September 24, 1980. Yield was 45 bu. per acre.

Gateway barley and park wheat was planted on  $1\frac{1}{2}$  acres each inside the dike with minimum tillage. A broadcast seeder was used. It rained before the seed bed could be harrowed after planting. The seeds sprouted on top of the ground. It had a thin stand and was combined on October 21, 1980.

Test plots of Anik, Beaver, and F.V. alfalfa were planted. The stand was good. Next spring the wintering results will be recorded.

Plots of rough rider winter wheat was planted in Ruby and Galena during the first week of August 1980. Results will be recorded next spring and summer.



THE ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY

AGRICULTURE AND ANIMAL HUSBANDRY

Research Priorities and Recommendations

A Special Report

Based Upon the Results of the  
Alaska Council on Science and Technology  
Agriculture and Animal Husbandry Committee Workshop  
Held February 1980 in Anchorage, Alaska

March 1980

ALASKA COUNCIL ON SCIENCE AND TECHNOLOGY SPECIAL REPORT

AGRICULTURE AND ANIMAL HUSBANDRY: Research Priorities and Recommendations

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EXECUTIVE SUMMARY:

This report cites certain background and priority needs for activities in agriculture and animal husbandry research in Alaska. The working committee was selected to represent a broad background and diversity relative to Alaska agriculture. The committee identified more than 30 critical concerns in agriculture and animal husbandry. Each concern was evaluated and the top 10 selected and set in order of their priority for this report.

The Council itself, in consultation with the committee's chairman, has added recommended fiscal actions for consideration this year.

BACKGROUND AND STATUS OF CURRENT ACTIVITIES IN AGRICULTURE AND ANIMAL HUSBANDRY:

Over the past six years the State of Alaska has launched a dynamic agricultural development program. Agricultural rights to land are already being sold, approximately 75,000 acres since 1977. An estimated 30,000 to 40,000 acres were already in private holdings, bringing the present potential agricultural base in private ownership to more than 100,000 acres. Present proposed legislation could add another 75,000 acres by 1983. The State has identified a goal of 500,000 acres for agricultural development by 1990. The people of Alaska, as identified in "Alaska Destination Tomorrow" released by the Office of the Governor, placed high priority on development. Through several planning efforts, both commercial and subsistence, agriculture has been consistently emphasized by the Alaskan citizen. (Subsistence in this case refers to farms, usually small, that produce food and fiber for family use and income to generally supplement other income sources.)

Alaska can produce many agricultural products consumed by the in-state population, especially on a subsistence level. Further, as transportation and other costs of imported food continue to rise, this potential becomes more significant. At present, most food needs for Alaska are met through the Seattle marketing structure. If this supply were cut, food shortages would start immediately, and critical shortages would develop within a matter of weeks. This has become an expressed concern and is an important factor behind present agricultural development interest.

The red meat industry is developing rapidly, especially the reindeer industry. Alaska produces less than 2 percent (estimate) of its annual red meat consumption. This can be increased, especially in view of Alaska's rapidly developing grain base. Small grains produced in Alaska could be first made available to meet local needs such as feed requirements for dairy, swine, and cattle feeding. Most of the small grain produced in Alaska over the next five years could be utilized within the state if the proper infrastructure were developed, but the lack of such a system is very evident and a source of concern. It should also be noted that Alaska's developing hydrocarbon industry manufactures urea (nitrogen) fertilizer in Alaska, providing a low-cost source of this most important fertilizer element. (The Kenai plant is presently the largest in the world.)

#### ANALYSIS AND DISCUSSION:

The present trend favoring agricultural development has been motivated by individual Alaskans. The Soil Conservation Service, through a public participation effort with local subdistricts, noted a strong public concern about the loss of present crop land and potential acreages. Citizens throughout the railbelt area expressed a concern that agricultural lands were being diverted to other uses (especially urban) or were being tied up by special interests.

The Delta Land Management Planning Study, conducted by the Division of Lands, also emerged with strong local public participation. Agriculture development and preservation have become the first identified objectives of this plan, resulting in the Delta Agricultural Development Project.

Several considerations relating to agricultural development and preservation have been developed by local citizens over the past four years.

##### 1. Project Approach

There is a need to clearly define each development boundary, and how the proposed project will proceed. All resources must be considered in each project. Where it is possible and practical, conflicts must be resolved or minimized.

##### 2. Conservation Ethics

Precautions must be taken to allow for minimum impacts on the environment during and after development. Erosion control practices, water-quality concerns, and potential pesticide hazards must be

identified. An attitude of prevention of the environmental hazards before they occur rather than correction after they have developed prevails among the public.

### 3. State Leadership

The need for strong state leadership has been expressed by local people. This includes: a) the necessary legislative authorities to support and maintain the agricultural industry, b) the financial resources necessary to participate, c) identification of the marketing structure, and d) technical support in both research and development.

As an overview of the above, it has been noted by soils experts that Alaska has the soils and climate to produce a variety of adapted, quality crops for both in-state consumption and export purposes.

## MAJOR ISSUES

The following are the 10 most urgent concerns for agriculture and animal husbandry. These were selected from approximately 30 areas identified as major research deficiencies in Alaska. The list is presented and explained in order of priority as determined by the committee.

### 1. Plant and Animal Improvement Research

Top priority was given to this basic area of research. Broad as it is, it is fundamental to establishing a stable agricultural base. The committee includes in this priority the recognition of the need for research in small animal, subsistence farming, village and urban gardening, and large-scale commercial farming. Research emphasis should be placed on:

- a. The introduction of new crop species and new animal species for evaluation under Alaskan conditions.
- b. Improvement of plants and animals through breeding programs designed to utilize both domestic and introduced genetic material.
- c. The management of plants and animals to best utilize the natural resources unique to Alaska, i.e., long summer days, and to increase the efficiency of production.
- d. The nutritional requirements of plants (fertilizer) and animals (feed) and especially how the former affects the latter.

As this is a broad display of research, it is recommended that this committee further define the specific research needs on a priority basis when funding is considered for plant and animal improvement research. This report of the committee will be forwarded by the Council to the University for their guidance.

## 2. Climatological Data

The second priority was given to the collection, analysis, and application of weather data. No natural phenomenon has more impact on agriculture than daily, seasonal, and annual weather conditions. Agriculture is now being practiced in areas with insufficient weather data to make daily forecasts or long-range planning decisions. In addition, agriculture is expanding into new areas where little or no weather data have ever been collected. These data are urgently needed to assure that proper decisions are made on crop species and variety selections, seeding and harvesting dates, wind and water erosion control measures, storage, transport, marketing considerations, and the myriad of other daily choices that must be weighed in light of the weather in all agricultural endeavors. Wind and water erosion control are the prime considerations, however.

Environmental hazards (such as floods, severe storms, and site-specific hazards) need identification in each potential agricultural area. Even short-term research (3-4 years) is of prime importance for the establishment of conservation practices. This activity has been developed and installations have been made for both the Delta Junction and Nenana areas. It is important that these efforts be continued there and expanded elsewhere when agriculture potentials are investigated.

## 3. Agricultural and Legal Relationships

The third priority specifies two research needs of agriculture which are bound by legal restraints. The first of these involves testing and clearance for use in Alaska of chemical pesticides and drugs by the Environmental Protection Agency (EPA) or the Food and Drug Administration. (Many chemicals and drugs cleared for use on specific crops and animals in the Lower 48 or other countries are not cleared for use in Alaska.) Chemicals cleared for use in Alaska on crops we do grow are not always effective at approved rates of application because of climate and/or soil conditions that differ from those where effective rates were determined and maximum limits set. EPA clearance of these chemicals on the crops that we grow and at rates of application that are effective under our conditions requires extensive support data and assurance that neither human beings nor the environment would be adversely affected. For example, one drug of primary importance to Alaska is Worbex. This drug is extremely effective in controlling warble fly infestations of reindeer and currently is used in both Scandinavia and the USSR. This drug has not been approved for use on Alaska reindeer.

The second research need now bound by legal restraints is the development of phosphate fertilizer deposits. These valuable deposits are presently within the boundaries of federal land withdrawals or in areas of State or Native land with land access. Phosphate is one of the major limiting minerals in agricultural soils in Alaska. Application of high rates of phosphorus are needed to produce economical crop yields. Methods or procedures are needed to provide access to and utilization of these deposits.

4. Marketing and Processing Beyond the Farm

The fourth research priority is concerned with the complex disposal system of farm products after they leave the farm. Research is needed in all areas of slaughtering, processing, packaging, storage, and shipment of animals as well as the processing, storage, shipment, and utilization of crops. This research should be directed toward developing technologies appropriate to Alaska's conditions and needs, village and remote area consumption, and urban utilization. The unique marketing system found in rural areas needs to be addressed as well as the development of foreign market feasibility. (Some of these kinds of research are related to priority number 10, below.)

5. Animal and Plant Disease and Insect Control

The fifth priority addresses the serious need for research into the control of animal and plant diseases and insects. These pests annually cause large losses of animals, poor growth rates and feeding efficiencies, and reduced quality of finished meat products. Plant diseases and insects likewise reduce plant population, yields, and quality. There is presently neither a plant or animal pathologist or entomologist on the University of Alaska faculty. Both are desperately needed.

6. Erosion Control Practices

The sixth priority of erosion control research is essentially mandated by the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-50, Sec. 208) and the Clean Water Act of 1977 (P.L. 95-217). These two acts combined require the development of what are called Best Management Practices (BMP's), and the application of these BMP's to agricultural lands to reduce nonpoint source pollution of lakes and streams. Many BMP's are already developed and practiced, and more are being developed to fit special or changing situations. Their suitability under Alaska conditions and development of BMP's specially for our conditions, need to be researched. The urgency of preventing erosion and water pollution before it occurs is recognized by Alaskans. This is the only state which still has this opportunity. Research of this nature is needed now, not later.

7. Extension - The Transfer of Resources

The seventh priority emphasizes the transfer of research results into appropriate technology that is understandable and usable by large and small commercial farmers, subsistence farmers, and rural and urban gardeners or small animal raisers. The traditional role of the Cooperative Extension Service in this effort is recognized. An intensification of research under other priorities listed here will require a concomitant expansion of extension activities to communicate the results to the people. Increased research without communication is futile.

Additionally, the committee recognizes the accumulation of large amounts of research data over seventy-odd years which now rests, unavailable to

the majority of the public, in archives, private libraries, forgotten files, attics, and closets. These data must be gathered together and placed in a repository with public access. Computer storage of these data, similar to that of the Arctic Environmental Information and Data Center of the University of Alaska, would provide ready access to a large amount of research already conducted and would avoid duplication with new research.

#### 8. Interrelationship of Agriculture and Natural Systems

The eighth priority responds to a controversy which commands the collective attention of agriculturists and nonagriculturists alike--are agriculture and natural ecosystems compatible, complementary or antagonistic, and if so, to what degree? Just as important is the question--can agriculture be adjusted or manipulated to be compatible with natural systems without jeopardizing man? Sound information on these interrelationships is lacking and often misunderstood. Of special importance to Alaska is the relationship of natural systems during the development of artificial systems. The integration of agriculture with natural systems needs to be studied to enable orderly development to proceed without compromising nature.

#### 9. Range Site Identification and Carrying Capacity

The ninth priority concerns the vast range lands of Alaska, estimated to exceed 100,000,000 acres. The true value of these range lands in terms of human food production, wildlife production, and vegetative resources is unknown. Demand for the utilization of Alaska's range lands is growing. The resource is known to be fragile. Identification and classification of different kinds of range lands, their carrying capacities of domestic stock and wild animals, the necessary management for sustained use, and preservation of their aesthetic values, need to be determined.

#### 10. Feasibility of Regional Agricultural Base

The tenth priority addressed a problem peculiar to Alaska and other northern countries--distance and isolation of populated regions. These regions, including Anchorage and the Cook Inlet area, depend upon outside sources for more than 90 percent of their agricultural products. The unsoundness of this dependency is evident wherever the transportation system is disrupted. Even with the transportation system to Seward, Anchorage, and Southeast intact, redistribution to outlying regions depends on the variables of weather, sea ice, space on available carriers, internal transportation strife, etc. The ability of individual isolated population regions to maintain an integrated and self-sustaining agricultural base would relieve them of total dependency on the outside and avoid crisis situations during transportation or other disruptions. Soils with agricultural potential have already been identified in most of Alaska, and they are well dispersed throughout the state south of the Brooks Range. Information is available on a number of crops adapted to these areas. Research on the feasibility of the concept of regional agricultural bases is now appropriate.

PRIORITIES AND RECOMMENDATIONS:

1. New plant and animal improvement research should be funded with an initial line item appropriation to the University of Alaska Agriculture Experiment Station in the amount of \$200,000. The University of Alaska should be directed to use these funds cooperatively with both federal and state agriculture agencies and to be guided by further recommendations of the Council's committee.
2. New climatological data for agricultural growth through collection, analysis, and dissemination should be funded with an initial first-year line item appropriation to the University of Alaska Arctic Environmental Information and Data Center in the amount of \$40,000.
3. Legal restraints on agriculture should be examined by the University of Alaska, Institute of Agriculture for that purpose. In pursuing this effort, the Institute should work closely with other state agencies and federal agricultural experts.
4. Problems of marketing and processing beyond the farm should be analyzed through an appropriation to the Department of Commerce and Economic Development in the amount of \$80,000. This unique and difficult problem must be examined in light of Alaska's food consumption in relation to its production ability and the marketing structure and legislation needed to tie these together.
5. Two new research positions in the fields of animal and plant disease should be established within the Institute of Agriculture of the University of Alaska by the initial appropriation of \$120,000 for salary and support.
6. The Office of the Governor should appoint a lead agency for the coordination of research related to agriculture-related erosion and direct this accomplishment in agencies through the use of existing funds. The U.S. Soil Conservation Service needs to be closely consulted in this activity.
7. The University of Alaska Arctic Environmental Information and Data Center and Agricultural Extension Service should be directed to cooperatively develop a plan for the compilation and dissemination of appropriate bibliographies, data files, and materials for the transfer of knowledge to the agricultural community through the utilization of existing funds. The University should be directed to keep the agricultural committees of the legislature informed of the progress of this effort.
8. The problem of relationships between agriculture and natural systems should be addressed by a pilot project, perhaps in the Mat-Su Valley, examining these agriculture, natural habitat, and wildlife relationships. This report might be requested by an appropriate legislative committee or funds made available to the Council on Science and Technology for the solicitation of research proposals throughout the Alaska community of interest.

9. The Department of Natural Resources, in cooperation with the U. S. Soil Conservation Service, Bureau of Land Management, Forest Service, and others as needed, should be requested to provide a plan for range site identification and carrying capacity research.
10. The Office of the Governor should be requested to develop a framework research plan and proposal for the feasibility analysis of regional agricultural bases.

In summary, appropriations as follows are suggested relative to specific recommendations:

1. University of Alaska Agriculture Experiment Station	200,000
2. Arctic Environmental Information and Data Center, University of Alaska	40,000
3. University of Alaska, Institute of Agriculture	N/C
4. Department of Commerce and Economic Development	80,000
5. University of Alaska Institute of Agriculture	120,000
6. Office of the Governor and U. S. Soil Conservation Service	N/C
7. University of Alaska Cooperative Extension Service and Arctic Environmental Information and Data Center	N/C
8. Legislature (appropriate committee)	open
9. Department of Natural Resources	N/C
10. Office of the Governor	<u>N/C</u>
	440,000 +

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Anchorage, Alaska

ABOUT THE COUNCIL:

The Alaska Council on Science and Technology reports annually to the Governor and the Legislature on research activities funded by the state and recommends research and funding priorities. Though the Council itself does not perform research, it is charged with helping to coordinate research activities and to enhance standards of research. Nonpartisan advisory services to assist planning at both state and local levels are provided by the Council; for this and other purposes the Council convenes committees, task forces and conferences as needs arise. Utilizing earmarked funds appropriated to the Council's Scientific and Technological Account, the Council conducts the Northern Technology Grants Program to foster Alaskan innovation. From the Account, the Council can award research grants and contracts for purposes specified when monies are appropriated or otherwise assigned to the Account.

1979

NORTHERN TECHNOLOGY GRANTS PROGRAM

The purpose of the Northern Technology Grants Program is to help develop and encourage the use of low-cost and small-scale technologies appropriate to Alaska.

In July, 1979, \$50,000 in grant funds was appropriated by Alaska's state government to be awarded by the Alaska Council on Science and Technology (ACST) in grants of up to \$5,000 each.

Proposals were solicited in the areas of "energy generation, waste disposal, recycling, food production, transportation, building design, or any residential or industrial enterprise which might be more efficient, less costly or less energy-intensive than methods now in use." Appropriateness to the Alaskan environment was required. The first year's program closed for receipt of applications on August 15, 1979.

The Alaska Council on Science and Technology received 178 proposals and selection of winning proposals was made in mid-September. Proposals were judged on innovativeness, potential benefit to Alaskans, and soundness of use of funds. Grant awards ranged from \$200 to \$5,000. Results will be published as projects are completed.

For more information on the program, please contact:

Alaska Council on Science & Technology  
Pouch AV  
Juneau, Alaska 99811  
(907) 4653510



## SUMMARY OF PROJECTS

#0011      REGENERATIVE FREEZER      Keven McDougal      \$3,100  
Delta, Alaska

Mr. McDougal will build a multi-family freezer which will store the winter's cold for summer use. It will maintain freezing temperatures for 3,000 pounds of meat or fish year-round without need of any power source whatsoever. The freezer will be a buried 14'x14' room housing a 10 foot high, 10 foot diameter brine-filled tank. A fluid-filled convection loop will be installed in the tank and project above ground. When the outside air is colder than the brine, the convection loop will continuously remove heat from the freezer and dissipate it above ground. The freezer will be insulated well enough to keep heat out during the summer.

#0107      JUICE BOTTLING PLANT      M. Michael Rowcroft      \$3,250  
Juneau, Alaska

M. Michael Rowcroft will set up a juice processing, bottling and distributing center in Juneau. Overripe produce purchased from local markets and wholesale distributors will be processed, bottled in recyclable containers and sold to the public at a reasonable cost. All processing will be performed according to the state Division of Public Health regulations -- Mr. Rowcroft is the Juneau District Sanitarian.

#0146      HYDRAULIC-POWERED      TO      Bert Bingham      \$4,045  
Ken Kunkel  
Don Luterbach  
Fairbanks, Alaska

This grant will help finance the building of an automobile with a hydraulic propulsion system. A volkswagen chassis and running gear with a sleek fiberglass body will house the low-fuel/high-energy system. The system starts with a 16 h.p. Briggs and Stratton engine. This drives a hydraulic pump. The hydraulic pump supplies charge pressure to two 5000 psi accumulators, and drive pressure to a Sunstrand hydraulic motor. The small gas engine operates at full power until the accumulators are fully charged. At that point the engine drops back to idle and the accumulator takes over. The sequence repeats automatically when the accumulators are drained to a certain level. The propulsion system, which has been previously demonstrated elsewhere, is expected to develop 75 mpg while cruising at 55 mph to 75 mph.

#0083      BEE-OVERWINTERING BUILDING      David W. Stoops      \$3,775  
Kasilof, Alaska

A  
Mr. Stoops will construct a building in which he will over-winter bees in a controlled environment. Presently the state's 250 beekeepers have no alternative but to kill their bees each fall and face the difficulty and expense of shipping in new bees each spring.

#0029      WASTE-HEAT-CLAIMING GREENHOUSE      Galena Regional      \$2, 70  
Learning Center  
Galena, Alaska

A  
GRLC is a rural extension of the University of Alaska involved in facilitating subsistence gardening programs in 17 villages along the Yukon and Koyukuk Rivers. The group will use grant money to build a 1,500 square foot greenhouse heated by waste heat from the local power plant. The Galena Air Force Site will provide access to the glycol solution in the plant's cooling system. The hot glycol will be piped to a unit heater inside the greenhouse as well as through the soil bed of a garden behind the power plant.

#0089      SOLAR HOT WATER HEATER      Julie Scott      \$1,200  
Camp Bingle, Alaska

Camp Bingle-Harding Lake Camp is a non-profit camp operating at Harding Lake, a recreational area 40 miles east of Fairbanks. The camp is used by various children's groups and its program is educational in nature. The staff will build a solar collector into the camp's hot water system to help offset operating expenses and incorporate energy awareness into the camp's educational program.

#0144      INSULATED SHUTTERS      Rob Walton      \$1,100  
Fairbanks, Alaska

Mr. Walton will design and construct insulating shutters that can be used to cover large window areas to reduce heat loss. The shutters will take advantage of garage door technology and photoelectric or temperature sensing switches to achieve ease of operation.



#0145 OIL-FIRED CLOTHES DRYER Mike Potter \$500  
Fairbanks, Alaska

Mr. Potter will convert a standard household dryer from electric to oil-fired hot water heat to take advantage of the oil-fired boiler which heats his house. Hot water will be piped to a radiator core which will be mounted on the rear of the dryer; air forced across the radiator will dry the clothes. The energy requirements and cost of drying clothes with an electric dryer will be measured before the conversion; when the oil-fired system is installed, its heat requirements will also be tested. Mr. Potter says the high cost of electricity and gas, and the fact that a large number of Alaskan homes use hot water heat suggest significant potential savings.

#0165 METHYL-FUEL PLANT Douglas R. Grimm \$5,000  
Auke Bay, Alaska

Mr. Grimm will build a scale model of a system capable of accommodating the electrical and automotive energy needs of a typical urban or rural residence in southeast Alaska. The methyl-fuel plant will produce approximately one gallon of methyl-fuel for every 20 pounds of waste material. This project will make use of the large quantity of sawmill wood chips available in southeast Alaska. Experimentation will also be done with many other forms of "garbage." The fuel produced will then be applied to a modified 4 H.P. internal combustion engine driving an 1800 watt generator. This scale model should supply about 1/10 of the electrical energy requirement of a typical residence.

#0155 HYDROELECTRIC GENERATOR Richard V. Ford \$2,500  
Copper Center, Alaska

Mr. Ford will build a small-scale hydroelectric system to reduce his family's dependence on a diesel generator. The system will be mounted on a raft in the Copper River and provide enough electricity to the residence for 8 months of the year.

#0136 WOOD FURNACE Donald M. Ruef \$2,109  
Palmer, Alaska

Mr. Ruef will build, instrument and test a wood-coal furnace with a fluid-filled jacket. The fluid tube will store heat and be controlled to produce a low-pressure hot fluid and not vapor. Mr. Ruef expects the furnace to deliver 100,000 BTU/H, provide long term even heat, require no electricity, and be marketable at less than \$1,500 each.

#0098      ELECTRIC CAR      David Grove      \$5,000  
Fairbanks, Alaska

Mr. Grove will build and test an electric car for operation in cold climates. The plans for the vehicle will be purchased, but modifications will be incorporated, such as the use of light weight aircraft steel, an insulated battery compartment, and solid state devices for startup. Mr. Grove expects to demonstrate that the electric car is uniquely suited to Alaska for three reasons: first, gasoline is generally priced higher here; second, because pollution, especially ice fog, is a serious problem; and finally, because much of Alaska's road system is disconnected, the auto's 60-mile range per charge will not be a serious limitation.

#0074      SOLAR GREENHOUSE      Jeremy and Linda      \$5,000  
Weld  
Gakona, Alaska

A      The Welds will build an add-on solar greenhouse which will utilize a thick gravel pad to store heat from the greenhouse for later use in the greenhouse and in the attained cabin. The gravel pad will be insulated from the ground around it and a heat collector at the greenhouse ridge will pump warm air into it. In addition, a rain water collection system will be incorporated into the greenhouse such that the stored water will also bank heat.

#0027      AMBULANCE SPLINT      Steven J. Carney      \$200  
Fairbanks, Alaska

Mr. Carney will build a modification of the long spine board used by ambulances which he expects to be an improvement. His patient stabilization system will utilize vacuum "bean bags" in conjunction with conventional straps. The vacuum bags would rely on the same principal as the vacuum splints, be adjustable, and would attach to the board with velcro.

#0129      HYDROELECTRIC GENERATOR      Ted Neville      \$350  
Fairbanks, Alaska

Mr. Neville will build a small-scale water-powered electric generator to be powered by a river. A paddle wheel's rotation will be translated by a 2:1 ratio gearbox, and then drive an electric motor. The electric motor, when driven, produces current. Mr. Neville hopes to produce enough current to run small power tools.

#0065 SOLAR HEATER

Chris Johansen \$600  
Fairbanks, Alaska

Mr. Johansen will use grant money to build a simple solar air heater which could be placed in window openings. The heater would consist of a plastic panel which would admit fresh cold air from outside, allow the sun to heat it as it rises toward the window opening, and have a simple thermostatic device at the top to allow air to pass in only when it is warmer than the ambient room temperature.

#0106 WASTE-OIL HEATER

Donald C. \$250  
Pendergrast  
Fairbanks, Alaska

Mr. Pendergrast will build a stove that burns waste crankcase oil. The stove will provide a more complete use of a scarce resource and an efficient method of waste disposal. The design utilizes a discarded electric water heater, several frying pans, and generally available and inexpensive hardware.

#0180 EXPERIMENTAL GREENHOUSES

Jim Donally \$1,000  
Anchorage, Alaska

A  
Mr. Donally will build three greenhouses to test the efficiency of a plastic product, called ACPS, as a greenhouse wall material. ACPS is commercially available in long sheets or on rolls. Its common purpose is as a packing stock for fragile merchandise. It is a clear plastic film with little bubbles in it which, Mr. Donally notes, when squeezed "give a satisfying little pop." But, the bubbles also seem ideally suited to provide insulating dead air space for greenhouse walls. The first greenhouse built will have only a 6-mil visqueen covering. The second greenhouse will have ACPS, and the third, ACPS plus an insulated north wall. Maximum-minimum thermometers will be installed in each greenhouse and daily readings taken to determine the length of frost-free season.

LIST OF GRANT RECIPIENTS

#0011	\$3,100	Kevin McDougall (Regenerative Freezer) P. O. Box 503 Delta, Alaska 99737
#0027	\$200	Steven J. Carney (Ambulance Stretcher) University of Alaska Fire Department Fairbanks, Alaska 99701
#0029	\$2,570	Galena Regional Learning Center (Waste-heat-claiming-greenhouse) P. O. Box 181 Galena, Alaska 99741
#0065	\$600	Chris Johansen (Solar Heater) P. O. Box 81162 College, Alaska 99708
#0074	\$5,000	Jeremy & Linda Weld (Solar Greenhouse) P. O. Box 165 Mile 128 Richardson Highway Gakona, Alaska 99586
#0083	\$3,775	David W. Stoops (Winter Beehouse) Mile 2.8 Kalifornsky Loop S.R. 2 Box 707 Kasilof, Alaska 99610
#0089	\$1,200	Julie Scott (Solar Water Heater) Camp Property Committee c/o Box 80435 College, Alaska 99708
#0098	\$5,000	David Grove (Electric Car) 214 Harwood Hall University of Alaska Fairbanks, Alaska 99701
#0106	\$250	Donald C. Pendergrast (Waste-oil Heater) S.R. Box 50342 Fairbanks, Alaska 99701
#0107	\$3,250	M. Michael Rowcroft (Juice Bottling) R. 3 Box 3323 Juneau, Alaska 99801
#0129	\$350	Ted Neville (Hydroelectric Generator) 313 Lakeview Trailer Court Fairbanks, Alaska 99701
#C136	\$2,109	Donald M. Ruef (Wood Furnace) P. O. Box 1906 Palmer, Alaska 99645

#0139	\$5,000	Cyndie & Steve Tack (Experimental Greenhouse) S.R. Box 51113 Mile 24 Chena Hot Springs Road Fairbanks, Alaska 99701
#0144	\$1,100	Rob Walton (Insulated Shutters) P. O. Box 1480 Fairbanks, Alaska 99707
#0145	\$500	Mike Potter (Oil-fired Clothes Dryer) P. O. Box 80293 Fairbanks, Alaska 99708
#0146	\$4,045	Bert Bingham (Hydraulic-powered Auto) 1650 Beaver Road Fairbanks, Alaska 99701
#0155	\$2,500	Richard V. Ford (Hydroelectric Generator) P. O. Box 158 Copper Center, Alaska 99573
#0162	\$5,000	O. Alexander Hoke (Tidal-powered Dredge) P. O. Box 963 Juneau, Alaska 99802
#0165	\$5,000	Douglas R. Grimm (Methyl-fuel Plant) S. E. Applied Electronics P. O. Box 324 Auke Bay, Alaska 99821
#0180	\$1,000	Jim Donally (Experimental Greenhouses) 1014 East 11th, #4 Anchorage, Alaska 99501



# Newsletter

Alaska Council on Science and Technology

Volume 1 No.3

January/February 1981

## Report Executive Director

### Christopher Noah

In the January 12 issue of the Anchorage Times, an editorial titled "Planning for Disaster" appeared, pointing out that there was good reason to step up considerations of government responses to major natural disasters. This, of course reiterates what ACST has been saying for some time. The appearance of even one media story concerning Alaskan natural hazards, prompted my reply to Fred Dickey, executive editor of the Times.

#### Dear Mr. Dickey:

I am very encouraged to see the lead editorial in Monday's newspaper concerning planning for the possibility of a catastrophic earthquake in California and by inference expressing the need for such measures in Alaska, the nation's most seismologically active state. Unfortunately, the federal government through its current science policy, does not see the severity of the problem in our state as compared to that of California. This is evidenced by the U.S.G.S. and Department of Commerce continual rapid withdrawal of funding from Alaska's seismology program. This significant reduction in funds will mean closure of seismic stations throughout the state and elimination of the seismology program at the University of Alaska; a useful program which monitors earthquakes, attempts to predict seismic activity, and, up until 1979, compiled seismological data in its quarterly bulletin "Summary of Alaskan Earthquakes."

Two of the Council's reports "Alaskan Seismology: Research Priorities and Recommendations" and "Alaskan Natural Hazards: Research Priorities and Recommendations" have spelled out the need for more support in this area. One recommendation of the seismology report states:

"As the nation's most seismically active state, Alaska should give high priority to establishing a comprehensive state policy for seismic safety. This policy should involve codes and standards for the design and construction of buildings; means of dealing with critical facilities such as dams, hospitals and schools; planning, development and land-use control, emergency preparedness and post-disaster recovery, and

seismic research needs."

If the federal government is to continue its reduction of scientific support, then it is up to the state to perform this important program function at a level sufficient to Alaska's needs. The report in addressing this point states:

"Governmental decisions concerning actual and potential influences of natural [hazards] on Alaska's population and future development require a long-term historical record of hazard observations, including frequency, magnitude, location and extent. To avoid costly duplication of effort and to ensure adequate coverage of critical hazards, the Alaska Division of Geological and Geophysical Surveys should take a lead role in establishing an ongoing hazards monitoring system that meets specifically Alaskan needs. The overall monitoring program should be designed to take maximum advantage of monitoring activities that are already operational."

The legislature responded to these experts by appropriating \$300,000 to the Alaska Council on Science and Technology for "geophysical hazards and other research." However, what is needed is a commitment to coordinated seismological planning and research programs on an ongoing basis.

(signed) Christopher Noah

## AAAS

### Alaska Division News

#### T. Neil Davis

A resolution that will have an impact on arctic science policies in Alaska was passed unanimously at the annual meeting of the American Association for the Advancement of Science, January 7, in Toronto.

The resolution, presented by myself and adopted by the national 133,000-member organization, parallels the recent resolution of the Council on Science & Technology states "that there is an urgent need for the United States and the State of Alaska to articulate rigorous arctic science policies that will encourage the pursuit of knowledge necessary to effect the development of national energy needs, enhanced fisheries management in North Pacific and Arctic Ocean waters, and the resolution of developmental and environmental conflicts in arctic and subarctic regions."

William D. Carey, executive officer of AAAS, the oldest and

**ACST**

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# AAAS

largest general scientific organization in the nation, emphasized that "the resolution is clear in its intent and urgency - to establish comprehensive policies towards arctic research and resources management."

As Executive Secretary of the Alaska Division of AAAS, and chairman, I emphasized the disparate attention given antarctic research over arctic affairs by the National Science Foundation and other federal agencies and stated that research costs in Antarctica are running ten times as much as costs in arctic regions. Furthermore, Antarctica does not have resident people and holds very little immediate promise for the nation in energy, fisheries, and other resources development. Development of an enhanced defense position clearly holds promise in the arctic. This will prove out when long overdue science policies and research priorities are targeted for the arctic.

Members of the Alaska scientific community have long been concerned and vocal over the lack of national policy towards arctic research. This neglect has led to piecemeal attrition of federal support to research facilities, failure to reciprocate in international scientific exchange and an absence of long-range planning.

National and state research-lags have placed the United States behind other countries in certain areas of arctic development.

Russia is in the lead in developing and exploring northern regions for human use. The United States is the only nation in the world with Northern interests that does not have a single research vessel capable of year-round arctic operation. Eight vessels of this type are in operation in Canada, nine in Norway, and twenty operate out of the Soviet Union.

Many other areas of research neglect exist and will continue to present real problems for the residents of Alaska. The state leads the nation in the number and magnitude of earthquakes, windstorms, avalanches, forest fires, floods, and other natural hazards. There's an average of twenty-four potentially damaging earthquakes per year, with magnitudes of 5.5 or higher. Last year, a single windstorm caused thirty million dollars damage in Anchorage. The establishment of a policy relative to the recognition, evaluation and mitigation of natural hazards would lessen the adverse effect on Alaska's residents and their property.

The Council will be seeking congressional and state legislative hearings during the 1981 sessions. The supportive action taken by AAAS, this prestigious national association, in adopting the resolution, will add impetus in urging state and federal governments to take a realistic look at present arctic science policies and research - especially in Alaska. I hope that decisions on progressive policies that will lead to much needed research will finally be forthcoming.

## ACST meetings

**The Alaska Council on Science and Technology will be meeting in Juneau on February 25,26 and March 25,26 in the ACST offices. Suite 510, Mendenhall Apartments, 328 Fourth Street.**

**The council annual report outlining its activities for 1980 is available. For copies, write ACST, Pouch AV, Juneau, 99811.**

# Northern Technology

Grants up to \$5,000 are again available to Alaskans with innovative ideas in northern technology. For the third time since the inception of the program in 1979, the ACST Northern Technology program is seeking low-cost alternatives in such areas as building design, food production, recycling, transportation, energy generation, waste disposal and small residential and industrial enterprises.

Proposals should include requests for materials, supplies, or services, to help develop feasible northern technology ideas. Personal labor compensation is not covered by the funds.

Deadline for submissions of proposals is April 20, 1981. Names of those persons receiving grant awards will be released May 22.

**Proposal guidelines are available at the ACST office, Pouch AV, Juneau, 99811, or call 465-3510.**

Reports on the results of projects funded by the 1979 ACST Northern Technology program are currently being studied by the council. Most of the progress reports are in and the council expects to have brief summaries of the project progress by next month. Restricted space in the newsletter does not permit a summary of reports on hand. However, a brief on one of the reports appears below.

### Project

Construction of three improved design greenhouses. Participants are Jim Donally and Norm Stoppenbrink, Anchorage.

### Summary of results

Two greenhouses of improved geodesic design have been constructed. One greenhouse has improved light-transmitting insulation. A third greenhouse of total solar design is almost finished. Qualitative measurements show that the completed greenhouses are able to extend frost-free time for growing plants by 4 months per growing year. Quantitative measurements show that using the improved double insulation gives an R-value of 69, as compared with 52 for conventional double paning with visqueen and 35 with single sheet visqueening of greenhouses.

## Oral History Project

The Alaska Historical Commission has awarded the Rasmuson Library, University of Alaska, Fairbanks, a grant for \$22,000 to compile an annotated index of all the oral history collections in Alaska and to propose a system for updating the index. Dr. William Schneider, an anthropologist specializing in ethnohistory, is project director.

The project will inventory recorded speeches, testimonies, elders' conferences, life histories and legends that are scattered throughout the state. Dr. Schneider will be the first to systematically investigate what has been done in this area and where the collections are located.

Dr. Schneider pointed out that it's a long overdue task and it is fortunate that some of the people who played key roles in the events that shaped Alaska's history, are still alive.

It is hoped that, in addition to keeping track of what has already been done, an aggressive program can be pursued by the continuation of the Oral History Project, on a sound financial basis, to copy tapes and collect original material, before these items disappear forever.

# Transportation and education

Two Research and Priorities reports, "Rural, Primary and, Secondary Education in Alaska" and "Transportation in Alaska", have recently been completed by ACST committees.

The central issue in the rural education report is the problem of delivering effective and relevant education to culturally different population groups. Most groups are scattered in remote communities and the remainder comprise significant minorities in urban areas. These problems differ from national educational issues and research funds are not available from non-state sources.

Concerning Alaskan transportation needs, the committee's report emphasized that most research has concentrated on foundation problems caused by permafrost and other arctic soil conditions. The report is broad in scope, dealing with the use of appropriate vehicles, support facilities, aviation, ice-fog, roads, railways and market structure. The emphasis of the report is on the need to improve research in the areas of transportation that affect the daily existence of Alaskans, such as moving basic commodities and commuters to work.

These reports are available at the ACST office, Pouch AV, Juneau, 99811, or call 465-3510.

## Natural hazards grants

Grants totaling \$86,500 have been allocated by the Council on Science and Technology for research on Alaskan natural hazards in relation to coastal flooding and avalanche forecasting.

The council approved an allocation of \$57,500 for a study of coastal flooding from storm surges and \$28,500 for a project that would incorporate snowpack structure into regional avalanche hazard forecasting.

The grant award on flooding will be given to the Arctic Environmental Information and Data Center, University of Alaska. The center's proposal outlines a plan to prepare a climatology of storm surges, develop manual objective forecast procedures to be used by the National Weather Service and to develop an automated forecast procedure for use at weather service offices in Anchorage.

The avalanche prediction grant is to be awarded to the Geophysics Program, University of Washington and involves a new technique of avalanche prediction incorporating snowpack structure. Research would be concentrated on the restructure of current snowpack data to determine slope stability with an end result of improved avalanche forecasting and a wider scope of forecast capabilities.

## ACST assists fire protection plans

The Division of Alaska State Troopers of the Alaska Department of Public Safety has requested that ACST assist them in an examination of the most suitable types of fire or smoke detectors for use in rural residences.

The Village Public Safety Officer (VPSO) program within the Alaska State Troopers, began in July, 1980, as a means of addressing the very serious public safety problems that exist in rural Alaska. As a part of the fire protection aspect of the program, funds were provided to purchase smoke detectors for village homes. Since there are many brands and types of

smoke detectors available, there is the need for research involving on-site testing to determine which type or brand will best meet the rural arctic environment.

The first step will be to identify the problems and requirements involved in the prevention of loss of life and property in rural areas of Alaska. The current status of technology must be determined, especially the decision on whether further laboratory testing of commercially available devices is needed.

There have been two preliminary meetings involving representatives of the Department of Public Safety and ACST. In mid-December, a meeting was chaired by Neil Davis, with the two agencies and technical resource personnel from the fire service and the University of Alaska.

## Senate Bill No. 48

### Grant Increases

Senate Bill No. 48, by the Rules Committee, at the request of the Governor, states, in part, that ACST may, as funds are appropriated, make grants of financial assistance of up to \$7500, rather than the current maximum of \$5000, to participants in the Northern Technology program.

The Governor, in his letter to the Senate President, pointed out that the original grant maximum of \$5000 has been diminished, due to inflation, increased shipping costs and the technical assistance needed to insure success of the innovative projects, even though ACST does not allow applicants to charge for their own labor.

He added that in the past, ACST has been unable to fund some excellent projects because they were over the \$5000 ceiling, yet did not qualify as a large scale project.

## Report updates

These reports are the results of workshops conducted by ACST and are available, upon request, at the council office in Juneau.

Report contents include: executive summary, background material, status of current research, analysis and discussion, priorities and recommendations, and contributors to the report.

Alaska Seismology  
Alaska Energy  
Alaska Minerals  
Alaska Health and Human Life

Alaska Agriculture and Animal Husbandry  
Alaska Natural Hazards  
Alaska Rural Education  
Alaska Transportation

A report on scientific and technological research needs in Alaska, from a joint meeting of ACST and the Polar Research Board, including public comments, is also available in limited numbers.

## Newsletter mailing list

ACST is working on updating its present mailing list. If you are receiving duplicate copies of the newsletter, or have changed your address, please notify the ACST office in Juneau. Or, if you have names of individuals or organizations who would be interested in receiving a copy of the newsletter - please let us know.

# Highlights 1980 Annual Activity Report

While 1979 could be described as the year of organization and initiation of programs, 1980 can be described as the year of implementation. Activities associated with implementation of the Act included setting state research needs and priorities in a number of areas and providing expert advice to policy makers. The implementation of the Science and Technology Account included its use in conducting the Northern Technology Grants Program and a Research Grants Program.

## Research Needs

The Council formed committees comprised of experts in various fields to review specific research needs and identify priorities in Alaska. Eight completed reports are the result of the committees' findings and are available in the Council office.

Five other committees are constituted. These will be producing reports in the following areas: Basic Sciences; Communication and Information Transfer; Community Structure; Cultural/Lifestyle Relationships; and Renewable Resources and Related Habitat Protection.

## Scientific and Technological Research

Following receipt of capital appropriations from the Legislature, the Alaska Council on Science and Technology established a Scientific and Technological Account in 1980. This account was used to make grants for research and innovation to individuals applying through two programs, the Northern Technology Grants Program (NORTECH) and the Research Grants Program.

## Research Grants

The Council capital budget included \$300,000 for research grants. Initially, the Council decided to award \$150,000 for research in natural hazards and \$50,000 for research in domestic violence. The request for proposals yielded eleven proposals. Following a scientific review of the proposals, the Council awarded research monies to two projects: "Coastal Flooding by Storm Surges and Development of Objective Forecasting Procedures in Alaska" in the amount of \$57,500; and, "Incorporating Snowpack Structure Into Regional Avalanche Hazard Forecasting" in the amount of \$28,503.

The Council is currently soliciting proposals for research needs identified by the working groups in the areas of Natural Hazards and Seismology, Health and Human Life, Minerals, Education and Transportation. It is anticipated that the remaining \$213,000 will be awarded for research in those areas by mid spring of this year.

## Assistance to Government

During the past year, the Council has received fifty-five requests from the Legislature and twenty-five requests from the executive branch for information on a variety of scientific subjects. Additionally, the Council has developed an on-going working relationship with the Alaska Energy Center, the Polar Research Board of the National Academy of Sciences, the American Association for the Advancement of Science and other organizations.

## Alaska Energy Center

AS 44.46.080 requires the Council to recommend projects which should be conducted or supported by the Alaska Energy Center. The Council's report on Energy recommended a number of research projects on Alaska's natural resources, including coal, oil, gas, hydro power, geothermal energy, windpower and solar energy. Additionally, the enabling legislation for the Energy Center states that the Alaska Council on Science and Technology shall meet with the Board of Directors of the Energy Center at least two times each year. An officer of the Council has attended all meetings of the Board of Directors of the Energy Center.

## Inter-Agency Activities

The Council worked closely with EPA in their effort to receive additional federal funding. As a result, \$900,000 was allocated to EPA for cold climate research in Alaska.

The Council reviewed the Department of Commerce and Economic Development's appropriate technology grant proposals.

Ernst Mueller and Christopher Noah assisted NOAA/OCSEAP in formulating their research priorities.

## Public Information

The news media has actively publicized the NORTECH program and its award recipients. Additionally, the NORTECH program was the subject of a television documentary, "Grassroots Energy", produced by the Arctic Environmental Information and Data Center in collaboration with station KAKM with funding from the state of Alaska.

## Alaska Council on Science and Technology

The Science and Technology Act of 1978 was the first step in political recognition of the importance of the role of science and technology in public policy and decision making. The act gave a statutory framework for the creation of the Alaska Council on Science and Technology. The Council's aim is to guide research activities in support of state objectives and to ensure the efficient transfer of resulting data and information.

**Robert D. Burkett**  
Department of Fish & Game

**T. Nell Davis (ACST Chairman)**  
Geophysical Institute  
University of Alaska

**Mim Dixon**  
Private Anthropological Consultant

**David Hickok, Director**  
Arctic Environmental Information & Data Center  
University of Alaska

**Jay Hogan, Director**  
Division of Legislative Finance

**Ernst Mueller, Commissioner**  
Department of Environmental Conservation

**Richard Straty (ACST Vice Chairman)**

Director, Marine Investigations  
Auke Bay Fisheries Laboratory  
U.S. Dept. of Commerce/NOAA

**Christopher Noah, Executive Director**  
Alaska Council on Science and Technology  
Pouch AV, Juneau, Alaska 99811

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Delta Agricultural Project  
Anticipated Schedule of Events  
April 1978

Statement Deadline for Farmer Qualification	June 1, 1978
Application period for qualified applicants	Month of June, 1978
Qualifications and Notifications of Qualified Lottery Participants	July 1, 1978
Appeal Period for Rejected Applicants	Month of July
Lottery Drawing (22 plus five alternates)	August 1, 1978
Down Payment Due	August 1, 1978
Burning of Test Clearing	Summer-Fall, 1978
Farm Plans Due From Successful Participants	September 15, 1978
Clearing and Road Contract Let for 60,000 Acres	October 15, 1978
Clearing Begins	October 15, 1978
Test Market, 1978 Crop	October, November 1978
Agricultural Symposium on Marketing and Production	January, 1979
→ Transportation Study Report and Market Report	February, 1979
Recommendation for Type of Market Structure	February, 1979
1. → Power System Construction Begins	April, 1979
Burning, Cleanup, and Breaking of 60,000 Acres (timing as dictated by results of test clearing)	Summer-Fall, 1979
Contract Let for Construction of Country Elevator Cleaners, and Drying Facility	Early Fall, 1979
Contract Let for Construction of Port Facilities (if necessary)	Early Fall, 1979
Land Payment Due (possibly covered by <u>clearing credit</u> ) ?	October, 1979
Plant at least 30,000 acres	Spring, 1980
2. Power Grid Systems Available	Spring, 1980
3. Country Elevator Available	August 1, 1980
4. Port Elevator Available (if necessary)	August 1, 1980
First Payment Due, Including First Clearing Payment	January, 1981
Last First Land Payment Due	1998
Final Clearing Payment	2018

REPORT ON THE DEVELOPMENT OF AGRICULTURE  
IN THE DELTA AREA

By

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Agricultural Agent

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University of Alaska  
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February 23, 1981

## INTRODUCTION

Agricultural development in the Delta area actually began with the activities of the original homesteaders in the early 1950s. Agricultural production was primarily a subsistence effort at that time, and remained basically so until the early 1970s.

A corporate, large-scale farming enterprise attempted commercial production during the 1970s. Due to the economies of scale and lack of an adequate marketing system, the corporate farm was forced to dissolve.

It was during the mid 1970s that the citizens of Delta, along with numerous state and Federal agencies, developed and implemented a Delta Land Management Planning Study (DLMPS). As a result of this study and public demand, the land in the Delta area was classified for best usage as determined by resource inventories and community needs.

The area encompassed by the current Delta Agricultural Project (Delta I) and that of the proposed expansion (Delta II) was classified as agricultural land and reserved for large-scale commercial farms (Figure 1). Simultaneously, the agricultural lands in the Tanana Loop and Clearwater areas were so classified and reserved for smaller subsistence farms.

The overall intent of developing agriculture in Alaska is to establish a viable, renewable-resource industry with investments from our current economy, financed on finite non-renewable resources. Therefore, according to the recommendations of the DLMPs, the State of Alaska initiated the Delta Agricultural Project in 1977. Baseline environmental data were collected, and experimental land clearing trials were conducted in 1977-78 to determine the most economically and environmentally sound method of development.

In April of 1978, 57 small farm parcels (6,000 acres) were released to private ownership in the Tanana Loop area. Approximately 60,000 acres were released in 22 large parcels (Delta I) on August 5, 1978. Again, in November 1980, another 4,100 acres of agricultural land were distributed in 36 parcels for small-scale farming. The small-scale farms are benefitting from the economies of scale generated by the larger commercial farming operations.

#### CURRENT DEVELOPMENT

Development of the crop land on Delta I is progressing according to schedule. Approximately 39,000 acres have had the debris and overburden stripped and piled into berm rows. Over

22,000 acres have been cleared sufficiently for the production of crops. This has all been accomplished in less than 18 months --of which less than half were suited to land clearing.

Other agricultural development is occurring also. Within the Tanana Loop, more than 2,500 acres have been cleared. Previous farmland is being reclaimed and new farmland developed in the Clearwater area (2,500-plus acres).

In 1979, approximately 3,000 acres of barley were planted in the Delta area, of which only 300 acres were on the Delta I project. This past year, the local acreage in small grains increased to nearly 11,000 acres with some 8,000 on the Delta Agricultural Project.

The livestock industry is also increasing dramatically in the Delta area. One farmer has created a 200-cow foundation beef herd and will be marketing slaughter beef in 1983. Another farmer has built and equipped a swine facility capable of producing 3,000 slaughter hogs per year. The first market hogs will be available for slaughter in September of this year. Several other land owners are entering the livestock industry in smaller scale with beef herds of 20-80 cows, and dairy herds of 20-60 milk cows. Delta does have a family-operated dairy with milk processing capabilities in operation.

#### COMMUNITY IMPACT

The agricultural development has provided substantial employment for the Delta Community. Estimates of seasonal and full-time positions created by--or directly related to--the Delta Agricultural Project exceeds 150.

One farmer, who planted 700 acres of grain last year, provided the following cost and/or investment information for 1980:

Hired Labor	\$ 34,000
Land Clearing	60,500
Buildings	13,000
Farm Equipment	276,000
Seed & Fertilizer	52,500
Well	3,000

One of the three local equipment dealers indicated an investment of \$175,000-180,000 in real property, excluding inventory. This dealer also has three permanent employees and anticipated expanding to five in the near future.

Community sales and services have increased in accordance with the influx of new agricultural families (12 on the Delta Agricultural Project and 25-plus on other agricultural parcels). These figures do not reflect temporary residency due to seasonal employment.

The major impact to the community school system has been in the vocational agriculture and Future Farmers of America programs. In 1976, 12 students were enrolled in the Vo-ag program. Today, that enrollment stands at 52 out of a total high school enrollment of 182 (refer to the February 18, 1981 issue of The Delta Paper).

The Vo-ag program has recently acquired a 40-year lease on 65 acres of agricultural land. A new vocational education/vocational agricultural building is being erected. However, real problems plague the Vo-ag program in terms of obtaining

funding for equipment and extended contracts for instructors. These youth are tomorrow's farmers and therefore are a vital ingredient in the successful development of Alaska's agricultural industry.

## RESULTS

The Delta Agricultural Project has proven that a family operation can indeed develop quality 2,000/3,000-acre farms within the time period desired. They are also capable of producing crops successfully on a large scale--in excess of 1,000 acres. This does not mean that they are without significant problems, however.

Tables I and II contain the yield results from hand-sampling the crops in 1979 and 1980 respectively. The depressed yields for 1980 can best be explained by addressing the various problems encountered.

1. Logistics - The local agricultural industry was not familiar with the quantity or quality of input products necessary to produce 11,000 acres of grain. This caused planting delays while seed and fertilizer supplies were replenished. Also, equipment dealers were not familiar with the most vulnerable components of specific implements--once again, adding to the delays in planting and harvesting.
2. Weather - The 1980 season was plagued with inclement weather. July precipitation was only 33% of normal, causing slow growth and stress to the grain. August and September were cool and damp, thereby delaying

grain maturity. Frosts occurred on August 2, 27, September 1- 9, 12 and 17--all within the normal frost-free growing season. The average daily maximum temperatures from August 14 through September 14 were approximately six degrees below normal, thus delaying maturity. Finally, harvesting was hampered by rain. August received 16 days of precipitation and September received 14 days of rainfall. Grain lodging, shattering and high moisture content resulted from this anomaly.

3. Bison Damage (1980) - Because of the unusual climate at the normal harvest season (August-September) and subsequent harvesting delays, the bison were provided with maximum opportunity to depredate the barley, causing \$150,000 worth of crop damage. Hopefully, more favorable harvest conditions and development of the Delta Bison Management Area will alleviate this problem.
4. Farm Management - As farmers gain additional experience in cultural practices and timing of activities, they will eliminate the bottlenecks in their operations-- such as lack of seed and fertilizer and equipment down-time. The University of Alaska Agricultural Experiment Station is conducting research to help answer these questions. The University of Alaska Cooperative Extension Service is actively assisting the farmers to adapt new research and modify accepted practices to meet their needs. The majority of

the new subsistence farmers are in need of this assistance.

5. Marketing -- The development of a marketing system still poses a major problem for our agriculture. Delta grain producers are now able to supply Alaska's current demand for small grain. As more livestock is brought into the state, the demand for feed grains will increase. However, in order to attain our full potential and the accompanying economies of scale, an export facility must be developed. Large-scale farmers were able to produce barley this year for less than \$110/ton (assuming a 50 bushel per acre average), Table III. Current world market is \$154 per ton. However, the Delta area, as yet, does not have the transport facilities to economically enter that market.

#### POSSIBLE SOLUTIONS

The Alaska Farmers' Co-op has constructed a bulk fertilizer plant with sufficient storage and blending capacities to meet the existing and future demands of this region. Future fertilizer-induced planting delays should become essentially non-existent.

The grain drying and storage facility, owned and operated by the Co-op is also scheduled for modification. This will speed up drying time and thereby reduce unloading delays at the elevator during the critical harvest season.

Several farmers are contemplating constructing storage facilities for a portion of their crop. This will improve harvesting also.

Continued efforts through the University of Alaska Agricultural Experiment Station and Cooperative Extension Service

will keep the farmers informed of technological advancements and managerial improvements.

The Alaska Agricultural Action Council will continue to pursue agricultural project opportunities in terms of marketing systems, red meat industry coordination and complimentary agricultural development projects. All are vitally essential to developing a successful agricultural industry in Alaska.

#### SUMMARY

The past three years have brought tremendous changes to the Delta area as well as to the state's entire agricultural industry. Two years ago, only 17,000 acres of land were in production in the entire state of Alaska. Delta Junction alone had nearly that much production in 1980.

It is virtually impossible to evaluate the development of a totally new industry in the third year of its existence, especially when similar development in the rest of the nation required decades.

Alaska's agricultural development must follow the pattern of agricultural development elsewhere in that it requires land, labor, capital and technological advancement. The state is releasing land and making loans available to qualified applicants. The public is providing technological advancement and assistance. The ingredients are already in place--now it will only require time for coordination and continuity.

Alaskans eat, but we are too many to live off the land and must currently import 95-98% of our food, even though we have nearly 18 million acres of potential farmland. We desperately need an industry based on renewable resources--

and what better industry than agriculture?

Alaskan agriculture will succeed.

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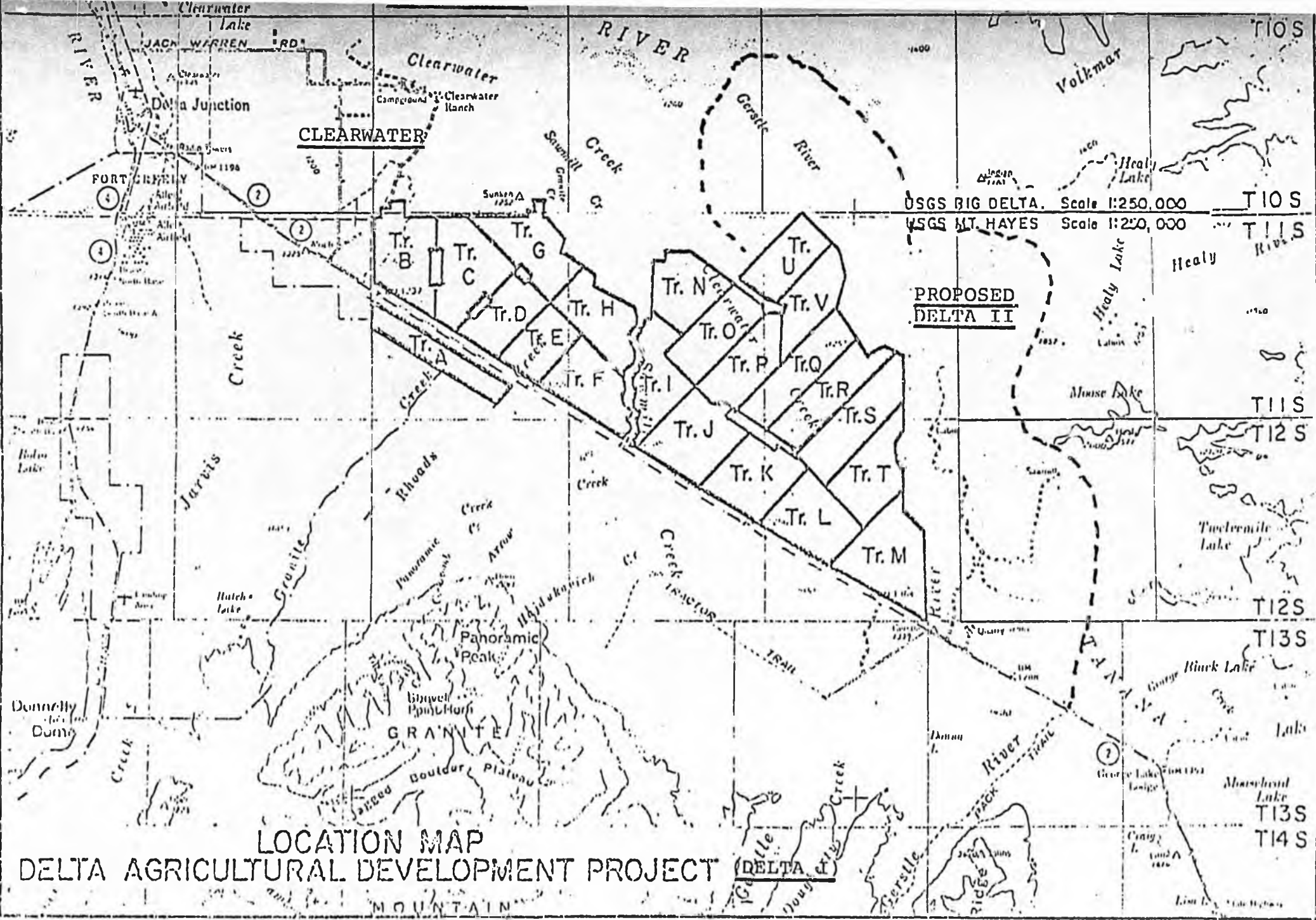


FIGURE 1. Delta Agricultural Areas

Delta I  
Delta II

Tanana Loop  
Clearwater

TABLE I. Crop-Yield Tests, 1979 Crop-Year, Delta Junction Area, Alaska\*

GROWER	PRODUCT	VARIETY	AREA	AVG. YIELD (bu/acre)
Saylor/Jenkins	Barley	Weal	1	58.6
			2	57.4
			3	52.7
		Galt	1	40.7
			2 (sludge area)	106.2
Ruta	Barley	Otra	1	69.8
			2	96.0
Green, Bob	Barley	Weal	1	31.5
Green, Dan	Barley	Weal	1	55.1
Brazier, L.	Barley		.1	69.5
Spears, L.	Barley		1	39.8
			2	72.6
			3	58.9
Dougherty	Barley	Weal	1	60.1
Smith	Barley		1	40.4
Carlson, L.	Barley	Weal	1	59.5
			2	96.5
Kachelmier	Barley	Weal	1	76.9
			2	39.8
			3	70.6
		Otra	4	70.7
			5	79.1
			6	70.7
Brazier, L.	Oats		1	99.7
	Timothy seed		2	725.0 lbs/acre
	Rapeseed		1	27.5
			2 (Kenny)	13.7
S & K Farms	Wheat, h.r.s.		1	41.9
Fett, L.	Rapeseed		1 (Hanson Rd.)	11.9
			2 (Putney)	22.8
			3 (Forks)	21.5

\* Results of randomly-sampled crop-yield tests from throughout the Delta Junction area prior to machine harvest, fall, 1979. Persons using this data should realize that these results are significantly biased (estimate up to 10%) toward the upper side by the following factors: 1) hand-harvested equals no loss; 2) dockage and moisture generalized for all samples, so any given sample or group may have benefitted; 3) early collection precluded losses to bison, birds, wind-shatter, etc.

TABLE II. Small Grains Yield Tests, Delta-Clearwater Area, 1980 Season\*

GROWER	VARIETY	FIELD	BUSHELS	(dry weight)
Olson	Galt	E. end	37.3	37.0
Karr	Windsor	N. side	32.0	31.9
Fett	Galt	3rd panel	27.0	26.9
Brehmer	Weal		80.6	
Helkenn	Weal	S. end	(sample spilled)	
Engellant	Wheat		13.5	13.4
Carlson	Windsor	N. end	60.5	60.5
Brehmer	Galt	E. side	48.73	x
Brehmer	Windsor	4th panel	63.86	x
Spears	Galt	W. side	20.5	x
Kilmurray	?	1/2 mi. e. of graineries	30.6	30.2
Brehmer	Wheat	3rd panel	13.45	13.44
Green	Galt	Tr. F	30.25	30.24
Karr	Windsor	hilltop	74.0	73.9
Kelkenn	Windsor	5th panel	50.4	x
Carlson	Weal	W. side	77.3	x
Helkenn	Lydal	Center	28.6	x
Spears	Galt	W. end	20.2	x
Engellant	Galt		23.5	x
Engellant	Oats		102.5	x
Carlson	Windsor	E. side	62.2	x
Rutt	Lydal		37.0	x
Helkenn	Galt		42.0	x
Brehmer	Tibetan Hulless		57.1	x
Carlson	Wheat		45.7	x
Kilmurray	Barley on old berm row		47.0	x
Bannon	Weal		77.3	x
Karr	Galt		50.4	x

\* Data represents randomly-sampled ideal yield potential for small grain crops in the Delta-Clearwater area. Samples were hand-collected using yard<sup>2</sup> frame, three samples per field, prior to commencement of threshing.

ALASKA  
COMMERCIAL  
AGRICULTURE  
DEVELOPMENT  
SERIES

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COOPERATIVE EXTENSION SERVICE, University of Alaska and USDA Cooperating

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COSTS  
OF  
PRODUCTION  
BARLEY

DELTA  
AGRICULTURAL  
PROJECT  
Delta Junction  
Alaska  
1980

prepared by  
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Assistant Professor &  
Resource Economist  
Cooperative Extension Service  
University of Alaska  
November 1980

# BARLEY PRODUCTION COSTS PER ACRE

Delta Agricultural Project  
Delta Junction, Alaska  
1980

	UNIT PRICE	LOW COST		HIGH COST		AVERAGE COST	
		Units/Acre	\$/Acre	Units/Acre	\$/Acre	Units/Acre	\$/Acre
Seed	\$ 17.30/cwt.	65 lbs.	\$ 10.40	82 lbs.	\$ 14.76	71 lbs.	\$ 12.29
Fertilizer:			36.78		47.77		41.41
urea	200.00/ton	230	23.00	174	17.40	188	
9-36-18	318.00	84	13.15	190	29.64	138	
applicator rental	4.00		.63		.73		
Fuel:			2.83		4.24		3.60
tillage	.94/gal.	.61 gal.	.57	1.14 gal.	1.07		
fertilizer (tractor)	.94	.20	.19	.28	.26		
fertilizer (truck)	1.05	.18	.19	.13	.14		
seeding (tractor)	.94	.30	.28	.50	.47		
seeding (truck)	1.05	.06	.06	.04	.04		
harvest (combine)	.94	1.00	.94	.86	.81		
harvest (truck)	1.05	.00	.00	1.38	1.45		
harvest (semi)	.94	.65	.60	.00	.00		
Repair & Maintenance			3.81		6.61		5.01
Hired Labor	9.00/hr.	1.38 hrs.	12.42	1.89 hrs.	17.01	1.56 hrs.	14.04
Interest on Operating Capital			1.64		2.24		1.91
<b>TOTAL OPERATING COST</b>			<b>\$ 67.88</b>		<b>\$ 92.63</b>		<b>\$ 78.26</b>
Equipment Depreciation			15.25		32.30		21.44
Interest on Equipment Investment			6.86		14.53		9.65
Machinery Storage Building Depreciation			1.10		2.47		1.79
Interest on Machinery Storage Building			.99		2.22		1.61
Interest on Land Investment			12.90		12.90		12.90
<b>TOTAL COST OF PRODUCTION PER ACRE</b>			<b>\$104.98</b>		<b>\$157.05</b>		<b>\$125.65</b>

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The purpose of this analysis is to provide bench marks on the costs associated with large-scale commercial production of barley in Alaska. Also, it is intended to identify existing economic advantage of operations where acreage in production is sufficient to make full use of modern equipment.

Information contained in this cost of production budget is based on data collected in interviews with four Delta Agricultural Project farmers. Acreages under production on the four farms ranged from approximately 500 acres to more than 1,200 acres. Where possible, actual costs were reported and used in this analysis; otherwise, costs were calculated based on fuel use rates and acre-per-hour rates estimated by the individual farmer.

High, low and average cost figures do not represent any one farm. Rather, the lowest cost among surveyed farms for each particular category of expenses (e.g., seed, fertilizer, fuel, etc.) is listed in the column labeled "low cost." Entries in the column labeled "high cost" were similarly determined. The "average cost" column is an average over all farms participating in the survey.

**Operating Costs** are those which require a cash outlay during the crop year. Average total operating costs for the farms in the survey were \$78.26 per acre. The difference between the high and low total operating costs was \$24.75. While seed and fertilizer costs account for the greatest share of this variation, differences in expenses for fuel, repair and maintenance and labor are of equal interest. All of the latter three classes of expenses were higher on farms using smaller or older equipment. Also, use of a tractor-trailer "sem." on one farm reduced labor costs and greatly reduced the fuel cost associated with hauling grain the relatively long distance from farm to elevator. Also affecting the difference in labor costs, one farm relied much more heavily on hired labor than did other owner operators.

**Equipment Depreciation and Interest on Equipment** also showed substantial variation, which is almost wholly attributable to differences in farm size. All farms in the survey owned one large combine and all needed primary tillage equipment, drills, and at least one tractor of relatively large size. All farmers had from \$150,000 to \$250,000 investment in equipment for barley production. Interest expense on this investment is the same regardless of the number of acres farmed. Thus for a 1200 acre farm, interest expense on equipment would be only half as much per acre as it would be on a 600 acre farm.

While depreciation results in part from use, it is largely the result of passage of time. If a new tractor is used only slightly, it will depreciate almost as much in one year as will one with an average amount of use. Depreciation expense per acre is, therefore, less if more acreage is farmed with the same amount of equipment. Within the farms surveyed, however, farmers with smaller sized equipment relative to acreage farmed did incur a lesser depreciation expense per acre, but this reduced cost was partially offset by higher fuel and labor costs per acre.

Interest on equipment and equipment depreciation expenses shown in the low column are associated with the farm that had the greatest acreage under production, and those in the high column are associated with the farm with the lowest production acreage. Clearly, as the project farms increase their acreages of production, per acre costs associated with machinery ownership will decrease at least to the level listed in the low column and possibly beyond that with efficient machinery use. The same is true for depreciation and interest expense on machinery storage buildings.

# CONCLUSIONS

Of the \$52.07 difference between the high and low total cost of production per acre, more than \$27.00 is attributable to interest and depreciation expense on equipment and equipment storage facilities. In other words, \$27.00 of the high production costs are a result of under utilized equipment. High cost farms, with increased acreage next year, will see costs per acre drop to roughly this year's average cost per acre figure, if other factors remain unchanged.

Disregarding inflationary effects, the range between the low and the average total production cost per acre would seem to be the reasonable expectation for farms of the 1,200-acre class in the coming years. While the most efficient farmers might produce at a cost lower than \$105.00 per acre, this figure represents an attainable goal for the above average farm managers. Farms which expand to the 2,000-acre class can expect added economies in equipment operation and thus, lower per acre labor and equipment ownership costs. However, because there were no farms of this size within the survey, an estimate of this reduction in cost is not made.

It is important to note that three factors have not been budgeted in this analysis: drying costs, handling costs and return to management. The Alaska Farmer's Cooperative, Inc., in Delta Junction quotes \$5.00 per ton handling charges and \$10.83 per ton drying expense for barley with 18 percent moisture content. With the addition of these, the low and average figures for total cost of production are \$128.75 and \$149.40 per acre, respectively, assuming a yield of 1.5 tons per acre. Continuing with the assumption of a 1.5 ton per acre yield, total production costs (excluding drying and handling) would be \$70.00 per ton based on the low total cost and \$83.77 per ton based on the average figure for total cost. If handling and drying

costs (18 percent moisture content) are included, total cost increases to \$85.83 per ton and \$99.60 per ton, respectively.

The following matrix identifies the average yield per acre that a farmer would need to achieve to earn a \$25,000 return to management based on various prices and on the low or average production costs, assuming that the farmer is producing barley on 2,000 acres.

Table A. Yields necessary to provide a \$25,000 return to management on a 2,000-acre Delta Agricultural Project farm.

Price f.o.b. Elevator Delta	Low Production Cost (\$104.98/acre)	Average Production Cost (\$125.65/acre)
	Tons per Acre	Tons per Acre
\$ 80/Ton	1.82	2.15
90/Ton	1.58	1.86
100/Ton	1.39	1.64
110/Ton	1.24	1.47
120/Ton	1.12	1.33

Again, note that this matrix is based on production on 2,000 acres. If the price, f.o.b. the elevator at Delta Junction is \$100 per ton, and if the farmer's production cost (excluding drying and handling) is \$104.98 per acre, a yield of 1.39 tons per acre is necessary to provide a \$25,000 return to management. With production costs of \$125.65 per acre, the manager would need to produce 1.64 tons per acre to make the same return to management, based on the same barley price.

## METHODS OF COST CALCULATION

**Seed:** Listed unit price is the average price paid per hundredweight by farmers surveyed. Cost per acre shown in high and low cost columns is based on actual price paid by individual farmers.

**Fertilizer:** Blended fertilizer price and composition are averages over all farmers surveyed. As with seed, however, cost per acre for high and low cost columns is based on actual price paid by individual farmers. Applicator rental rate is based on a quote from Alaska Farmer's Cooperative, Inc., Delta Junction, Alaska.

**Fuel:** The prices of \$.94 per gallon for number 2 diesel and \$1.05 per gallon for regular gasoline are the average prices paid by farmers throughout the cropping year. Rates of fuel use per acre for various operations were supplied by farmers. These rates and average prices were then used to calculate all fuel costs. Fuel expense for trucking grain is based on an assumed yield of 1.5 tons per acre.

**Repair & Maintenance:** Standard repair and maintenance costs based on hours of annual equipment use are provided in *The Costs of Owning and Operating Farm Machinery in Washington*, E.J. 4035, Cooperative Extension Service, Washington State University 1976. (Authors: G.S. Willett, W.H. Pietsch and F.W. Brown.) Hours of annual use of each piece of equipment for barley production were calculated for each farm. From this, repair and maintenance costs for each item were taken from the above publication and totaled. This figure was increased by 50 percent to account for what is the author's judgement of the cost difference between 1976, Washington costs and 1980, Alaska costs.

**Hired Labor:** \$9.00 per hour including benefits typified wages paid on all farms. Labor expense was calculated based on farmers' estimates of hired labor requirements.

**Interest on Operating Capital** was calculated based on 6 percent interest assumption that operating capital would be borrowed on May 1 and paid on October 1. Thus, the calculation was 6 percent times 5/12 of one year times total operating costs (less operating capital costs).

$$i = [(.06) \times (5/12) \times (\text{O.C.})] + \text{acres}$$

**Equipment Depreciation:** Calculation using straight line method, assuming a 10-year life and 20 percent salvage value on all items.

$$\text{Dep.} = [(\text{New Value} - \text{Salvage Value}) \div 10] \div \text{acres}$$

**Interest on Equipment Investment** was calculated as 6 percent times the average value over the life of the equipment.

$$i = \{ .06 \times [(\text{New Value} + \text{Salvage Value}) \div 2] \} \div \text{acres}$$

**Machinery Storage Building:** In the survey of farm operators, no data were collected regarding farm buildings. To estimate this cost, it was assumed that a 40x40 foot building would be sufficient. With a \$25 per square foot building cost, investment would be \$40,000. Assuming a 30-year life and zero salvage value, depreciation expense is calculated as  $(\$40,000/30) \div \text{acres}$  using the straight line method. Interest is calculated as  $[(\$40,000 \div 2) \times (.06)] \div \text{acres}$ .

## DELTA AGRICULTURAL PROJECT

In August 1978, a lottery was held to distribute nearly 60,000 acres of land for agricultural production. This was the beginning of the "Delta Agricultural Project".

The land was platted in 22 parcels averaging 2,650 acres each. Sizes of the individual tracts ranged from 2,000 to 3,300 acres. Studies conducted by the University of Alaska determined that these sizes were necessary to provide the economies of scale necessary for small grain production in a semi-arid climate such as found in the interior regions of Alaska.

Clearing of the land began during the first winter following the lottery. The progress made during the two years succeeding the lottery has been phenomenal. The actual work that has been accomplished totals nearly 60% of completion. Vegetation on approximately 55,000 acres has been knocked down and has been piled into burn rows on 35,000 of these acres. Crops were planted in 1980 on about 7,600 acres; 1981 will show a significant increase in planted acreage.

In 1979, 1.3 million dollars were loaned to the Alaska Farmers' Cooperative, Inc. for the purchase and construction of a grain elevator. During 1980, an additional \$300,000 was used to expand their grain storage and handling capabilities. They now have secure storage for over 500,000 bushels of grain.

It has become apparent, however, that an additional facility must be added in the very near future. This elevator likely will be in a location separate from the existing facilities and will receive grain from the eastern portion of the Delta Agricultural Project (Delta I), and also production from the newly planned Delta Expansion Project, (Delta II). It is expected that construction will be started in 1981.

The Alaska Farmers Cooperative, Inc. has constructed a first class fertilizer

storage, blending, and processing plant. This plant has a storage capacity of 6,000 tons. It can blend and outload 12 tons of product in ten minutes. They have also included a modern bagging unit in this facility. With this addition, they will be able to handle the needs of a small farm operator who prefers bagged materials as well as the large farmers who handle most materials in bulk form.

Grain harvested in 1980 totaled approximately 7,800 tons from the Delta Area. This was much higher than in the past as verified by field checks before harvest. Due to sever weather conditions and preditor (buffalo) damage, however, field losses ranged as high as 50%. Despite these problems, the total tonnage harvested will averaged over 30 bushels per acre.

Since 1980 was the first year of any significantly large acreage planted, it served as an educational period. Much was learned from this season and this knowledge will be incorporated into farming plans for succeeding years. We have the technology to overcome the problems that surfaced this year and with the knowledge we've gained, many of the problems encountered in this year's harvest will be overcome.

Estimates of barley production tonnage for the next five years from Delta I and Delta II are:

<u>Year</u>	<u>Delta I</u>	<u>Delta II</u>	<u>Total</u>
1981	25,000	-0-	25,000
1982	40,000	5,000	45,000
1983	40,000	15,000	55,000
1984	40,000	30,000	70,000
1985	40,000	35,000	75,000

With the opening of new agricultural lands in Delta Junction, the private business sector has stepped in to begin supplying the farmers with needed quipment, parts, and service. At the present time there are three equipment dealers operating in the area. They represent the three major manufacturers of agricultural equipment

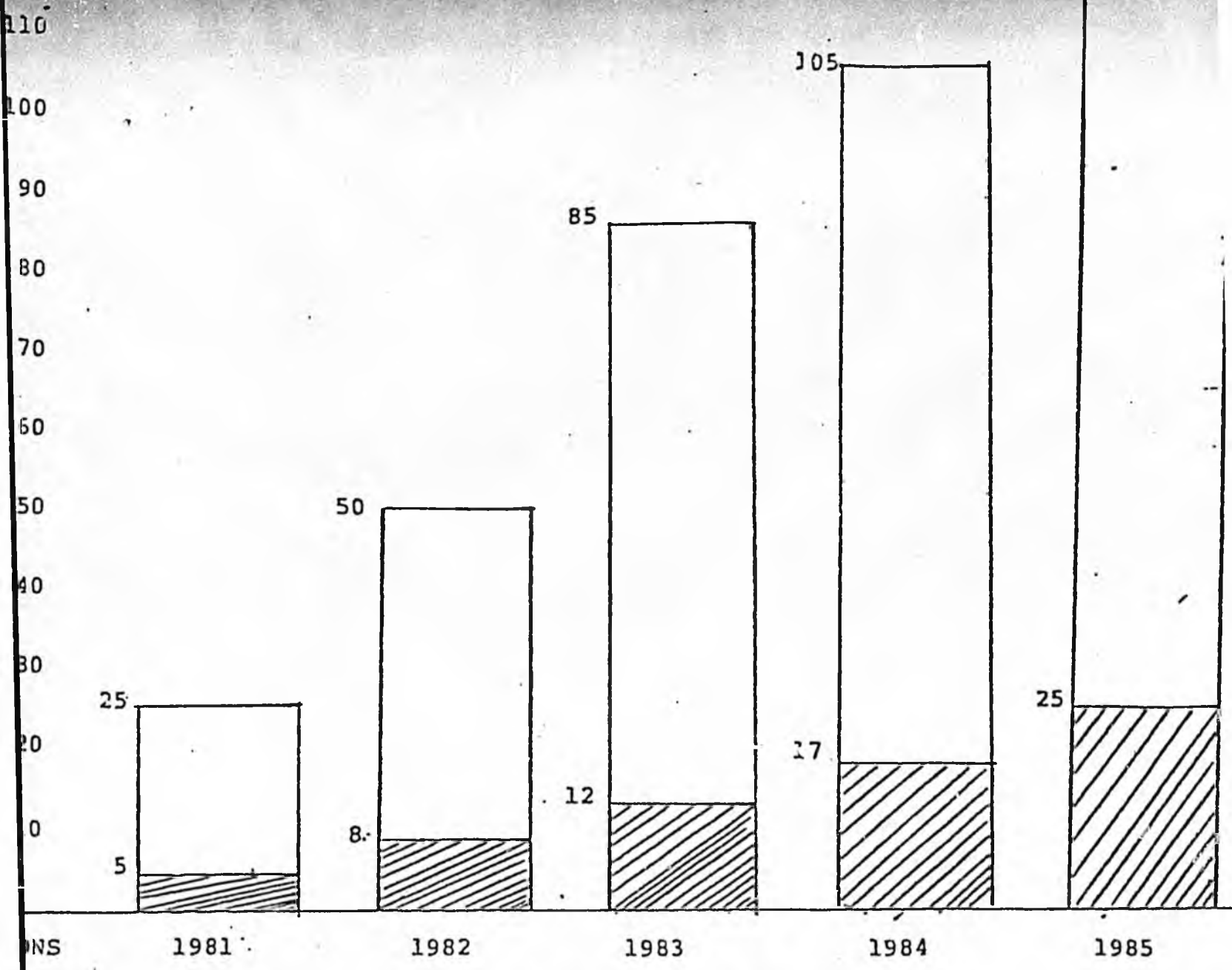
in the U. S.. The financial commitments of the dealers are indicative of the faith they have in the potential for agricultural development in interior Alaska.

Concurrent with the expanded feed grain production in the State is the increase in numbers of livestock being raised. Beef, dairy, and hog production have all taken a large upswing in the Delta area. Beef animals held for breeding purposes have more than tripled in the past year. In addition, several farmers who have not previously kept beef herds are getting geared up to handle them.



The interior dairy industry which for years has been extinct received a shot in the arm when Northern Lights Dairy began producing and processing milk in July of 1980. They were followed by another producer who came on line in November and began shipping milk through their facility. A third farmer is in the planning stage now for the inclusion of a dairy herd in his operation.

In 1980 there were fewer than 1,500 hogs raised in Alaska. That situation will change rapidly, as evidenced by the construction of a completely confined farrow to finish hog operation, in the Delta area. When in full operation, this plant will house 150 sows and raise 3,000 fat hogs per year.

The additional livestock from these initial enterprises will severely tax the available red meat processing that is available in Alaska. Therefore, it is extremely important that facilities be started now to alleviate a glut in the live animal market that is sure to occur.



Production and Usage of Grain from Delta, Delta Expansion, and Nenana Projects

 in State grain usage  
 surplus

# MEMORANDUM

State of Alaska

TO: Representative Terry Gardiner  
House Resource Committee  
Alaska State Legislature

DATE: February 19, 1981

FILE NO:

ATTN: Mary Hakala

TELEPHONE NO:

FROM: Mike Gilleland *Mike*  
Planning Coordinator  
Alaska Agricultural Action Council  
Office of the Governor

SUBJECT: Delta Barley Production

In 1980 approximately 11,000 acres of barley were seeded in the Delta Junction area. Total HARVESTED tons of barley was 7,800. There were over 2,000 acres of barley fields that were damaged by bison foraging and trampling that significantly reduced the quantity harvested.

Of the 7,800 tons, 5,500 were delivered to the Alaska Farmers Cooperative, Incorporated to be subsequently purchased by the State of Alaska with the 3rd year funds from the "Test Marketing" program. The balance of 2,300 tons is being held in on-farm storage by the producers to be used in their own dairy, beef, and hog operations.

The barley purchased from the Cooperative, by the State, is being marketed by the Alaska Agricultural Action Council office in Fairbanks. To date we have sold 1,493 tons to in-state users. We have in addition contracted for sale and delivery of approximately 2,000 tons. As the coordinator of grain sales, I also anticipate at least another 1,000 tons to be sold from the 1980 production. This will leave us with a "cushion" of 1,000 tons for contingencies.

During the past month a survey was conducted, by our staff, of the Delta producers for their estimates of 1981 crop year production. The figures we obtained indicate that around 16,000 acres will be seeded. With "normal" weather conditions, we should be able to produce 20,000 tons of barley. I would anticipate at least a 10% increase in domestic useage which would require some 5,000 tons. The balance of approximately 15,000 tons would then be available for export shipment.

If you need any further clarification on this subject please contact me.

FIRES RELATED TO DELTA AGRICULTURAL PROJECT1979

No.	Name	Cause	Acres	Duration Start to Control
912007	Delta Barley 3	Controlled Burn equip. use	30,050	117 days*
912013	Kachelmier	Controlled Burn Escaped	1,285	7 days
912043	Delta Barley 6	Controlled Burn Escaped	125	2 days
912046	Delta Barley 7	Controlled Burn Escaped	3,400	23 days
912048	Delta Barley 8	Controlled Burn Escaped	5,770	7 days

1980

No.	Name	Cause	Acres	Duration Start to Control
012009	Ferguson Farm	Controlled Burn Escaped	7,155	15 days ✓
012011	Barley Way	Controlled Burn Escaped	220	15 days
012013	Tract H	Controlled Burn Escaped	360	15 days
012034	Tract J	Cat. Exhaust	240	4 days

\* Includes three individual manning and demanning operations, two control dates before the final control date.

MAJOR FIRE COSTS RELATED TO DELTA AG PROJECT

60,000 ACRES TOTAL AGRICULTURE PROJECT

FIRE #	ACRES	COST
912007	30,050	4,336,916. includes 799,000. BLM costs
912013	1,285	63,641.
912043	125	Costs for these three fires were lumped in with 912007 fire costs and cannot be broken out individually.
912046	3,400	
912048	5,770	
	40,630	4,400,557.

1980

FIRE #	ACRES	COST
012009	7,155	399,491.
012011	220	28,098.
012013	360	38,024.
012034	240	165,492.
	7,975	631,105.

# Issues Regarding the Delta Agricultural Project

## *1. What was the major impetus for the Delta agricultural project? Date of legislation?*

The State of Alaska has recently undergone a period of high economic activity caused by construction of the oil pipeline. With completion of the pipeline, unemployment in Alaska has risen substantially. Agricultural and fishery developments are viewed by many Alaskans as the means to stabilize the economy.

The Delta agricultural project was undertaken by the Governor of Alaska using existing departments of the executive branch. The project is directed by the special projects coordinator within the Office of the Governor. The legislature approved the development program and provided initial funding during its 1978 session in the amount of \$4.8 million dollars. A second appropriation bill in the amount of \$7.1 million passed the legislature in 1979.

## *2. What are the objectives of the project?*

With less than 20,000 acres in production in a state with 20,000,000 acres of farmable land, Alaska's agricultural potential is largely undeveloped. This project is directed at developing a latent renewable resource into a productive economic and social activity.

Such development will strengthen Alaska's economy and reduce its boom-bust cyclical nature. The program will be conducted in a manner that will facilitate creation of the necessary infrastructure concurrent with development of the farm program. In conjunction with this objective is the organization of a marketing effort which will include both domestic and foreign sales of agricultural products from project and adjacent lands.

## *3. What is the land development program?*

Phase one was initiated with a land sale in August 1978. A 60,000 acre block near Delta Junction, Alaska, was broken down into twenty-two tracts and sold by lottery. Presently approximately 53,000 acres have been "knocked down", 40,000 acres piled into berm rows, and 7,000 acres planted to crop. The second phase, adjacent to the first, will be sold by lottery in early 1981 and consists of approximately 50,000 acres. The total amount of land in production in the Delta Junction area, including privately owned, new project lands, should approach 150,000 acres by mid-1980's. Additional projects at Point MacKenzie (near Anchorage), and Nenana area of interior Alaska, are also envisioned for the near future. Total land in production is scheduled to be close to 500,000 acres by 1990.

## *4. What are the major crops in the Delta agricultural project?*

Barley and rapeseed are expected to be the initial major crops on project lands. Wheat may also be included. Lesser crops should include buckwheat, grass seed, hay and silage, and potatoes.

## *5. How were farmers selected?*

A lottery system has been used on all project land sales. To qualify for the lottery pool, an individual had to possess \$35,000 in equity capital, show evidence of management (not necessarily agricultural) background, be a resident of Alaska for 30 days, and be a United States citizen. Corporations were excluded.

## *6. In what manner has the State participated in the funding process of the project?*

Project funding includes a loan program for land clearing which amounts to approximately \$165 per acre. Each farmer who bought a farm tract in the project was eligible for this loan. The terms included interest at 6 percent and a payback of 40 years. The land-purchase price, averaging \$51 per acre, was repayable over a 20-year period. The State has built a gravel-based road system for \$1,100,000 that connected project farms to the main highway. Monies were also allocated to administer the project and for a country elevator loan program (see 10). The State has also made low interest farm construction, machinery, and operating loans available. Plans are also being discussed for state participation in marketing, transportation and processing systems.

7. *What about title on these lands?*

Title on all State lands sold for agricultural uses in Alaska has a unique feature. It is fee simple with two restrictions; subsurface rights and all other development rights are retained by the State. In other words, the land can be used only for farming. The farmer is protected from land price increases based on other uses or non-agricultural speculation.

8. *What are the marketing plans for the crops from this project?*

Crops from project lands will be sold locally and in export markets. The barley will probably substitute for most feed grains entering the State. Projections indicate that local use will increase to consume as much as 50 percent of the crop by 1985. The remainder will be exported, probably to Japan and Taiwan. All rapeseed which grades number 1 will be shipped whole to Japan.

9. *Is transportation development being planned?*

A number of studies and proposals have been completed coordinating an agricultural transportation system for the entire state. These include the use of trucks to transfer sites and off-loading to railroad cars. From that point, grain can be transported to either domestic or export users.

10. *What about storage of grain awaiting shipment?*

A state loan for approximately \$900,000 was granted to Alaska Farmers Cooperative of Delta Junction to build the first major country elevator in Alaska. Additional cooperative storage facilities plus considerable on-farm storage is planned. The State is also considering a proposal to construct a port grain terminal.

11. *Are additional agriculture projects planned?*

Two projects were recently approved by the Alaska Legislature. One, an additional 50,000 acre development adjacent to the present project, and second, a 15,000 acre project near Anchorage designed for the dairy industry.

12. *Where can I obtain more information about agriculture in the State of Alaska?*


You may contact either Bob Pollock, Delta Agricultural Project, P. O. Box 887, Delta Junction, Alaska 99737, phone (907) 895-4687 or Bob Palmer, Chairman, Agriculture Action Council, State of Alaska, Pouch AN, Juneau, Alaska 99811, phone (907) 465-3568.


Alaskan Agricultural Action Council  
Revised June 4, 1980

# MEMORANDUM

# State of Alaska

TO: Ronald J. Somerville  
Director  
Division of Game

THRU: Richard H. Bishop   
Regional Supervisor

FROM: John W. Coady   
Research Coordinator  
Division of Game  
Department of Fish and Game  
Fairbanks

DATE: March 2, 1981

FILE NO:

TELEPHONE NO: 452-1531

SUBJECT: Potential Impacts of  
Intensive Agricultural  
Development on Wildlife  
in Alaska

This is to provide an outline of significant interactions which have already occurred or that we should anticipate in the near future between agriculture and wildlife in Alaska. A more detailed and fully documented draft report or "white paper" on this subject will be completed soon.

- I. Interaction between agriculture and wildlife will occur.
  - A) The history of both favorable and unfavorable influences of agriculture on wildlife in North America is extensively documented.
  - B) Small family farms generally benefit some wildlife species, while large fields, crop monocultures, and livestock grazing adversely impact several wildlife species.
  - C) In Alaska, the best areas for agriculture are also frequently the best for some wildlife species.
- II. Wildlife habitat will be impacted.
  - A) Loss or alteration of habitat will occur through crop production, grazing, and use of herbicides.
    - 1) This is a major cause of wildlife population declines in many areas of North America.
    - 2) This may cause major impacts in Alaska on some furbearer, moose, bison, black bear, and small game populations.
  - B) Competition for forage may occur.
    - 1) Competition for some willow species occurs between moose and livestock in southeast Idaho and Jackson Hole, and for herbaceous plants between livestock and bison in many areas including Alaska.
    - 2) Competition between livestock and moose for some willows and herbaceous forage is possible in Alaska.

- 3) Competition for grasses, sedges, and forbs between livestock and Dall sheep will occur if grazing is permitted in alpine and subalpine areas.
- 4) Competition between reindeer and caribou will occur if reindeer are allowed to graze on traditional caribou ranges.

III. Depredation will occur.

- A) Depredation on crops and structures will result in the need or pressure to reduce a wildlife population size.
  - 1) For example, a Board of Elk Control was established in Utah to control elk numbers because of depredation problems.
  - 2) In Alaska, depredation by bison, moose, waterfowl, hares, squirrels, beaver, and perhaps other species on grain, hay, garden crops, ensilage, and fences will increase.
- B) Depredation on livestock has already and will continue to result in the need or pressure to reduce or eliminate predators, such as wolves and bears.

IV. Disease and parasite problems in both livestock and wildlife will likely increase.

- A) The introduction of infected livestock or domestic animals that affect susceptible wildlife is of paramount concern.
  - 1) This has contributed to catastrophic wildlife losses of some wildlife populations in western states and provinces.
  - 2) For example, Wyoming lost thousands of antelope and deer to blue-tongue virus last year; cattle are the reservoir host for this virus.
- B) Livestock may infect wildlife, and that wildlife population then will serve as a potential reservoir for reinfection of livestock.
  - 1) Wildlife both may be affected by disease and criticized for being the source of disease.
  - 2) Brucellosis in western states is the best example.
  - 3) Wildlife have been slaughtered to prevent reinfection of livestock.

V. Direct mortality to wildlife will increase.

- A) Unintentional poisoning of wildlife by fertilizers, herbicides, and pesticides has and will continue to occur.

- B) Entanglement in fences will occur.
- C) Shooting of "nuisance" animals and poaching will increase.

VI. Movements of wildlife will be affected.

- A) Lengthy fences will create a physical barrier to local movements and seasonal migrations of some species.
- B) Structures, open fields, and intensive human activity may create behavioral barriers.

VII. Access-Trespass problems will increase.

- A) Access to or through areas by hunters and trappers will be limited by agricultural developments.
- B) Trespass by outdoorsmen, possibly resulting in vandalism and unintentional property damage to agricultural developments, will increase.
- C) Improved public access via agricultural development may create new wildlife management challenges which we should be prepared to meet.

VIII. We should provide for the optimum sustained use of all natural resources.

The agricultural industry should be developed and expanded in Alaska.

- B) Policy decisions should be deliberate and objective and should strive for careful consideration of soil, water, plant, and wildlife resources.
- C) Wildlife losses and the loss of traditional uses of wildlife can be mitigated with careful assessment and planning.
- D) With proper planning, agricultural development can be compatible with the long-term well-being of most wildlife populations in Alaska.

# MEMORANDUM

# State of Alaska

TO: Ronald J. Somerville  
Director  
Division of Game  
Juneau

DATE: February 4, 1981

FILE NO:

THRU: Richard H. Bishop *RHB*  
~~580M~~ Regional Supervisor  
Oliver E. Burris *OB*  
Management Coordinator  
Division of Game

TELEPHONE NO: 452-1531

~~XXXXXX~~

FROM: David M. Johnson *DMJ*  
Area Biologist *OS*  
Division of Game  
Department of Fish and Game  
Delta

SUBJECT: CY 1981 Bison Activities

This is an outline of proposed bison-related activities for calendar year 1981 for your approval. I am concurrently beginning work on a contract for land clearing. At this stage, the bid request will not specify areas or exact acreages to be cleared.

## SUMMER RANGE

1. Begin working with the Army to rehabilitate summer bison range. Consisting of prescribed burns and/or fertilization, this operation would attempt to provide better quality and quantity of forage and to hold the bison on the summer range longer. It should be possible to fertilize in 1981, at least on a test basis. Burns may not take place until 1982 or 1983. This activity is primarily to alleviate bison-agricultural conflicts. Since summer range is not a limiting factor to a herd of less than 400 animals, it probably is not a cost effective way of improving bison habitat.

2. Provide salt in midsummer. Salt seems to hold the bison on their summer range longer than they might otherwise stay. We would put out 30-50 blocks of 50 pounds each opposite and south of the Texas Range on the Delta River. (See map). Timing of salting would depend on bison movements.

## TRAILS

3. Complete North (Alcan Highway) Trail from 33-Mile Loop Road to the bison range clearings. Completion of this trail was disputed last year. If it is left incomplete, even with its blockage along the Loop Road, the bison will use it--as they demonstrated in 1980--to access Tract A. Completing the trail to our fields should reduce the possibility of early damage. Tract A was not planted in 1980 but probably will be this year. It will also give bison moving south from the project a trail along which they may safely move. (See map). Approximately 2 miles of trail would be required.

4. Complete South Trail from 33-Mile Loop Road to bison range clearings. This was the trail originally designated by the Army in their bison plan for bison range access. If the bison move along the military's planned trail system, it may be useful. Two trails, this one and the north trail, should help to maximize bison movement to the range. Approximately 2 miles of trail would be required. (See map).
5. Cooperate with military to provide forage along the trails and in the food plots they have cleared. The Army has largely completed development of a trail system across Fort Greely to the bison range; it incorporates some gravel roads and short sections of new trails. Food plots are located in several places along the trail, and we would work with them to promote maximum use of these food plots. The Army reports that food plots planted late to oats on the 33-Mile Loop were used heavily by bison last fall. Those portions of their trail system that can be planted will be. (See map).
6. Block access to north from trail system with berms, brush, fence sections, and gates as appropriate. While bison go where they will, it may be possible to direct their movements to a degree by blocking cross trails against their passage. This, in combination with the inducement of salt and forage along the "right" trails, may lead more of them to bison range fields. Three cross trails of particular concern are: an old fire line crossing both the north and south military trails, an old trail through our existing fields and Tract A, and the 1408 road. A trail leading from the crushed area may also need to be gated or blocked. Other trails may need to be blocked as well.
7. Assist the Army in providing salt along their trails as animals begin moving. The Army has nearly 500, 50-pound blocks of salt to use for the purpose of directing the animals along their trail system. We would cooperate with them to ensure the blocks are set out at the optimum time and places.

#### FIELDS AND PLANTINGS

8. Clear fields and trails to limits of money available in a NW-SE axis along the northern edge of the bison range. Fields of varying sizes would be cleared first in the crushed area and later, as money permits, south and parallel to the first series. Trails would interconnect these fields and those cleared in 1979 with the trail system discussed earlier. A trail or trails would also be cleared to water at Sawmill Creek. (See map).
9. Plant fields with barley and perennials. Fields would be planted with barley or perennials. The mix or forage has not been decided, but in order to reduce annual maintenance, more perennial fields would likely be planted than barley fields. We will attempt to farm the barley fields on a sharecrop basis.

HARASSMENT

10. Radio-collar additional bison to allow better detection of movements. Five additional radio collars are on hand and would be placed on bison as time and money permits. In addition, radio collars would be used next fall to track bison movements. They are also useful for composition counts and recording migration patterns.

11. Divert bison south of the Alaska Highway to the trail system and the bison range. We would monitor bison movements regularly as they move east and attempt, through various forms of harassment, to keep them south of the Alaska Highway and moving toward the bison range. As harvest is complete, harassment would cease.

The following table lists the priority, estimated cost, and man-days for the activities listed above.

## PRIORITY AND ESTIMATED COST OF PROPOSED PROJECTS CY 1981

<u>Priority</u>	<u>Activity</u>	<u>Estimated Cost</u>	<u>Estimated Man-Days</u>
1	(8) Clear Fields	\$25,615 <sup>1</sup>	14 <sup>2</sup>
2	(9) Plant Fields	11,385 <sup>1</sup>	4 <sup>2</sup>
3	(1) Rehabilitate Summer Range	3,000 <sup>3</sup>	20
4	(2) Salt	250	4
5	(3) Complete North Trail	150	1
6	(4) Complete South Trail	150	1
7	(6) Block Access	250	10
8	(10) Radio-Collar Bison	3,000 <sup>4</sup>	10 <sup>4</sup>
9	(11) Divert Bison	2,000 <sup>4</sup>	40 <sup>4</sup>
10	(5) Cooperate with Military: Salt and Forage	-0-	5

Notes

1. The total expenditure of time and money would depend on the amount of money available. Assuming \$37,000 remains from the \$50,000 FY81 Bison Range Appropriation, about 115 acres could be cleared and planted. If an appropriation bill is passed and made effective this spring, if sharecropping arrangements can be negotiated or if major use is made of the crushed area, additional acres could be cleared.

2. The man-days figure proposed assumes clearing and planting 115 acres.

February 4, 1981

3. This money could come from the \$50,000 appropriation. If it comes from another source, or if it is not used, about 10 additional acres could be cleared and/or planted on the Bison Range.

4. At current budget levels, I recommend spending this amount of money and time in FY82. If additional money becomes available, substantially improved control of bison movements could probably be effected.

If you concur with the activity and priorities listed above, it may be necessary to modify our agreement with the U.S. Army or get them to modify their bison plan. Their plan does not call for the completion of the north trail to the bison range. Further, their plan does not call for development of bison range on the west side of the Delta River; however, it does not exclude it either. A draft letter to Colonel Bonito was sent to you a few days earlier.

If this does not provide the detail you requested earlier, please contact Bud or me. The map of the proposed clearing and trail work will be enclosed or sent in a few days as soon as we get it copied.

March 4, 1981

Sally,

Doctor Don Tomlin, Agricultural Director for the Tanana Chiefs agricultural program came by the office today to provide you with a copy of his letter to Representative Moss and backup information.

Dr. Tomlin is requesting continuation and expansion of the village gardening program which is administered by the TCC. BIA will cover only half of the gardening assistants needed to carry out the program's intent. TCC is requesting \$379,500 from the legislature.

Dr. Tomlin will be testifying before the Resources Committee today. He is hopeful of meeting you!

gb

March 2, 1981

Representative Pappy Moss  
Alaska State Legislature  
Pouch V  
Juneau, Alaska 99811

Dear Pappy:

I've changed work since I last talked with you; I'm directing the agricultural program for ~~Tanana Chiefs~~ as of the first of this month.

My boss, Jack Utton, said that he had talked with you about the Tanana Chiefs Conference village agriculture program. As you probably know, they have had continuing growth of interest in the ~~subsistence gardening~~. Last year, through your efforts in the 1979 legislature, TCC was able to place a gardening assistant in each of its six subregions to help the village residents with their gardening efforts.

The money you obtained from the 1980 Legislature for the food processing and preservation facilities in interior villages was channeled through the Department of Community and Regional Affairs. We found an engineer in Anchorage to do the design and pricing on the brine-reservoir, passive freezer building. We're looking at this as a pilot model, to see how well it works before we try any more of them. The rest of the money will go for food processing - preservation buildings (canning kitchen and root cellar, with a lean-to greenhouse) in three villages, and a training program for these facilities. We have every intention of completing construction this summer, in time for the food centers, at least, to be used. The passive freezer can probably be used to store food this fall, but its reservoir of cold will not be functional until it has gone through a whole winter.

I think the food centers will create interest in other villages but indications so far are that not every village will want or need one. We have budgeted for a few more next year.

Jack and I have discussed our views of the ~~future of this village gardening program~~. We hope to ~~develop~~ a ~~core group~~ of skilled ~~gardeners~~ in each ~~village~~ which will carry on the interest and provide support to the neophytes. We think the gardening equipment needs in the villages of our region have pretty well been met and anything further would be of a maintenance nature.

JOBS10  
c1

Page 2  
March 2, 1981

We do feel that it is extremely important to ~~continue~~ the program of providing people to help with gardening in the villages. We must not lose the momentum of interest developed in the past two years. We hope that a few more seasons of this assistance will build sufficient interest that we can reduce our efforts and expect it to continue.

That brings up the problem we are facing now. Our current B.I.A. ~~support budget~~ will not cover more than one and a half of the gardening ~~assistance~~ for this summer. We need at least six people working in the subregions to maintain the same level of support as last year. To properly handle the job, we need eight people. This is for thirty villages. Koyukon Development Corporation is covering only eight villages this year instead of the twenty last year, while Venetie and Arctic Village have opted out of the programs. It will cost us \$20,650 per person to provide training and keep them working in the villages through the gardening season. We also need to provide them with some basic visual aids, which will cost about \$300 per person. Is there any way you could get money to support our program for this season? We would need an initial appropriation by May 1, and another by July 15. Of course, we need to look forward to 1982, so we don't get caught behind the eight ball again. I've outlined these needs in a budget sheet at the end of this letter.

Confidentially, I think you know as well as we do that a vacuum has developed in this area of assistance to village gardening. The Cooperative Extension Service no longer budgets for travel to the rural areas, nor has it sufficient personnel to handle the rural needs. The Agricultural Experiment Station has never been oriented to the needs of subsistence gardening. I've been rather closely involved in the rumblings in the Rural Education Division of the University regarding its agriculture program at the Galena Regional Learning Center, and given the basic premises of Rural Education's administrators, I can't see any way that they will be able to cope with the need. Koyukon Development Corporation seems to be drawing back on their participation compared with last year. Of course, KDC and the Galena Center cover only 20% of the Doyon region. I didn't intend this as criticism; it's only to point out that a serious vacuum exists in TCC's territory and we must exert greater efforts to fill it. After all, what can be more important than teaching rural residents to produce and store their own foods.

Page 3  
March 2, 1981

These, then, are our needs for support of the ~~village gardening program~~. We hope you will be able to give it your support. I'm looking forward to discussing this with you in Juneau.

Sincerely,

TANANA CHIEFS CONFERENCE, INC.

Don C. Tomlin, Ph.D.  
Agricultural Director

DCT/699k  
enc.

Budget for TCC village gardening assistance program

May 1 to July 14, 1981, 6 persons

wages 6 @ \$1,750 per month	26,250
fringe benefits @ 21%	5,510
travel	7,500
per diem	8,200
training	5,100
visual aids	1,800
	<u>54,360</u>

July 15 to September 15, 1981

wages	21,000
fringe benefits	4,410
travel	6,000
per diem	8,930
training	4,740
	<u>45,080</u>

March 15 to September 15, 1982, 8 persons

wages 8 @ \$1,800 per month	86,400
fringe benefits	18,140
travel	24,000
per diem	30,240
training	11,120
visual aids	900
	<u>170,800</u>

Indirect Costs @ 25.8% of wages	41,720
Indirect Costs @ 36.7% of all other costs	39,830
Total	<u>351,790</u>

Capital Expenditures

6 food processing centers @ \$50,000 (canning kitchen, root cellar, greenhouse)	300,000
plus 10% inflation	30,000
plus overhead @ 15%	49,500
	<u>\$379,500</u>



# Alaska State Legislature

## House of Representatives

### Committee on Resources

Terry Gardiner, Co-Chairman  
Fred F. Zharoff, Co-Chairman  
465-3715

Pouch V  
State Capitol  
Juneau, Alaska 99811

#### AGRICULTURE      HEARINGS

House Resources Committee/ Room 118

Wednesday; March 4      3PM      TELECONFERENCE

#### Scheduled Speakers:

DELTA 1 & 11:

Rep. Pappy Moss  
Agriculture Action Council  
Gerald Brehmer, Delta farmer  
Adrian Fredrich, Alaska Farmer's  
Coop, via teleconference  
Teleconference participants

EISON & WILDLIFE CONCERNS:      Dick Bishop, Alaska Dept. of  
Fish & Game

RED MEAT INDUSTRY:      Bob Pollock, Agric. Action  
Council  
Don Tomlin

LAND LEASING POLICIES:      Ted Smith, DNR

Thursday; March 5      3PM

#### Issues which will be addressed:

Pt. McKenzie  
Nenana-Totchaket

(30) "state" means State of Alaska;

(31) "timber land" means those lands which, because of physical, climatic and vegetative conditions, are presently or potentially chiefly valuable for the production of timber and other forest products;

(32) the masculine gender includes the feminine and the neuter;

(33) the singular number includes the plural;

(34) "unclassified lands" means all lands not otherwise classified;

(35) "university lands" means all Sections 33 reserved to the University under 38 Stat. 1214, as amended (48 U.S.C. 353), and all lands presently or hereafter reserved for the benefit of the University of Alaska;

(36) "vendee" shall mean the purchaser;

(37) "vendor" shall mean the State of Alaska;

(38) "open-to-entry lands" means those lands which meet the criteria as established by AS 38.05.077;

(39) "resource management lands" means those lands containing an association of surface and/or subsurface resources which are especially suited to multiple-use management. Such management may be accomplished in whole or in part pursuant to an inter-agency agreement. (Eff. 7/1/60, Reg. 1; am 8/15/64, Reg. 18; am 3/22/69, Reg. 28)

Authority: AS 38.05.020  
AS 38.05.035  
AS 41.20.020

**ARTICLE 4.  
HOMESITES**  
Repealed 5/13/79.

**ARTICLE 5.  
OPEN-TO-ENTRY**  
Repealed 5/13/79.

**CHAPTER 55.  
LAND PLANNING AND  
CLASSIFICATION**

**Section**

- 10. Application of chapter
- 20. Planning and classification
- 30. Preparation of plan
- 40. Classification
- 50. Agricultural land
- 60. Commercial land
- 70. Forest land
- 80. Grazing land
- 90. Greenbelt land
- 100. (Repealed)
- 110. Industrial land
- 120. Material land
- 130. Mineral land
- 140. (Repealed)
- 150. Private recreation land
- 160. Public recreation land
- 170. Reserved use land
- 180. Residential land
- 190. Resource assessment land
- 200. Resource management land
- 210. Utility land
- 220. Watershed land
- 230. Wildlife habitat land
- 240. Reclassification
- 250. Notice
- 260. No effect on valid existing rights
- 270. Proposing classifications
- 280. Definitions

11 AAC 55.010 APPLICATION OF CHAPTER. This chapter deals with the planning and classification of all land under the management authority of the department, as well as land that has been selected or is otherwise to be acquired by the state and managed by the department. The intent of this chapter is to establish a system of land classification based on a land use planning process that recognizes the varied resources of the state, including land, water, and air, and the many competing demands for those resources. The planning process will provide for the balanced use, development, and conservation of those resources for the maximum benefit of the people of Alaska. (Eff. 11/12/78, Reg. 68; am 10/14/79, Reg. 72)

Authority: AS 36.04.900  
AS 36.05.020  
AS 36.05.300

available for the acquisition of rights to lease locatable minerals under AS 38.05.205 and 11 AAC 86.300 - 11 AAC 86.325, subject to any restrictions in each specific classification: resource management and wildlife habitat.

(f) Depending on the land use plan and subject to any restrictions in each specific classification, land in the following classifications may also be available for the acquisition of rights to lease locatable minerals under AS 38.05.205 and 11 AAC 86.300 - 11 AAC 86.325: commercial, greenbelt, industrial, public recreation, reserved use, and watershed.

(g) Land in the following classifications is available for the disposal of materials and of timber, subject to any restrictions in each specific classification: agricultural, commercial, forest, grazing, industrial, material, mineral, resource assessment, resource management, utility, watershed, and wildlife habitat.

(h) Depending on the land use plan and subject to any restrictions in each specific classification, land in the following classifications may be available for the disposal of materials and timber: greenbelt, private recreation, public recreation, and reserved use.

(i) Land or an interest in land in the following classifications is available for sale, lease or other disposal, subject to any restrictions in each specific classification: agricultural, commercial, industrial, mineral land (if acquired by escheat or foreclosure only), private recreation, residential, and utility.

(j) Title to land in the following classifications must be retained in state ownership, but an interest in land may be available for lease, subject to any restrictions in each specific classification: forest, grazing, material, mineral, public recreation, resource management, watershed, and wildlife habitat; except that grazing land is available for municipal selection under AS 29.18.201 - AS 29.18.213. (Eff. 11/12/78, Reg. 68; am 10/14/79, Reg. 72)

Authority: AS 38.04.015 AS 38.05.185  
AS 38.04.900 AS 38.05.295  
AS 38.05.020 AS 38.05.300  
AS 38.05.045

**11 AAC 55.050. AGRICULTURAL LAND.** (a) Land classified agricultural is land that, because of its location, physical features, and climate, is or may be made suitable for agricultural use.

(b) The primary management goal is the preservation of agricultural land for either present or future agricultural use.

(c) Land classified agricultural is intended for present or future agricultural use. It is to be used for the production of plants and animals useful to man, and for other uses incidental to and compatible with the primary use or as identified in the land use plan for the area. Agricultural land is available for mineral leasing under AS 38.05.135 - AS 38.05.184, for the disposal of materials and timber, and for the sale or lease of agricultural rights. (Eff. 11/12/78, Reg. 68)

Authority: AS 38.04.900 AS 38.05.069  
AS 38.05.020 AS 38.05.300  
AS 38.05.035 AS 38.05.321

**11 AAC 55.060. COMMERCIAL LAND.** (a) Land classified commercial is land that, because of its access to transportation systems, its location adjacent to existing or proposed compatible development, and its physical features, is suitable for nonindustrial business use.

(b) The primary management goal is to make commercial land available in locations that are compatible with local needs and the public interest and to cluster commercial uses at intervals along highways so as to prevent strip development, reduce traffic hazards, and minimize scenic blight.

(c) Commercial land is to be used primarily for the sale, exchange or distribution of goods and services, and for other uses compatible with the primary use. Residential use is allowed unless prohibited by local zoning. Commercial land is available for mineral leasing under AS 38.05.135 - AS 38.05.184, for the disposal of materials and timber, and for sale, lease, or other disposal, and may be made available for the acquisition of rights to lease locatable minerals, depending on the land use plan. (Eff. 11/12/78, Reg. 68)

Authority: AS 38.04.900 AS 38.05.035  
AS 38.05.020 AS 38.05.300

**11 AAC 55.070. FOREST LAND.** (a) Land classified forest is land that, because of physical,

climatic or vegetative conditions, is most appropriately managed for timber and other forest resources.

(b) The primary management goal is the maintenance of forest land for either present or future timber production on a sustained yield basis, and such other benefits as preservation and enhancement of watershed areas, wildlife habitat, and recreation areas.

(c) All uses within forest land must be compatible with the primary management goal. Forest land is available for mineral leasing under AS 38.05.135 – AS 38.05.184, for the acquisition of rights to locatable minerals, for the disposal of materials and timber, and for lease. (Eff. 11/12/78, Reg. 68)

Authority: AS 38.04.015                      AS 38.05.035  
                   AS 38.04.900                    AS 38.05.300  
                   AS 38.05.020

**11 AAC 55.080. GRAZING LAND.** (a) Land classified grazing is rangeland that, in its uncultivated state, supports native vegetation suitable for forage production and the pasturing of domestic livestock. If the grazing of domestic livestock on such land is potentially in conflict with wildlife, the land may be classified as grazing only if the land use plan finds that grazing is the more appropriate use.

(b) The primary management goal is to maintain the sustained-yield productivity of rangeland, using acceptable range management practices.

(c) Grazing land is to be used primarily for the pasturing of livestock raised for personal use or for sale, or for the sale of animal products. Other uses must be compatible with the primary use. Grazing land is available for mineral leasing under AS 38.05.135 – AS 38.05.184, for the acquisition of rights to locatable minerals, for the disposal of materials and timber, and for lease. (Eff. 11/12/78, Reg. 68)

Authority: AS 38.04.015                      AS 38.05.035  
                   AS 38.04.900                    AS 38.05.300  
                   AS 38.05.020

**11 AAC 55.090. GREENBELT LAND.** (a) Land classified greenbelt is land maintained in a natural state along a transportation route, prominent physical feature of land, stream,

waterway, or lakeshore, or as open space. The greenbelt classification may be applied, in accordance with AS 38.04.070(4), to state-owned segments of wild, scenic, or recreational rivers.

(b) The primary management goal is to maintain the landscape (including vegetation) within the greenbelt so that it serves as a visual screen, as a scenic transportation or recreational access route, as a wildlife migration corridor through developed areas, for protection of the fishery resource, as a buffer against noise, wind erosion, and polluted or silty runoff waters, or for floodplain management purposes.

(c) All uses within a greenbelt must be compatible with the primary management goals. Material sales from shorelands, logging of dead, downed, defective, or hazardous timber, and underground mining under lease may be allowed in accordance with guidelines in the land use plan. A right-of-way may be allowed to cross greenbelt land, but construction must be performed in a manner that minimizes impact on the greenbelt. If the land use plan determines that private recreational use is compatible and desirable in a specific greenbelt, such use may be allowed through a dual classification, under lease only. (Eff. 11/12/78, Reg. 68; am 10/14/79, Reg. 72)

Authority: AS 38.04.015                      AS 38.05.020  
                   AS 38.04.070(4)                    AS 38.05.035  
                   AS 38.04.900                    AS 38.05.300

**11 AAC 55.100. HOMESITE ENTRY LAND.**  
 Repealed 10/14/79.

**11 AAC 55.110. INDUSTRIAL LAND.** (a) Land classified industrial is land that, because of its access to resource and major transportation systems, its location adjacent to existing or proposed compatible development, and its physical and environmental features, is suitable for industrial development.

(b) The primary management goal is to make land available for industrial uses when and where it is needed, and to concentrate industrial use in areas suited for it.

(c) Industrial land is to be used primarily for the manufacture, processing, storage, and testing of goods and materials, the processing of miner-

## CHAPTER 60. GRAZING LEASES

## Section

- 10. Lands available for leasing
- 20. Applications
- 30. Reclassification
- 40. Term of lease
- 50. Lease rates
- 60. Lease utilization
- 70. Identification of livestock
- 80. Non-use
- 90. Sub-lease
- 100. Range improvements
- 110. Other improvements
- 120. Water rights
- 130. Recreational and other compatible uses
- 140. Stock driveways
- 150. Conversion privileges
- 160. General provisions
- 170. Purpose - short title
- 180. Definitions

**11 AAC 60.010. LANDS AVAILABLE FOR LEASING.** (a) Grazing leases may be issued on all lands except those which have been classified as "open to entry" pursuant to AS 38.05.077, and those lands classified as "public recreation lands" or "reserved use" lands under ch. 52 of this title.

(b) Lands classified under ch. 52 of this title as "residential lands," "private recreation lands," "agricultural lands," "commercial lands," "industrial lands" or "utility lands" shall be available for short term leasing only, as provided for in sec. 40(a) of this chapter. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.020. APPLICATIONS.** Applications for grazing leases shall be filed with the division on a form provided for that purpose or an image copy thereof. Each application shall be accompanied by a \$10 filing fee. Filing fees are not refundable. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.030. RECLASSIFICATION.** (a) The state specifically reserves the right to reclassify all or a portion of the leased area to other uses in accordance with 11 AAC 52.190.

(b) Reclassification of a portion of a leased area shall, whenever possible, be carried out in a manner which will minimize interference with the grazing use of the remaining lease area.

(c) The lessee shall be given written notice by certified mail, at least 90 days prior to any reclassification.

(d) The director shall adjust the lease rental to reflect changes in the leased area occasioned by any such reclassification. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020

AS 38.05.070

AS 38.05.300

**11 AAC 60.040. TERM OF LEASE.** (a) Leases on land subject only to short term leasing under sec. 10(b) of this chapter shall not exceed a term of five years.

(b) All other leases shall be for any period as determined by the director to be in the best interest of the state, provided the term of the initial lease and any renewal thereof pursuant to AS 38.05.100 does not exceed a total of 55 years. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020

AS 38.05.070

**11 AAC 60.050. LEASE RATES.** The value of the leased lands for purposes of auction minimum valuations, periodic reappraisals, and lease renewals, shall be determined on the basis of the value of the lands for grazing purposes. The grazing lease rates shall give due consideration to estimated carrying capacity for winter and summer use, the use of lands for the growing of forage to be consumed on the grazing lease, and other pertinent economic factors. The minimum leasing rate shall be \$0.05 per acre per annum. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020

AS 38.05.070

AS 38.05.310

**11 AAC 60.060. LEASE UTILIZATION.** Grazing leases shall be utilized only for purposes within the scope of the lease provisions, and the land classification. Utilization or development of the leased land for other than the allowed uses shall be grounds for cancellation of the lease. Failure to make substantial use of all or any part of the land, consistent with accepted range

practices shall constitute grounds for cancellation. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.070. IDENTIFICATION OF LIVESTOCK.** All livestock permitted on a state grazing lease shall be properly identified and such identification registered in accordance with AS 03.40.010-.270. In addition, the director may require that the livestock be tagged, dyed or otherwise marked as a control on numbers permitted on a lease in accordance with the annual operating plan. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.080. NON-USE.** (a) To maintain the land at its highest productive capacity, the director may, at any time during the life of the lease, when he deems it necessary, declare all or any part of the lease to be in non-use. The period of non-use may be for any specified length of time up to the expiration of the lease itself.

(b) The lessee shall be given written notice of a declaration of non-use, and the director shall adjust the lease rental to reflect any reduction in the leased area resulting from such declaration.

(c) The lessee may at any time during the life of the lease take non-use on any or all of the grazing lease to adjust or improve operations under the lease. He cannot take non-use, however, merely to hold a grazing lease. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.090. SUB-LEASES.** (a) Under no circumstances shall a lessee be permitted to sub-lease a grazing lease.

(b) Grazing lessees may, with the prior written approval of the director, pasture livestock owned by others on a temporary basis. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.100. RANGE IMPROVEMENTS.**

(a) Lessee shall not make range improvements

without first obtaining the written approval of the director.

(b) Applications to construct range improvements shall indicate the location of the proposed improvements, the necessity for such improvements, the estimated cost thereof, and that the improvements, as proposed, will not impair the value of the land or interfere with other reasonable uses thereof.

(c) All range improvements are subject to the provisions of AS 38.05.090. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070  
AS 38.05.090

**11 AAC 60.110. OTHER IMPROVEMENTS.**

(a) Grazing lessees desiring to construct other improvements of a permanent nature, such as housing, barns, sheds, slaughterhouses, silos and grain or hay storage buildings, etc., within the grazing lease area, must apply for either the sale or lease of the lands under chs. 54, 57 or 58 of this title.

(b) If the proposed lease or sale is considered to be in the best interest of the state, the lands involved will be excluded from the grazing lease and may be leased or sold in accordance with existing lease or sale procedures. In no event may the lands sold or leased exceed 40 acres, except that this limitation does not apply for a sale of an agricultural interest under ch. 57 of this title. (Eff. 4/15/70, Reg. 34; am 9/7/78, Reg. 67)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.120. WATER RIGHTS.** Any waters required for the full use and enjoyment of a grazing lease may be appropriated and reserved for the lessee's use by the director upon request of the lessee. Any such appropriation shall be in the name of the state and inure to the grazing lease lands, and be consistent with the provisions of the Water Use Act. The lessee shall be required to furnish such information as is necessary and requested by the director in order to effect an appropriation. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.130. RECREATIONAL AND OTHER COMPATIBLE USES.** (a) The lessee shall not interfere with the right of the public to enter the land for lawful pursuit of game animals, the taking of fish, the trapping of fur animals, or for temporary camping or other compatible uses.

(b) In order to protect the lessee's interest, the director may, if he deems necessary, grant written permission to post certain key areas.

(c) Lessee shall not prohibit or otherwise interfere with reasonable access to the leased area for other uses. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070  
AS 38.05.285

**11 AAC 60.140. STOCK DRIVEWAYS.** (a) In the event that an individual with livestock must cross the grazing lease of another, the livestock must be kept within the bounds of the stock driveway. The stock driveway will be adequately marked on both exterior boundaries.

(b) Prior to the movement of livestock, the lessee must apply to the director for a crossing permit, stating the dates of movement and the numbers being moved. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.150. CONVERSION PRIVILEGES.** (a) A lessee holding a grazing lease which has been issued pursuant to 11 AAC 58.030 or 11 AAC 58.040 may at any time convert the lease to a grazing lease subject to the provisions of this chapter.

(b) The term of the lease issued under such a conversion shall be identical to the term remaining on the original lease. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.160. GENERAL PROVISIONS.** State grazing leases shall be issued subject to the general provisions contained in ch. 58 of this title, and, in addition, subject to the particular

terms and conditions specified in ch. 60 of this title. (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.170. PURPOSE-SHORT TITLE.** The purpose of ch. 60 of this title is to ensure leasing of state range lands in a manner that will encourage development of the land consistent with its highest and best use. This chapter of this title may be referred to as the "GRAZING LEASE REGULATIONS." (Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

**11 AAC 60.180. DEFINITIONS.** In this chapter

(1) "crossing permit" means a permit, issued by the director, authorizing the use of a stock driveway to move livestock on or off the range;

(2) "grazing lands" means those lands which in their natural state have the physical and climatic features that make them primarily useful for the pasturing of domestic livestock;

(3) "preference right grazing lease" means a grazing lease granted to a lessee whose federal grazing lease was cancelled to allow the land under lease to be selected by the state;

(4) "land" means all lands under the jurisdiction of the division;

(5) "non-use" means the discontinuance of use of all or part of a leased area in order to enable the resource to return to its normal productivity;

(6) "range improvement" means any improvement necessary for use of the lease for grazing of livestock, such as fences, corrals, loading and branding chutes, clearing and cultivation of lands for forage crops and survey of lands;

(7) "stock driveway" means a route, designated by the director, and marked along its exterior boundary, over which livestock are

permitted to move across grazing lease areas.  
(Eff. 4/16/70, Reg. 34)

Authority: AS 38.05.020  
AS 38.05.070

CHAPTER 62.  
TIDE AND SUBMERGED LANDS

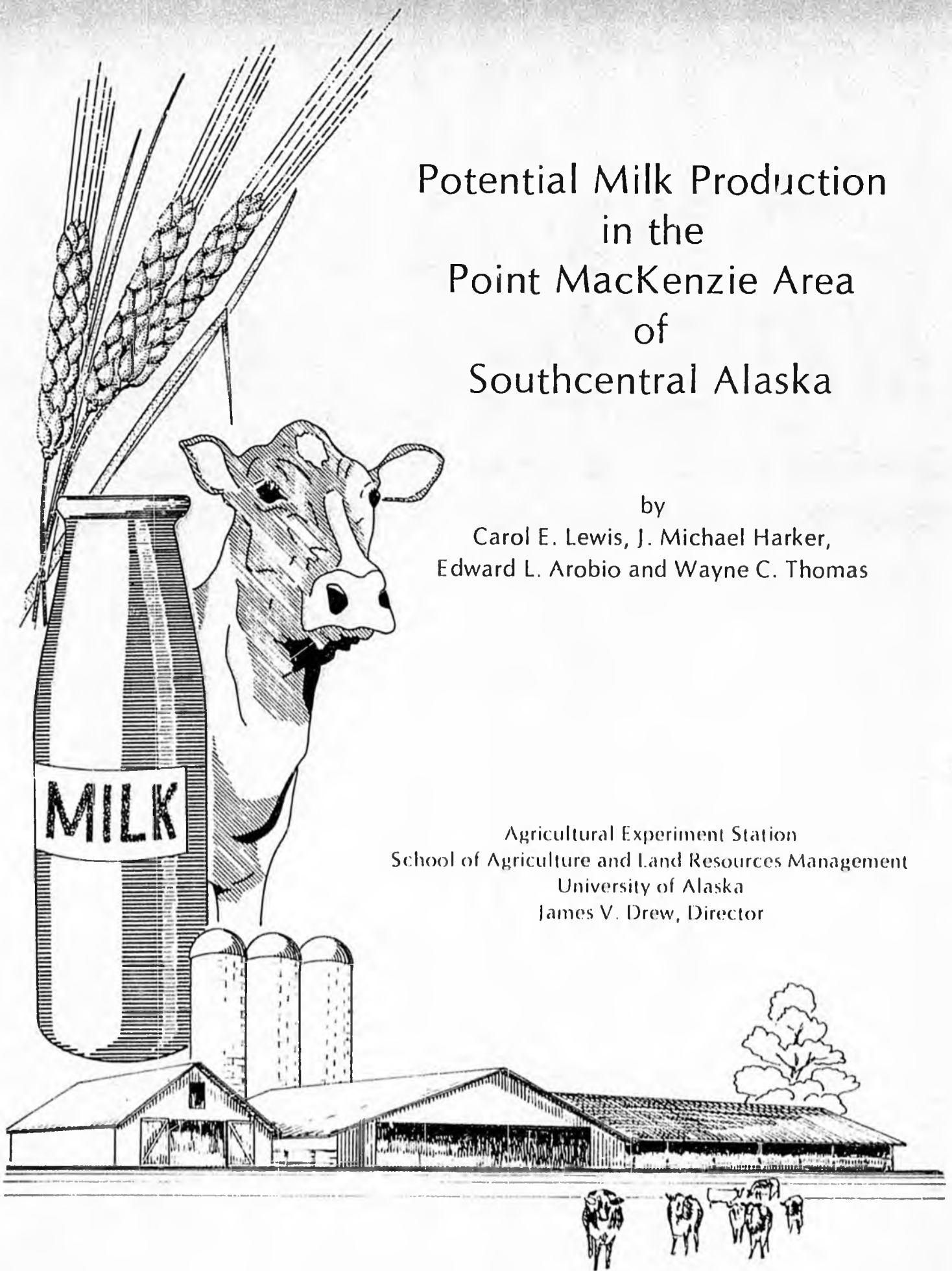
Section	
10.	Short title
20.	Ownership
30.	Protection of fish and game
40.	(Repealed)
50.	Classification
60.	Mining
70.	Materials
80.	(Repealed)
90.	(Repealed)
100.	(Repealed)
110.	Federal priority
120.	(Repealed)
130.	Protest
140.	(Repealed)
150.	Site examination
160.	Loss of preference rights; outside municipality
170.	Loss of preference rights; municipality
180.	Unoccupied and unappropriated state owned tide and contiguous submerged lands
190.	(Repealed)
200.	Applications
210.	Appeal
220.	Appeal—Notice
230.	Finality of decisions
240.	Completion of purchase requirements
250.	Jurisdiction
260.	Preliminary plat
270.	Preliminary plat requirements
280.	Survey procedure
290.	Procedure on final plat
300.	Final plat requirements
310.	(Repealed)
320.	(Repealed)
330.	(Repealed)
340.	Application; municipal corporation
350.	Proof of qualifications
360.	(Repealed)
370.	(Repealed)
380.	(Repealed)
390.	(Repealed)
400.	(Repealed)
410.	(Repealed)
420.	Final plat of survey
430.	Occupant not seaward of municipal corporation or surveyed townsite having Class I preference right
440.	Applications; Class I preference right
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# Potential Milk Production in the Point MacKenzie Area of Southcentral Alaska

by

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## FOREWORD

The information presented in this bulletin is part of a report prepared for the Agricultural Action Council of the State of Alaska. The group was formed in 1979 by legislative action and is chaired by W. I. "Bob" Palmer, Special Projects Director, Office of the Governor. The purpose of the group is to plan and manage agricultural development projects within the state.

The report on the feasibility of milk production in the Point MacKenzie Area presented to Governor

Hammond through the Alaska Agricultural Action Council was prepared by the authors of this bulletin and Dr. Boyd Buxton, Agricultural Economist, U.S.D.A., stationed at the University of Minnesota at St. Paul and Dr. Paul Fuglestad, Agricultural Economist, U.S.D.A., stationed in Anchorage, Alaska, both of whom are acknowledged with gratitude.

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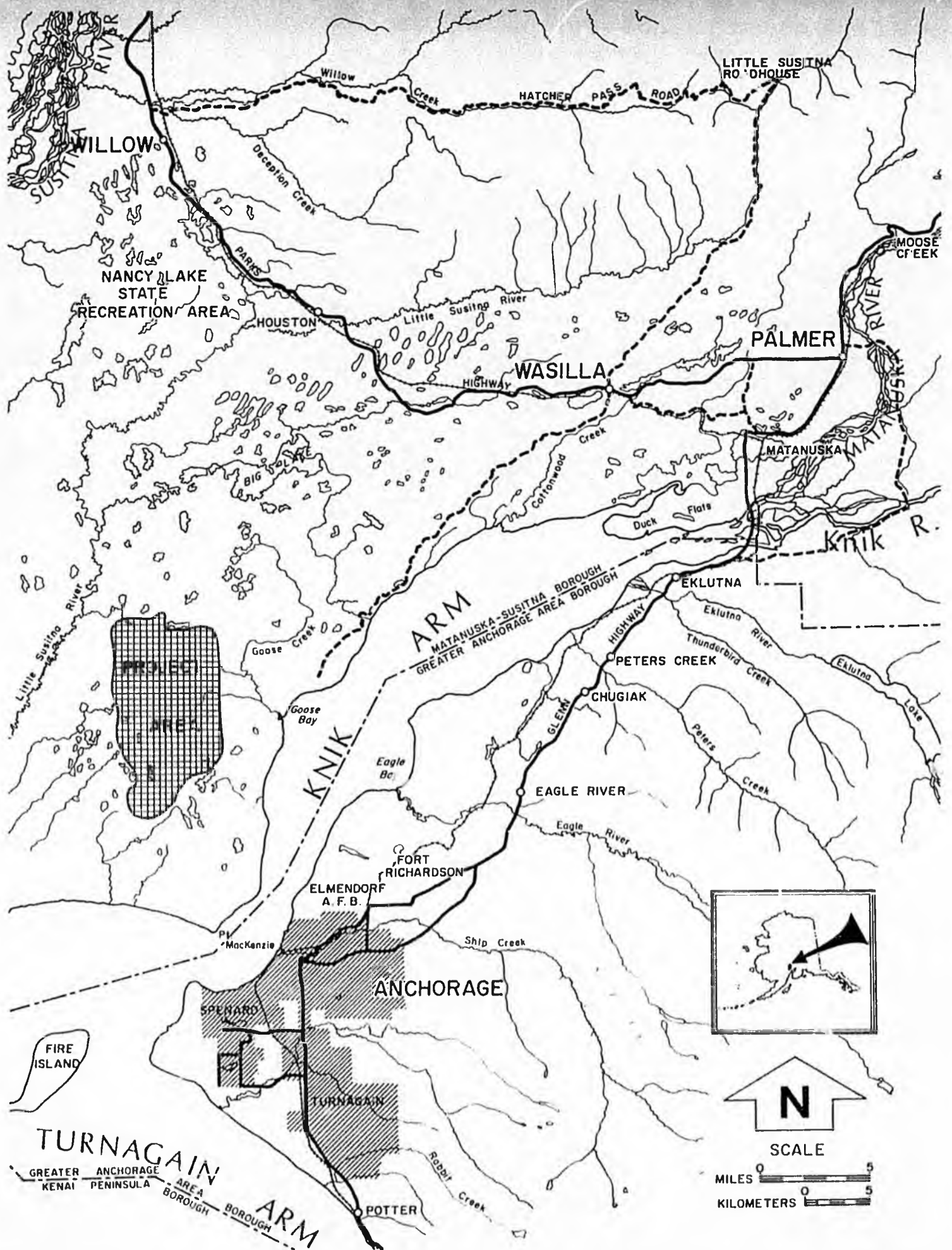


Figure 1: Point MacKenzie, just northwest of Anchorage, is the proposed project area for an expansion of Alaska's dairy industry.

## CHAPTER 1

### INTRODUCTION

Point MacKenzie is an area northwest of Anchorage directly across the Knik Arm of Cook Inlet (Figure 1). This area contains a substantial amount of latent agricultural land and discussion regarding its potential has been going on for some time. The catalyst which activated the recent planning process directed at Point MacKenzie was concern over potential loss of the southcentral Alaska dairy industry expressed on May 4, 1979, in a letter from Jack Flint, General Manager, Matanuska Maid, Inc., to Governor Jay Hammond: "It is my opinion that if we do not take immediate steps to stabilize this important phase of agriculture, [the dairy industry] will pass from the scene. I think that if it should occur, it would be a serious blow to the State of Alaska, economically and socially. I believe we should also realize that if the dairy industry should cease to exist within the state, it is going to be very difficult to re-establish it."

Mr. Flint's letter and corresponding action by the Matanuska-Susitna Borough have directed planning processes of the State of Alaska toward Point MacKenzie. The Alaska Agricultural Action Council, created by the 1979 state legislature to plan, recommend, and administer agricultural development projects on state lands in Alaska, held a meeting in the Matanuska Valley in September, 1979, and determined that an economic feasibility study, directed toward dairy production, should be undertaken for the Point MacKenzie area. This report is that feasibility study.

In order to perform the analysis, certain general assumptions are made. These include:

1. Sufficient state land is available in the Point MacKenzie area for a dairy farm development project.
2. Land price is \$100 per acre with a \$50 homestead credit making the effective price \$50 per acre to the farmers.
3. Land-clearing costs are \$220 per acre for project farms.
4. The dairy farms will be designed for forage production in the form of silage and haylage; concentrate, hay, and straw requirements will be met by off-farm purchases.
5. Private slaughter facilities are currently available in the Matanuska Valley to handle cull cows and calves from project lands.
6. Electrical power hook-up will be provided each farm.
7. Roads to each farm will be constructed.

The land price of \$100 per acre for purchase of agricultural rights only is set by the Alaska Land Statutes, Section 38.05. It is an average price and may vary depending on soil type and timber on the property. The homestead credit, repealed in 1979, will be reinstated in 1980. The land-clearing costs were based on a \$165-per-acre cost in 1979 in interior Alaska. An additional 15 per cent was added to bring them to 1980 costs. The heavier timber cover will probably require more machine time estimated at \$30 per acre.

## CHAPTER 2

### FARM ECONOMICS

The total capital investment cost for the physical facilities used in the simulated dairies is estimated for four sizes of farms milking 50, 75, 100, and 150 cows. These are the numbers of cows milked daily. Because cows are dry for two months each year, herds actually total 60, 90, 120, and 180 cows, respectively. Total farm budgets for these dairy herds are also provided, followed by a suggested plan for bringing new dairy farms into full production and a cash flow analysis for these farms during their first three years of operation.

#### Capital Costs for Four Dairy Sizes

Capital costs are determined using examples from existing dairy farms in Alaska's Matanuska Valley, Minnesota, and Wisconsin. It is assumed that the 50- and 75-milking-cow herds will be housed in stanchion barns. As milking herd size increases to 100 and 150 cows, the less labor-intensive, free-stall barn design is used. Milking in the stanchion barns is accomplished with a pipeline system while a milking parlor is used in the free-stall system. All barns are controlled-environment facilities. Housing for replacement heifers and dry cows is assumed to be in an uncontrolled-environment or "cold" facility. Silage, haylage, and/or hay is fed year-round. Feeding is automated, using auger load-out into feed mixers and either feed carts or augers to move the feed into feed bunks.

Costs of buildings and silos are estimated on a per-square-foot basis. It is possible that the larger structures could be built at less cost per square foot as there is not twice as much material in a 100-cow barn as there is in a 50-cow barn. If several structures are under construction at once, there may also be a savings. These two considerations are not used in the calculations here. An average cost for all size structures is applied. Deviations from this average, relevant to specific cases, will become evident as construction begins. Economies of size are recognized in feed and

milk-handling equipment. For example, feed load-out service for 100 cows is also adequate for 150 cows.

Trade-offs are made between labor and technology. The technology level in all units is kept in the medium range typical of that in existence in the majority of dairy farms in the United States. Alternative-energy technology is not incorporated, although such technologies may offer economic opportunities in the near future. Individual farmers may wish to pursue some of the recent developments in this field, particularly as technology improves.

#### Barns and Milking Facilities

Barn and milking facility construction costs are based on a full-truss structure, 4-inch insulation in walls and ceiling, and concrete floors and bunks. A figure of \$15/ft.<sup>2</sup> was estimated from Fairbanks construction costs for utility buildings. This figure includes the iron work for free stalls and stanchions, the heating system, and the electrical work.

Typical layouts for stanchion barns and free-stall barns are shown in Figure 2. The stanchion barns are based on 36-foot barn widths, two rows of cows facing out. Free-stall barns are 78 feet wide with four rows of stalls and a center-feed bunk. The stanchion operations do not require a milking parlor but do require a bulk tank for which space is provided. Milking is performed in the stalls using individual milkers and a pipeline to the milk room. Office space and a lavatory area are not included in the barns. Free-stall barns are provided with a milking parlor and an area for holding cows, maternity pens, hospital area, office, and lavatories, as well as a milk room.

Interior temperatures of all barns are kept at a minimum of 45°F throughout the year. Ventilation systems for the barns are adequate to move a maximum of 200 cfm of air per 1,000 pounds of animal weight in the barns, 3,000 cfm in the milk house, and 400 cfm per stall in the milking parlor. Heating is accomplished through the ventilation system using

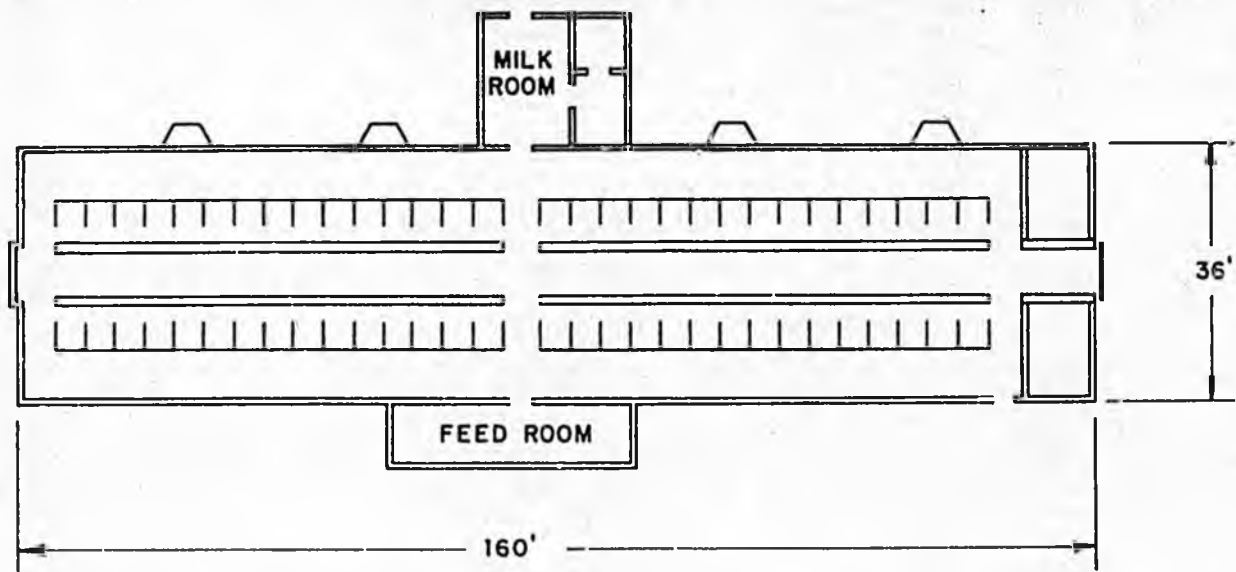
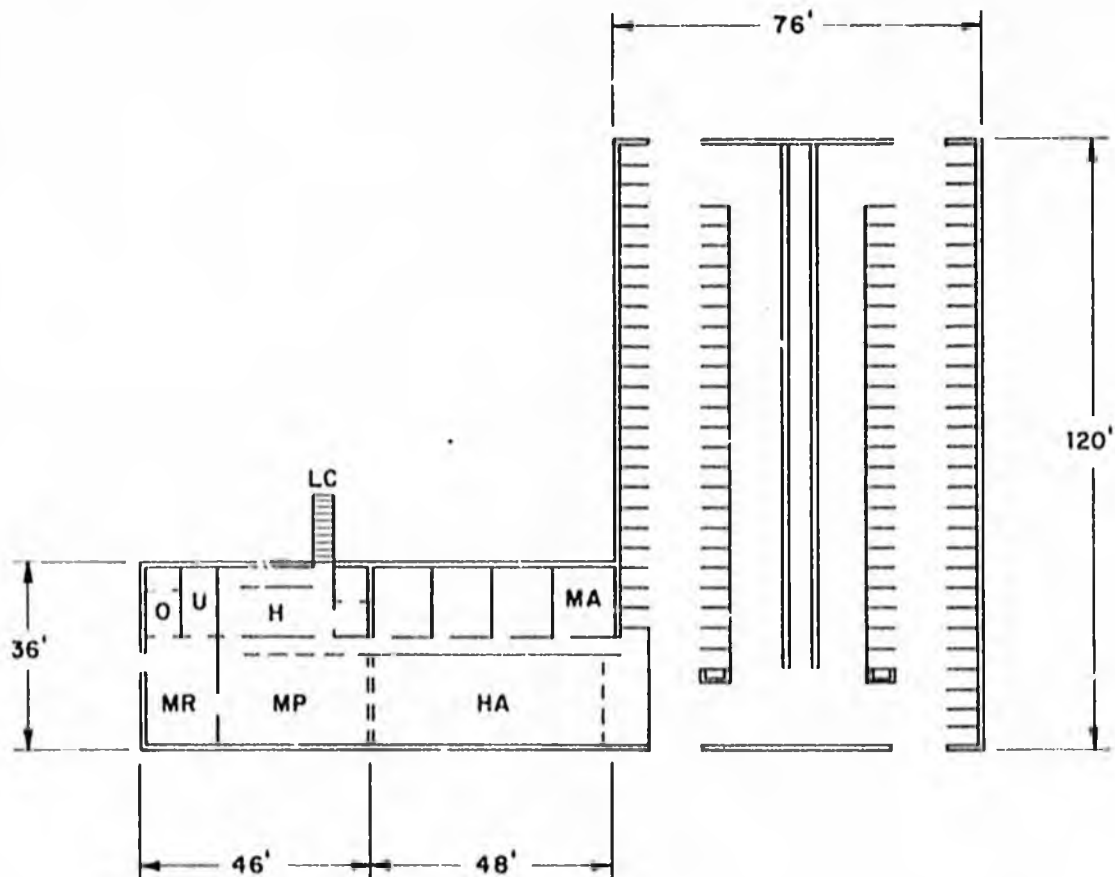


Figure 2: Typical Stanchion Barns. The upper drawing illustrates a typical stanchion barn. The unit shown houses 60 milking cows. The lower illustration is a 100 cow, free-stall facility including a holding area (HA), maternity area (MA), hospital (H), milking parlor (MP), milk room (MR), utility and office area (U, O), and a loading chute (LC). (From: Midwest Plan Service, Dairy Housing and Equipment Handbook. Iowa State University, Ames, 1978).



oil-fired burners. Milking equipment in the stanchion barns includes the bulk tank, milking units, pipeline, vacuum pump, cooling compressors, and associated plumbing. Milking machines handling 40-50 cows per hour are included as are bulk tanks sized to suit the dairy assuming the milk is collected on alternate days. The free-stall milking operations are based on six- and eight-stall, double herringbone (DHB) parlors. All other components are the same as in stanchion facilities. Milk-parlor sizes are based on gallons of production. Barn- and milking-parlor specifications and costs of components are summarized in Table 1.

### Waste Handling

All farming operations are based on handling manure in the semisolid form. An earth-basin slurry system without a liner, similar to that shown in

Figure 3, should be adequate in the Point MacKenzie area. Removal of manure from barns is accomplished by barn scrapers dumping into a settling pit where manure is moved by a piston pump to the earth storage basin. Slurry pumps are used to agitate and load manure into tank wagons. Mats are provided in all barns for ease in stall cleanup.

Milk-house waste is handled using a separate leach field for this cost study. Because barn wastes are handled as semisolids, milk-house wastes need not necessarily have a separate system. In fact, there are indications that problems, such as plugging of the drain field, may occur in colder climates. It is informative to include the separate system in this report, however. Lavatory wastes are diverted into a separate septic system at a cost of \$3,000 for each farm unit. Table 2 shows the components and component costs for farm-waste-disposal systems.

Table 1: Barn and Milking Facility Specifications

	Barn	Ft <sup>2</sup> per Cow	Milk Parlor	Milk Room	Milking Equipment	Bulk Tank	Ventilation
FACILITY TYPE AND SIZE							
50-Cow Stanchion	36'x133'	96	—	20'x20'	1½" pipeline	825 gal.	133 ft <sup>3</sup>
75-Cow Stanchion	36'x200'	96	—	20'x20'	2" pipeline, 3 units	1,000 gal.	200 ft <sup>3</sup>
100-Cow Free-Stall	78'x120'	94	36'x94'	—	6 stall DHB	1,375 gal.	120 ft <sup>3</sup>
150-Cow Free-Stall	78'x180'	94	36'x96'	—	8 stall DHB	2,200 gal.	180 ft <sup>3</sup>
COST OF COMPONENTS FOR EACH FACILITY SIZE							
50-Cow Stanchion	\$71,820	—	—	\$6,000	\$30,000 <sup>c</sup>	\$10,000	\$7,500
75-Cow Stanchion	\$108,000	—	—	\$6,000	\$45,000 <sup>d</sup>	\$10,000	\$11,278
100-Cow Free-Stall	\$140,400	—	\$50,760	—	\$65,000	\$15,000	\$10,000
150-Cow Free-Stall	\$210,600	—	\$51,840	—	\$65,000	\$15,000	\$15,000

<sup>a</sup>Moves 200 cfm per 1,000 lbs. of animal weight.

<sup>b</sup>As in above but also handles the milk parlor as noted in text.

<sup>c</sup>Assumes a pipeline cost of \$10,000 and two milking machines at \$20,000.

<sup>d</sup>Assumes a pipeline cost of \$15,000 and three milking machines at \$30,000.

Table 2: Waste Disposal Systems for Four Facility Sizes<sup>a</sup>

	50-Cow Stanchion	75-Cow Stanchion	100-Cow Free-Style	150-Cow Free-Style
Basin <sup>b</sup>	\$ 6,392	\$ 7,936	\$11,664	\$11,664
Barn Cleaner	5,040	9,040	10,300	10,300
Mats	4,020	5,640	7,176	8,058
Piston Pump <sup>c</sup>	8,300	8,300	8,300	8,300
Load-out Pump <sup>c</sup>	4,100	4,100	4,100	4,100
Slurry Pump <sup>c</sup>	5,000	5,000	5,000	5,000
Piping	2,000	2,000	2,000	2,000
Manure System Total	\$34,852	\$42,016	\$48,540	\$49,422
Leach Field	800	1,198	1,598	2,298
Septic System	3,000	3,000	3,000	3,000
Tank and Wagons <sup>d</sup>	4,619	4,619	6,720	6,720
TOTAL	\$43,271	\$50,833	\$59,858	\$61,440

<sup>a</sup>All hardware based on University of Wisconsin 1977 estimates. 1979 Wisconsin = 1977 Wisconsin x 1.20. 1979 Alaska = 1977 Wisconsin x 1.15.

<sup>b</sup>Basin size based on an 8-month or 240-day storage period holding 2 ft<sup>3</sup>/day/cow.

<sup>c</sup>Pumps 20 HP in size are adequate to move 3,000 gpm over a rise of 10 feet.

<sup>d</sup>Tank capacities are 152 ft<sup>3</sup> with a 60 PTO HP requirement and 243 ft<sup>3</sup> with a 100 PTO HP requirement.

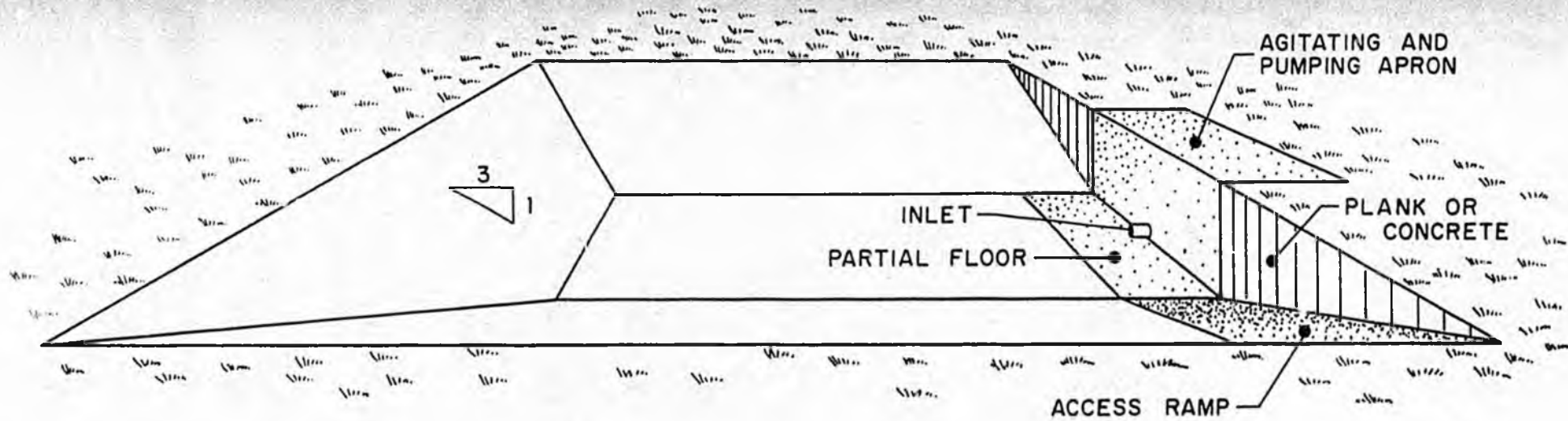
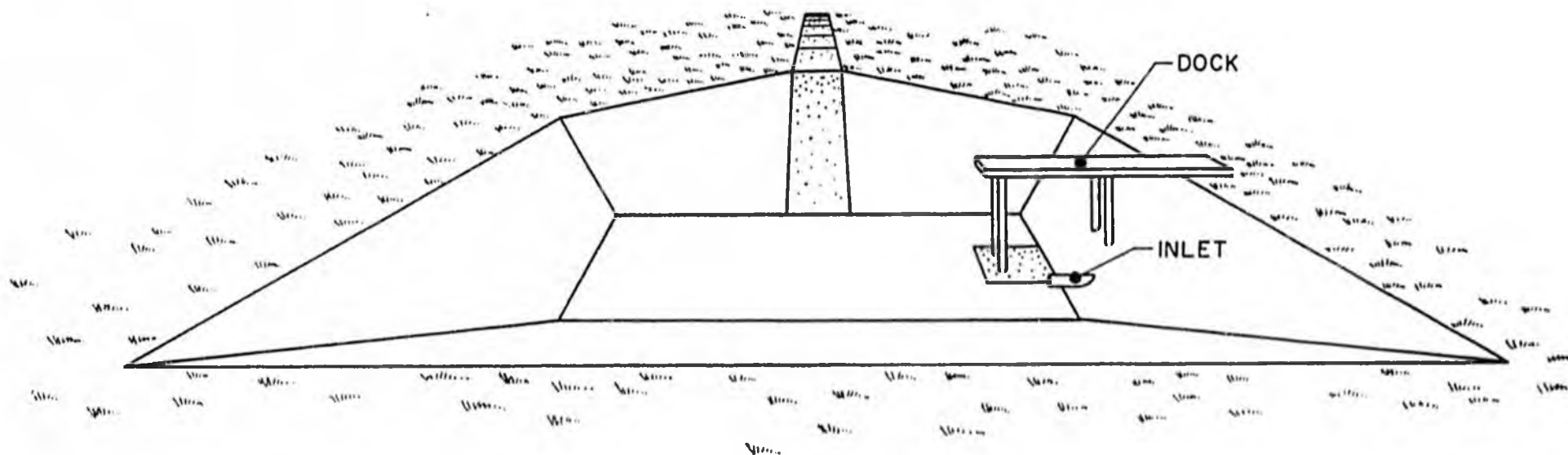


Figure 3: Manure Storage Basins. Two types of manure storage basins. The upper illustration includes a picket gate or a plank or concrete wall to facilitate unloading. (From: Midwest Plan Service. Dairy Housing and Equipment Handbook. Iowa State University, Ames, 1978).



## Feed Storage

The feed components used in rations were roughage (including silage or haylage) concentrates, and hay. Calf starter will be required for the calving operation. To obtain storage facility sizes, it is assumed all components will handle a yearly supply. This may not be the case with calf starter. However, it forms a small portion of the total feed requirement and less than a yearly supply would alter the space requirement very little.

## Silos

Silos are assumed to be uninsulated. The maximum height of the silos is 60 feet, 10 feet of which is unloader space. The silo-loading system uses a 30-HP electric motor with blowers for top loading. Top-unloading silos load out feed at the silo side into the feed room. This requires a 20-HP electric motor. To obtain a capital cost per ft<sup>3</sup>, 1979 Wisconsin prices and adjusted southcentral Alaska prices are used. The estimated erected cost is \$2.18/ft<sup>3</sup> including loading and unloading facilities. Because of possible problems with freezing along silo sides, base diameters are kept as large as possible while still maintaining a near 60-foot height. The additional parameter of a load-out rate of no less than 6 inches per day is used to further alleviate the possible freezing problems. Table 3 gives silo sizes and capacities and total cost of silage storage.

Table 3: Silo Capacities

Facility Size	Silage Stored	Silo Size	Number of Silos	Total Cost
50 Cow Stanchion	1077T	28'x60'	2	\$160,999
75 Cow Stanchion	1622T	28'x60'	3	\$241,499
100 Cow Free Stall	2154T	30'x60' + 22'x48'	3	\$316,488
150 Cow Free Stall	3231T	30'x60'	5	\$462,051

## Concentrate

The concentrate fed will probably be purchased in bulk. The cost of construction of a storage area for the concentrate is estimated at \$1.00 per bushel.

Table 5: Hay, Bedding and Starter Storage

Facility Size	Total Hay <sup>a</sup>	Total Bedding <sup>b</sup>	Total Starter <sup>c</sup>	Building Size	Total Cost
50-Cow Stanchion	9,599 ft <sup>3</sup>	10,935 ft <sup>3</sup>	75 ft <sup>3</sup>	40 x 60	\$31,200
75-Cow Stanchion	14,587 ft <sup>3</sup>	16,515 ft <sup>3</sup>	109 ft <sup>3</sup>	50 x 70	\$45,500
100-Cow Free Stall	19,053 ft <sup>3</sup>	21,645 ft <sup>3</sup>	146 ft <sup>3</sup>	50 x 90	\$58,500
150-Cow Free Stall	28,507 ft <sup>3</sup>	32,310 ft <sup>3</sup>	216 ft <sup>3</sup>	40 x 80 + 40 x 90	\$88,400

<sup>a</sup> Hay bale size is 4' x 2' x 2' and weight is 70 pounds per bale.

<sup>b</sup> Straw bale size is 4' x 2' x 2' and weight is 50 pounds per bale.

<sup>c</sup> 100-lb. bags sized at approximately 1.3 ft<sup>3</sup>.

Table 4 lists storage required and total cost assuming only one purchase is made annually. An alternate method would be to purchase a pelleted feed several times during the year. Less storage space would be required in this case.

Table 4: Concentrate Storage

Facility Size	Bushels Required	Storage Size	Total Cost
50 Cow Stanchion	9,226	10,000 BU	\$10,000
75 Cow Stanchion	13,862	15,000 BU	\$15,000
100 Cow Free Stall	18,434	20,000 BU	\$20,000
150 Cow Free Stall	26,643	30,000 BU	\$30,000

## Starter, Hay, Bedding

Storage for calf starter, hay, and bedding is in metal, uninsulated buildings with concrete floors. The buildings are ventilated through louvres and eaves. Current Fairbanks cost estimates indicate that such buildings can be constructed for \$13,000/ft<sup>2</sup>. Table 5 gives the amount of feed and bedding stored, building size, and cost of construction.

## Machinery Storage and Workshop

The dairy farms will be producing silage and haylage. In addition to equipment associated primarily with this operation, at least front-end loader storage will be required for the dairy. The storage buildings will probably not be heated. Additionally, a heated workshop will be necessary for repairs and maintenance. The storage space required per machine includes 15 per cent space for movement. The workshop size is based on the largest piece of equipment on the farm and includes a working area of 8 feet on the sidewalls and 5 feet at each end. Also included are a grease pit and fuel tanks. Capital cost and construction for the machinery storage are the same as those for hay and bedding storage. Workshop capital costs include a metal building with four inches of insulation and a heating system using oil-burning units. Construction costs are estimated at \$14.50/ft<sup>2</sup>. Table 6 (next page) gives the machinery and workshop sizes and total costs.

**Table 6: Machinery Storage and Workshop**

Facility Size	Machinery	Workshop	Total Cost
50, 75 Cow Stanchion	40'x60'	40'x46'	\$57,880
100, 150 Cow Free Stall	40'x75'	40'x46'	\$65,680

**Calf, Heifer, and Dry-Cow Housing**

There are controversies concerning the housing of calves. Indications are that calf death rates are less if they are removed to cold housing one day after birth. The cold housing recommended is a 4' x 14' hutch, 4' x 8' of which is a plywood shed free from drafts and bedded with straw, 4' x 6' being an exposed area enclosed in hog wire for feeding. In high snow areas, management of the hutches may be difficult. Therefore, an alternative is offered by putting the "hutches" in a cold building. An additional advantage of this practice is that the calf housing can be combined with that for heifers and dry cows in a single building. The major advantages of this system is that feeding can be accomplished in one building and that manure handling (a straw pack removed in spring and periodically throughout the summer) is a single operation. The straw pack waste is removed to the fields in spring and fall.

Housing costs are the same as those used for hay and straw storage plus \$1.00/ft<sup>2</sup> for iron and \$2,000 for all units for plumbing. Space for animals is determined using standard allotments. Twice the hutch area per calf is used to enable hutches to be moved before being occupied by a new calf. Table 7 shows space per cow by age, total number of cows housed, total space and total cost.

**Feed Handling**

Feed handling in stanchion units is accomplished by electric cart although a feed bunk system could also be used. Free-stall barn feeding is accomplished by augering the feed into the feed bunks. Provisions have been included for feed mixing at the silo unload area. The silos load out into a feed mixer and then either into carts or an auger hopper. A feed mixer is provided to keep feed consistency constant if both haylage and silage are fed. Approximate cost is \$4,000 per silo.

**Well**

There is limited data to indicate the depth of wells required in the Point Mackenzie area. It is

**Table 7: Calf, Heifer, and Dry-Cow Housing**

Facility Size	Space Per Cow			Number of Cows Housed <sup>a</sup>				Total Space (ft <sup>2</sup> )	Building Size	Total Cost \$
	0-2 mo.	2-12 mo.	12-24 mo. & dry cows <sup>b</sup>	0-2 mo.	2-12 mo.	12-24 mo.	dry cows			
50-Cow Stanchion	56 ft <sup>2</sup>	25 ft <sup>2</sup>	110 ft <sup>2</sup>	19	19	16	10	3,499	40' x 90'	52,400
75-Cow Stanchion	56 ft <sup>2</sup>	25 ft <sup>2</sup>	100 ft <sup>2</sup>	28	28	25	15	5,380	50' x 100'	72,000
100-Cow Free Style	56 ft <sup>2</sup>	25 ft <sup>2</sup>	110 ft <sup>2</sup>	37	37	32	20	7,037	50' x 140'	100,000
150-Cow Free Style	56 ft <sup>2</sup>	25 ft <sup>2</sup>	110 ft <sup>2</sup>	55	55	48	30	10,515	60' x 180'	153,200

<sup>a</sup>Assumes a 15% loss at 0-3 months, no losses at 3-12 months, 12% loss at 12-24 months and a herd replacement of 25% of the total.

<sup>b</sup>Includes 45 ft<sup>2</sup> of resting area and 65 ft<sup>2</sup> of "lot" area.

<sup>c</sup>Two 50' x 70' or two 60' x 90' buildings could be used.

**Table 8: Total Capital Investment for Four Facility Sizes**

	50-Cow Stanchion	75-Cow Stanchion	100-Cow Free Stall	150-Cow Free Stall
Barn and Iron	\$ 71,820	\$108,000	\$140,400	\$ 210,600
Ventilation	7,500	11,278	10,000	15,000
Milk Room	6,000	6,000	N/A	N/A
Milk Parlor	N/A	N/A	50,760	51,840
Milking Equipment	40,000	55,000	80,000	80,000
Silos	160,999	241,499	316,988	462,501
Manure Handling	43,271	50,833	59,858	61,440
Concentrate Storage	10,000	15,000	20,000	30,000
Hay and Bedding Storage	31,200	45,500	58,500	88,400
Machine Storage	31,200	31,200	39,000	39,000
Workshop	26,680	26,680	26,680	26,680
Calf and Dry-Cow Housing	52,400	72,000	100,000	153,200
Well	3,500	3,500	3,500	3,500
Feed-Handling Equipment	8,000	12,000	16,000	20,000
<b>TOTAL</b>	<b>\$492,570</b>	<b>\$678,990</b>	<b>\$921,686</b>	<b>\$1,241,711</b>

assumed a 100-foot well eight inches in diameter is adequate to provide a 3,000 gpm flow rate. The current average cost for drilling, casing, and pump is \$35 per running foot. This cost is included in each farm unit.

### Total Capital Costs

The total capital investment for the four dairy systems is given in Table 8 (pg. 9). On a per-cow basis, the 150-cow, free-stall dairy requires the least capital injection. Tables 9 through 12 (pgs. 9 and 10) show the annual cash and noncash owner costs associated with the dairy farms. Costs allocated to the dairy operation only are associated with milking and dry cows. Those allocated to the replacement heifers include animals required for a 25% annual herd replacement and are aged 0 to 24 months. Feed-associated cost allocation and calf and dry-cow housing cost allocation are accomplished on a feed-requirement and a space-occupied basis respectively. The percentages used in allocation are shown in Table 13.

Table 13: Cost Allocation to Dairy Cows and Replacement Heifers

Facility	Dairy Cows	Replacement Heifers
Silos	84%	16%
Hay and Bedding Storage	17% <sup>a</sup>	83%
Concentrate Storage	81%	19%
Calf and Dry-Cow Housing <sup>b</sup>	22%	78%

<sup>a</sup>Only dry cows use straw bedding. Milking cows are not fed hay.

<sup>b</sup>Based on space occupied.

### Farm Budgets

Enterprise costs and returns presented in this report are estimated for dairy-farm operations milking 50, 75, 100, and 150 cows daily. Returns from the sale of calves and culls are specifically identified. However, a specific assumption of per-herd milk production is not used in the analysis. Rather, revenues from calf and cull sales are first subtracted from costs, and then the average milk production per cow required to break even (cover all remaining costs) is calculated. Included in the costs is a charge for operator labor of \$15,000 per year. Returns arising from milk production above that required to break even is the return to management.

Basic assumptions reflected in the estimated budgets are:

1. Cows are milked ten months of the year and are dry two.
2. All feed is purchased except for silage or haylage which is grown on the farm.

3. Land-clearing costs and purchase price are included in silage (haylage) costs.
4. Dairy farmers replace 25% of their herds annually with springer\* heifers.
5. All replacement heifers are provided by the dairy farms in the third year of operation.
6. All breeding is by artificial insemination.
7. Dairy farms of 50 and 75 cows use a stanchion confinement-stall system. With 100 and 150 cows, a free-stall system is used.
8. Family labor is the only labor used on 50- and 75-cow dairy farms. It has been suggested that the 75-cow dairy farm may require one additional laborer if a stanchion barn is used.
9. Dairy farms with 100 cows require family labor plus one hired laborer while the 150-cow dairy farm requires two laborers and one herdsman in addition to family labor.
10. Three acres of cropland in silage production are required for each milking and dry cow in the dairy herd.
11. An interest rate of 6%, that charged by the Alaska Agricultural Revolving Loan Fund, is charged against the capital investment. A 9% interest charge is leveled against operating capital assuming a mixture of private and public loan monies.

Data for this analysis were obtained from several sources. Feed rations, production techniques, and production costs were developed in consultation with animal scientists of the University of Alaska Agricultural Experiment Station and experienced Alaskan dairymen. Silage and haylage production costs are detailed in a preliminary USDA working paper available from the authors (Fugelstadt, U.S.D.A.-E.S.C.S.). Investment requirements are described in an earlier section. Milk prices were obtained from Matanuska Maid Inc., while prices for calves and culls were provided by marketing specialists of the Alaska Division of Agriculture and Alaskan dairymen.

Production costs are summarized in Table 14 (pg. 11). Total annual costs for the 50-, 75-, 100-, and 150-cow dairy farms are \$175,061; \$237,471; \$323,853; and \$479,008, respectively. Costs are divided into feed cash costs, non-feed cash costs, and non-cash costs. Of these three categories, feed is the major expense accounting for approximately 39 per cent of total cost for each herd. Major costs in non-cash costs are operator labor and interest and depreciation on facilities. As noted previously, we have included an operator labor charge of \$15,000 annually as an absolute minimum under which an owner would be willing to remain in business.

In Table 15 (pg. 12), returns from sales of calves and culls and the average milk production per cow

Table 9: Annual Cash and Non-Cash Capital Associated Costs for the 50-Cow, Stanchion Dairy

	Depreciation (years)	Depreciation <sup>a</sup> (\$)	Investment Cost <sup>b</sup> (\$)	Insurance <sup>c</sup> (\$)	Taxes <sup>d</sup> (\$)	Repairs & Maintenance <sup>e</sup> (\$)	Total Cost (\$)
<b>DAIRY</b>							
Barn & Iron	30	2,394	2,155	503	934	1,436	7,422
Ventilation	10	713	236	53	98	150	1,250
Milk Room	30	200	180	42	78	120	620
Milking Equipment	10	3,800	1,260	280	520	800	6,600
Silos	20	6,762	4,057	947	1,758	2,704	16,228
Manure Handling	20	2,164	1,208	303	563	865	5,193
Concentrate Storage	20	405	273	57	105	162	972
Hay & Bedding Storage	20	265	159	37	69	106	636
Machine Storage	20	1,560	936	218	406	624	3,744
Workshop	20	1,334	800	187	347	534	3,202
Calf & Dry-Cow Housing	20	577	346	81	150	231	1,385
Well	350	105	25	46	70	596	
Feed-Handling Equipment	10	760	252	56	104	160	1,332
<b>ANNUAL TOTAL</b>		<b>21,284</b>	<b>12,027</b>	<b>2,789</b>	<b>5,178</b>	<b>7,962</b>	<b>49,242</b>
<b>REPLACEMENT HEIFERS</b>							
Silos	20	1,288	772	180	334	515	3,099
Concentrate	20	95	57	13	25	38	228
Hay & Bedding Storage	20	1,295	777	181	337	518	3,108
Calf & Dry-Cow Housing	20	2,044	1,226	286	531	817	4,904
<b>ANNUAL TOTAL</b>		<b>4,722</b>	<b>2,832</b>	<b>660</b>	<b>1,227</b>	<b>1,888</b>	<b>11,329</b>

<sup>a</sup> Depreciation is calculated using the straight line method. Salvage value is 5% of new cost for equipment and zero for buildings.

<sup>b</sup> Investment costs are charged at 6% annual rate using:

$$\text{Investment Cost} = \frac{\text{New Cost} + \text{Salvage}}{2} (\text{Interest Rate})$$

<sup>c</sup> Insurance rates are \$7.00 per \$1,000 new cost.

<sup>d</sup> Taxes are 13 mil, the current rate in the Matanuska-Susitna Borough.

<sup>e</sup> Repairs and maintenance are charged at 2% of new cost.

Table 10: Annual Cash and Non-Cash Capital Associated Costs for the 75-Cow, Stanchion Dairy<sup>a</sup>

	Depreciation (years)	Depreciation (\$)	Investment Cost (\$)	Insurance (\$)	Taxes (\$)	Repairs & Maintenance (\$)	Total Cost (\$)
<b>DAIRY</b>							
Barn & Iron	30	3,600	3,240	756	1,404	2,160	11,160
Ventilation	10	1,071	355	79	147	226	1,878
Milk Room	30	200	180	42	78	120	620
Milking Equipment	10	5,225	1,733	385	715	1,100	9,158
Silos	20	10,143	6,086	1,420	2,637	4,057	24,343
Manure Handling	20	2,542	1,525	356	661	1,017	6,101
Concentrate Storage	20	578	383	85	158	243	1,447
Hay & Bedding Storage	20	387	232	54	101	155	929
Machine Storage	20	1,560	936	218	406	624	3,744
Workshop	20	1,334	800	187	347	534	3,202
Calf & Dry-Cow Housing	20	792	475	111	206	317	1,901
Well	10	350	105	25	46	70	596
Feed-Handling Equipment	10	1,140	378	84	156	240	1,998
<b>ANNUAL TOTAL</b>		<b>28,922</b>	<b>16,428</b>	<b>3,802</b>	<b>7,062</b>	<b>10,863</b>	<b>67,077</b>
<b>REPLACEMENT HEIFERS</b>							
Silos	20	1,932	1,159	270	502	773	4,636
Concentrate Storage	20	135	90	20	37	57	339
Hay & Bedding Storage	20	1,888	1,133	264	491	755	4,531
Calf & Dry-Cow Housing	20	2,808	1,685	393	730	1,123	6,739
<b>ANNUAL TOTAL</b>		<b>6,763</b>	<b>4,067</b>	<b>947</b>	<b>1,760</b>	<b>2,708</b>	<b>16,245</b>

<sup>a</sup> Footnotes as in Table 9.

Table 11: Annual Cash and Non-Cash Capital Associated Costs for the 100-Cow, Free-Stall Dairy<sup>a</sup>

	Depreciation (years)	Depreciation (\$)	Investment Cost (\$)	Insurance (\$)	Taxes (\$)	Repairs & Maintenance (\$)	Total Cost (\$)
<b>DAIRY</b>							
Barn & Iron	30	4,680	4,121	983	1,825	2,808	14,508
Ventilation	10	950	315	70	130	200	1,665
Milk Parlor	30	1,692	1,523	355	660	1,015	5,245
Milking Equipment	10	7,600	2,520	560	1,040	1,600	13,320
Silos	20	13,313	7,988	1,864	3,462	5,326	31,953
Manure Handling	20	2,993	1,796	419	778	1,197	7,183
Concentrate Storage	20	810	486	113	211	324	1,944
Hay & Bedding Storage	20	497	298	70	129	199	1,193
Machine Storage	20	1,950	1,170	273	507	780	4,680
Workshop	20	1,334	880	187	347	534	3,202
Calf & Dry-Cow Housing	20	1,100	660	154	286	440	2,640
Well	10	350	105	25	46	70	596
Feed-Handling Equipment	10	1,520	504	112	208	320	2,664
<b>ANNUAL TOTAL</b>		<b>38,789</b>	<b>22,377</b>	<b>5,185</b>	<b>9,629</b>	<b>14,813</b>	<b>90,793</b>
<b>REPLACEMENT HEIFERS</b>							
Silos	20	2,536	1,522	355	659	1,014	6,086
Concentrate Storage	20	190	114	27	49	76	456
Hay & Bedding Storage	20	2,428	1,457	340	632	971	5,828
Calf & Dry-Cow Housing	20	3,900	2,340	546	1,014	1,560	9,360
<b>ANNUAL TOTAL</b>		<b>9,954</b>	<b>5,433</b>	<b>1,268</b>	<b>2,354</b>	<b>3,621</b>	<b>21,730</b>

<sup>a</sup>Footnotes as in Table 9.

Table 12: Annual Cash and Non-Cash Capital Associated Costs for the 150-Cow, Free-Stall Dairy<sup>a</sup>

	Depreciation (years)	Depreciation (\$)	Investment Cost (\$)	Insurance (\$)	Taxes (\$)	Repairs & Maintenance (\$)	Total Cost (\$)
<b>DAIRY</b>							
Barn & Iron	30	7,020	6,318	1,474	2,738	4,121	21,762
Ventilation	10	1,425	473	105	195	300	2,498
Milk Parlor	30	1,728	1,555	363	674	1,037	5,357
Milking Equipment	10	7,600	2,520	560	1,040	1,600	13,320
Silos	20	19,406	11,644	2,717	5,046	7,762	46,575
Manure Handling	20	3,072	1,843	430	799	1,229	7,373
Concentrate Storage	20	1,215	729	170	316	486	2,916
Hay & Bedding Storage	20	751	451	105	195	301	1,803
Machine Storage	20	1,950	1,170	273	507	780	4,680
Workshop	20	1,334	800	187	347	534	3,202
Calf & Dry-Cow Housing	20	1,685	1,011	236	438	674	4,044
Well	10	350	105	25	46	70	596
Feed-Handling Equipment	10	1,700	630	140	260	400	3,330
<b>ANNUAL TOTAL</b>		<b>49,436</b>	<b>29,249</b>	<b>6,785</b>	<b>12,601</b>	<b>19,385</b>	<b>117,456</b>
<b>REPLACEMENT HEIFERS</b>							
Silos	20	3,696	2,218	517	961	1,479	8,871
Concentrate Storage	20	285	171	40	74	114	684
Hay & Bedding Storage	20	3,669	2,731	514	954	1,467	8,805
Calf & Dry-Cow Housing	20	5,975	3,585	836	1,554	2,390	14,340
<b>ANNUAL TOTAL</b>		<b>13,625</b>	<b>8,175</b>	<b>1,907</b>	<b>3,543</b>	<b>5,450</b>	<b>32,700</b>

<sup>a</sup>Footnotes as in Table 9.

Table 14. Total Costs for Dairy Herds of 50, 75, 100, and 150 Cows in Third Year of Operation

	Cost per Unit	50 COWS		75 COWS		100 COWS		150 COWS	
		Amount	Total Cost	Amount	Total Cost	Amount	Total Cost	Amount	Total Cost
<b>FEED:</b>									
1. Silage <sup>a</sup>	\$18.20-\$22.87/ton	1,028.84T	\$ 23,529.57	1,539.39T	\$ 31,295.80	2,057.69T	\$ 38,540.53	3,086.53T	\$ 56,174.85
2. Concentrate	\$220/ton	187.98T	41,355.60	281.78T	61,991.60	375.95T	82,709.00	563.93T	124,064.60
3. Hay	\$120/ton	6.84T	820.80	10.04T	1,204.80	13.69T	1,642.80	20.53T	2,463.60
4. Salt	\$14/cwt	104.94 cwt	1,469.16	156.95 cwt	2,197.30	209.88 cwt	2,938.32	314.81 cwt	4,407.34
Total Feed Cash Costs			\$ 67,175.13		\$ 96,689.50		\$125,830.65		\$187,110.39
<b>NON-FEED COSTS:</b>									
1. Replacement Heifers <sup>b</sup>			\$ 27,296.15		\$ 39,719.14		\$ 52,510.33		\$ 78,585.96
2. Hired Labor		0	0	0	0	1	12,000.00	3	44,000.00
3. Property Tax <sup>c</sup>	\$13/\$1000		5,899.80		8,144.70		11,072.60		14,766.40
4. Dairy R&M			7,962.00		10,863.00		14,313.00		19,385.00
5. Electricity			6,000.00		6,000.00		8,000.00		8,000.00
6. Breeding Fees	\$10/head	60 cows	600.00	90 cows	900.00	120 cows	1,200.00	180 cows	1,800.00
7. Semen (1.75 ampul/head)	\$12/ampul		1,260.00		1,890.00		2,520.00		3,780.00
8. D.H.I.A.	\$.25/head/mo.		180.00		270.00		360.00		540.00
9. Fuel & Oil			800.00		900.00		1,000.00		1,100.00
10. Insurance <sup>d</sup>	\$7/\$1000		3,177.20		4,384.30		5,961.40		7,949.60
11. Vet & Drugs	\$20/head		1,200.00		1,800.00		2,400.00		3,200.00
12. Bedding	\$2/65 lbs.	2,700.00 lb.	83.08	4,050.00 lb.	124.62	5,400.00 lb.	166.15	8,100.00 lb.	249.23
13. Dairy Supplies & Misc.	\$25/milking head		1,250.00		1,875.00		2,500.00		3,750.00
Total Non-Feed Cash Costs			\$ 55,700.23		\$ 76,870.76		\$114,503.48		\$187,106.19
<b>NON-CASH COSTS:</b>									
1. Operator Labor			\$ 15,000.00		\$ 15,000.00		\$ 15,000.00		\$ 15,000.00
2. Interest on Investment:									
Cows <sup>e</sup>			3,690.00		5,535.00		7,380.00		11,070.00
Facilities (includes equipment)			12,027.00		16,428.00		22,377.00		29,249.00
Feed <sup>f</sup>			1,577.54		2,184.65		2,771.78		4,084.04
Operating Capital <sup>g</sup>			1,688.40		217.55		381.19		703.15
3. Depr. on Capital Investment			21,284.00		28,922.00		38,789.00		49,436.00
Total Non-Cash Costs			\$ 53,747.38		\$ 68,287.20		\$ 86,699.68		\$109,542.19
<b>TOTAL COST</b>			\$176,630.79		\$241,843.30		\$327,033.81		\$483,758.77

<sup>a</sup>The silage budgets were slightly revised so that the working paper described on page 17 shows slightly different figures.

<sup>b</sup>See Table 17 for replacement heifer cost summary.

<sup>c</sup>Includes an annual property tax of \$12.03/cow.

<sup>d</sup>Includes an annual insurance cost of \$6.47/cow.

<sup>e</sup>(6%)(1600 + 450)(milkers + dry cows)

<sup>f</sup>Interest calculated as follows:  

$$\frac{\text{silage cost} + \text{hay cost} + \text{concentrate cost} + \text{salt cost}}{2} (.09)$$

<sup>g</sup>Interest calculated as follows: 1/12 of operating costs less feed, replacement heifer cost, and property taxes times 9%.

**Table 15: Break-Even Analysis for 50, 75, 100, and 150-Cow Dairy Farms**

Herd Size	Cull Cows		Cull Heifers		Cull Calves		Required Annual Milk Production <sup>a</sup>
	Number	Revenue	Number	Revenue	Number	Revenue	
50	15	\$ 6,750	1.5	\$1,200	40.5	\$ 486	16,646 lbs./cow
75	22.5	10,125	2.25	1,800	60.75	729	15,122 lbs./cow
100	30	13,500	3.0	2,400	81	972	15,348 lbs./cow
150	45	20,250	4.5	3,600	121.5	1,458	15,124 lbs./cow

<sup>a</sup>Calculated Using:

$$[(\text{Total cost} - \$ \text{ rec'd fr. cull cattle}) / \$ \text{ rec'd per lb. milk}] / \text{Total no. cows} = \text{lb. milk per cow}$$

**Table 16: Replacement Heifer Cost Summary for Four Facility Sizes**

	50-Cow	75-Cow	100-Cow	150-Cow
<b>Overhead Costs:</b>				
Repair & maintenance	\$ 1,888	\$ 2,708	\$ 3,621	\$ 5,450
Interest on investment	2,832	4,067	5,433	8,175
Depreciation	4,722	6,763	9,054	13,625
Property tax	1,227	1,760	2,354	3,543
Insurance	660	947	1,268	1,907
<b>Total Overhead Cost</b>	<b>\$11,239</b>	<b>\$16,245</b>	<b>\$21,730</b>	<b>\$32,700</b>
<b>Feed Costs:</b>				
Silage	\$ 3,634.27	\$ 4,845.96	\$ 5,92.77	\$ 8,676.49
Concentrate	4,870.80	7,306.20	9,741.60	14,612.40
Hay	3,223.80	4,835.70	6,447.60	9,671.40
Salt	632.10	948.15	1,264.20	1,896.30
Interest on feed <sup>a</sup>	390.05	557.83	720.89	1,069.97
Milk Replacer	1,182.17	1,773.25	2,364.33	3,546.50
Calf Starter	554.04	831.07	1,108.09	1,662.13
Bedding	1,269.92	1,925.98	2,580.85	3,850.77
Calf Supplies	300.00	450.00	600.00	900.00
<b>TOTAL.</b>	<b>\$27,296.15</b>	<b>\$39,719.14</b>	<b>\$52,510.33</b>	<b>\$78,585.96</b>
<b>PER COW<sup>b</sup></b>	<b>\$ 1,707.34</b>	<b>\$ 1,652.90</b>	<b>\$ 1,637.94</b>	<b>\$ 1,633.95</b>

$$^a \text{Interest on feed} = \left( \frac{\text{Silage}}{2} + \frac{\text{Hay}}{2} + \frac{\text{Concentrate}}{8} + \frac{\text{Salt}}{8} + \frac{\text{Milk Replacer}}{8} + \frac{\text{Starter}}{8} \right) \cdot (.09)$$

$$^b \text{Cost per heifer} = \frac{\text{Total cost} - \text{calf and cull heifer receipts}}{\text{Number of replacement heifers required annually}}$$

required to cover all remaining costs are provided. Farmers receive 30 cents per pound for cull cows, \$800 per animal for cull heifers, \$12 per head for calves, and \$16.84 per cwt for milk.

The milk production required to cover all costs generally decreases as herd size increases. The 50-cow dairy farm requires an annual, average, per-cow production of 16,646 pounds of milk. This decreases to 15,124 pounds for a herd of 150 cows. Although it has been assumed that dairy herd sizes up to 75 cows need only family labor, it has been suggested that a 75-cow dairy farm may well require one hired laborer. If this is the case, then required milk production would have to increase from an average of 15,122 pounds per cow for 75 cows to an average production of 15,963 pounds per cow because of the additional labor cost.

Can Alaskan dairymen expect to obtain these per-cow, milk-production averages? With good management this should be possible. The current average production per cow for the six Alaskan herds belonging to the Dairy Herd Improvement Association (DHIA) is 16,844 pounds. This compares favorably with the California, Wisconsin, and New York averages of 18,674 pounds, 15,558 pounds, and 15,768 pounds, respectively.

It has been assumed throughout this report that each dairy enterprise would raise its own replacement heifers. However, as the Alaskan dairy industry enlarges, it is quite possible that replacement heifers would be available from other sources. Table 16 summarizes the cost of production for dairy heifers on a dairy farm.

## Herd Development and Projection of Revenues and Expenses

The farm budgets presented above are for dairy farms that are fully developed. This will not occur, however, until the third year of operation. How farms reach this developed stage and the revenue and expense picture for the first two years of operation must now be addressed.

### Herd Development

One of the first problems in starting a dairy farm is stocking the new farm so that full production can be reached as quickly as possible and milk production can be constant from month to month. One possible plan for accomplishing these goals is presented here in which cows are assumed to be milked ten months and dry two (See Tables 17, 18, 19, and 20, pgs. 14-17). Dairy farms are also assumed to cull 25 percent of the milking herd annually with cows culled when dry.

Initially, herds are stocked with purchased bred heifers. Animals arrive by contract air carrier before their last trimester of pregnancy, in two lots spaced six months apart. One-third of the heifers calve three months after arrival with the remaining two thirds calving two and four months later. By the end of the ninth month of the first year, dairy farms have reached full capacity in milking cows. However, purchases of replacement heifers are required in month eleven of year one and year two. Starting with the third year, dairy farms are able to provide all their own replacements.

For a herd of 100 milking cows (Table 16), for example, the development plan works as follows: 60 bred heifers are purchased initially, with one-third scheduled to start milking in months one, three, and five of year one. These cows are then dry in month eleven of the first year and in months one and three of the second year. As they become dry, 15 of the 60 are culled. A second lot of 60 heifers is delivered in month four of the first year and calve in months seven, nine, and eleven. As these cows become dry, 15 are again culled. An additional 30 heifers are purchased and brought on line in the second year. No more livestock purchases are required thereafter, since all replacements can be provided by the dairy farms beginning in the third year. It should be noted that these development plans are based on exact schedules that may be highly idealized. It may be that a producer would want a larger number of animals in the first purchase to increase immediate cash flow and compensate for possible delays in future calving schedules.

## Projected Revenues and Expenses

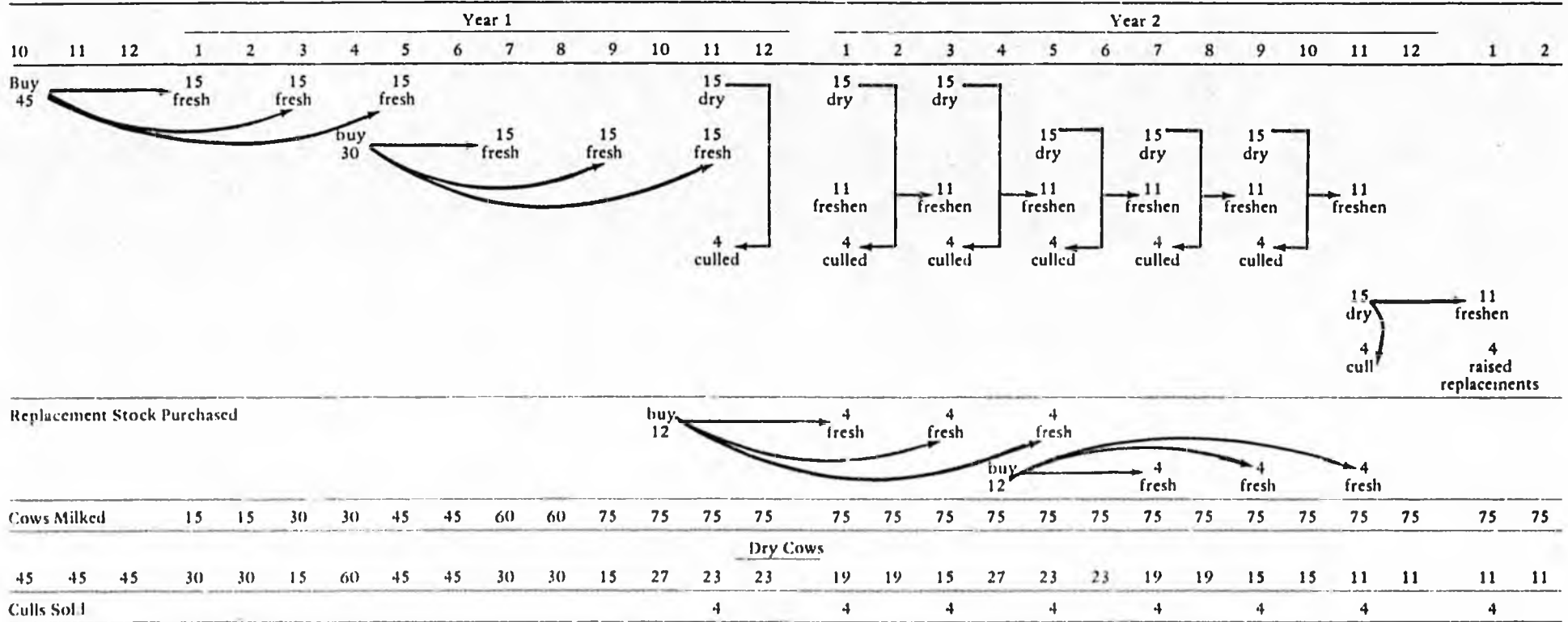
Table 21 (pg. 18) provides a revenue and expense projection for a 150-cow farm during the first three years of operation. The figures in this table can be adjusted for smaller sized farms—for example, .33 for a 50-cow-dairy farm or .5 for a 75-cow-dairy farm. This will yield a rough approximation of revenues and expenses for these smaller enterprises. Assumptions under which these projections are prepared are as follows:

1. All costs of feed for the first three months before the first lot of cows freshen are included in first quarter costs.
2. Cows produce only 85% of expected mature equivalent milk production during first lactation.
3. Property taxes are paid in January.
4. Labor is first hired in months five, seven, and nine of year one.
5. Repairs, maintenance, and electric costs are equally distributed through the year.
6. Fuel is purchased twice yearly in April and October.
7. Insurance is paid semiannually in April and October.
8. An initial purchase of \$1,000 of dairy supplies and \$600 of calf supplies is assumed. Thereafter, replacement of these supplies is proportionate to the number of cows milked in each quarter.
9. All bedding is purchased October 1.
10. Seventy-five per cent of silage costs are incurred in April through May. The remaining 25 per cent is encountered in July through September. Hay is purchased October 1.
11. All other costs are distributed equally over yearly quarters.
12. Repayment of debt on capital begins in the third year.

Assuming that production begins in October of 1981, a cumulative operating deficit results through December of 1982. Beginning in January through March of 1983, all losses have been recovered. A cumulative net profit continues for the remainder of the projection, even after the repayment of debt on the capital investment begins in the last quarter of 1983. Further, the dairy farm has cumulative silage assets of \$55,000 at the end of the 1983-1984 production year.

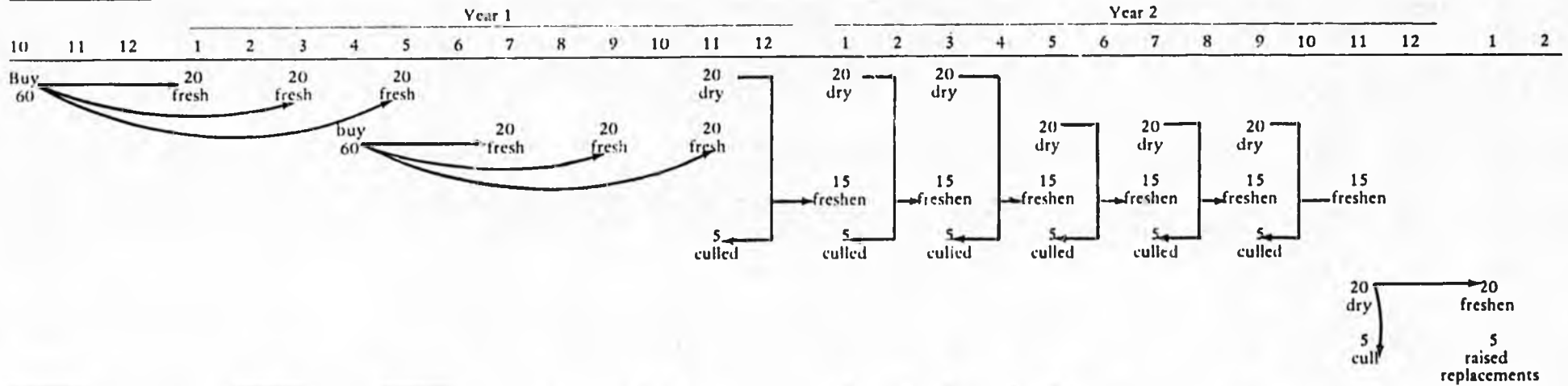


Table 18: Herd Development Plan for the 75 Cow Dairy Farm



15

Table 19: Herd Development Plan for the 100 Cow Dairy Farm



Replacement Stock Purchased

Cows Milked				20	20	40	40	60	60	80	80	100	100	100	100	100	100	100	100	100	100	100	100	100	100				
	60	60	60	40	40	20	80	60	60	40	40	20	35	30	30	25	25	20	35	30	30	25	25	20	20	15	15	15	15
Culls Sold													5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	

Table 20: Herd Development Plan for the 150 Cow Dairy Farm

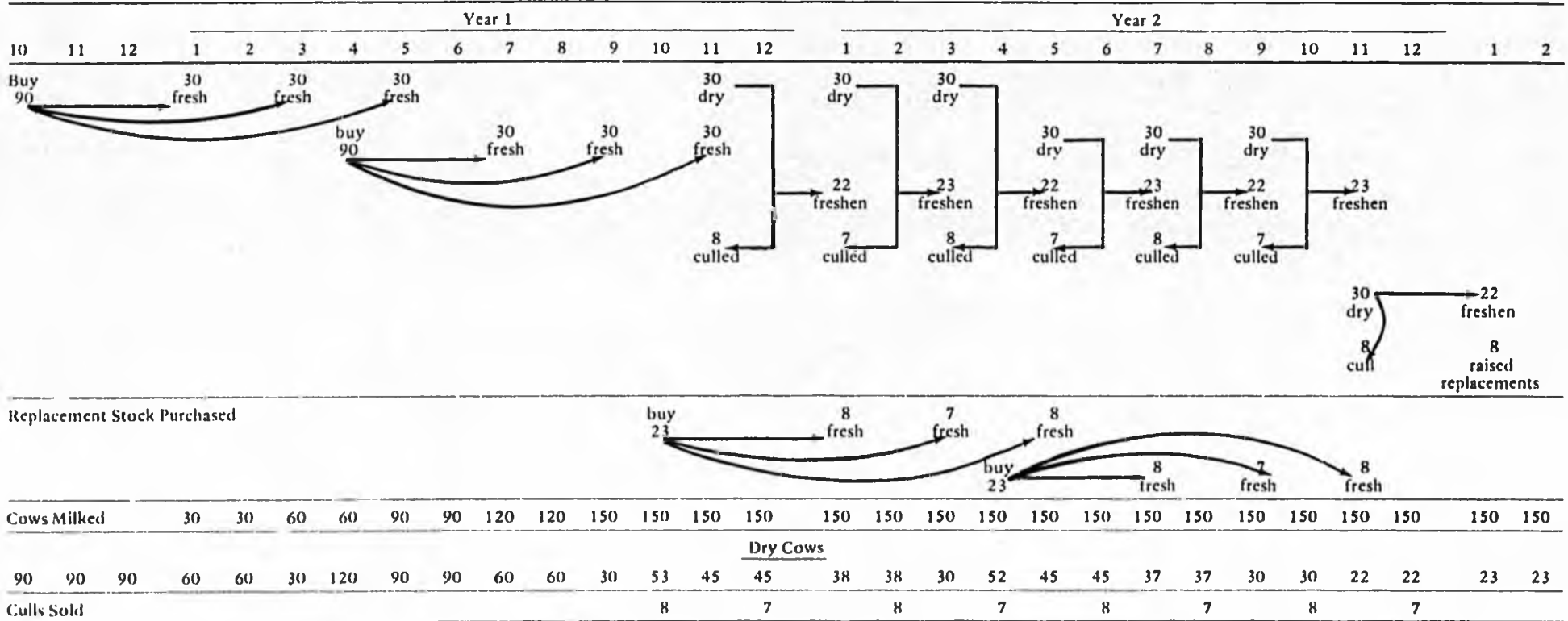


Table 21: Quarterly Projection of Revenues and Expenses for the 150-Cow-Dairy Farm<sup>a</sup>

	1981-1982				1982-1983				1983-1984			
	Oct.-Dec.	Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	Apr.-June	July-Sept.	Oct.-Dec.	Jan.-Mar.	Apr.-June	July-Sept.
<b>Cash Receipts</b>												
Calves	\$ 364	\$ 364	\$ 364	\$ 364	\$ 364	\$ 364	\$ 364	\$ 364	\$ 354	\$ 364	\$ 364	\$ 364
Cull Cows	0	0	0	3,375	5,062	5,062	5,062	5,062	5,062	5,062	5,062	5,062
Cull Heifers	0	0	0	0	0	0	0	0	900	900	900	900
Milk	26,360	51,575	84,811	97,419	102,003	106,587	112,318	114,610	114,610	114,610	114,610	114,610
<b>Total</b>	<b>\$26,724</b>	<b>\$51,939</b>	<b>\$85,175</b>	<b>\$101,158</b>	<b>\$107,429</b>	<b>\$112,013</b>	<b>\$117,744</b>	<b>\$120,036</b>	<b>\$120,936</b>	<b>\$120,936</b>	<b>\$120,936</b>	<b>\$120,936</b>
<b>Cash Expenses</b>												
Feed <sup>b</sup>	\$66,625	\$23,052	\$ 81,549	\$63,391	\$36,711	\$37,458	\$ 86,235	\$65,895	\$37,574	\$37,536	\$ 86,197	\$65,868
Hired Labor	0	2,000	9,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000	11,000
Property Taxes	0	18,309	0	0	0	18,309	0	0	0	18,309	0	0
Repairs & Maintenance	5,208	6,208	6,208	6,208	6,208	6,208	6,208	6,208	6,208	6,208	6,208	6,208
Electricity	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Breeding Fees	0	300	300	300	300	450	450	450	450	450	450	450
Semen	0	630	630	630	630	945	945	945	945	945	945	945
D.H.I.A.	540	0	0	0	540	0	0	0	540	0	0	0
Fuel & Oil	550	0	550	0	550	0	550	0	550	0	550	0
Insurance	4,928	0	4,928	0	4,928	0	4,928	0	4,928	0	4,928	0
Vet. & Drugs	800	800	800	800	800	800	800	800	800	800	800	800
Dairy Supplies	1,000	235	470	700	937	937	937	937	937	937	937	937
Calf Supplies	600	100	200	225	225	225	225	225	225	225	225	225
Bedding	3,750	0	0	0	4,100	0	0	0	4,100	0	0	0
<b>Total</b>	<b>\$87,001</b>	<b>\$53,634</b>	<b>\$106,635</b>	<b>\$85,254</b>	<b>\$68,929</b>	<b>\$78,332</b>	<b>\$114,278</b>	<b>\$88,460</b>	<b>\$70,257</b>	<b>\$78,410</b>	<b>\$114,240</b>	<b>\$88,433</b>
<b>Net Profit (Loss)</b>	<b><u>(\$60,277)</u></b>	<b><u>(\$1,695)</u></b>	<b><u>(\$21,460)</u></b>	<b><u>\$15,904</u></b>	<b><u>\$38,500</u></b>	<b><u>\$33,681</u></b>	<b><u>\$ 3,466</u></b>	<b><u>\$31,576</u></b>	<b><u>\$50,679</u></b>	<b><u>\$42,526</u></b>	<b><u>\$ 6,696</u></b>	<b><u>\$32,503</u></b>
<b>Payment to Debt</b>									\$38,854	\$38,854	\$38,854	\$38,854
<b>Cumulative Operating Deficit or Net Profit</b>	<b>(\$60,277)</b>	<b>(\$61,972)</b>	<b>(\$83,432)</b>	<b>(\$67,528)</b>	<b>(\$29,028)</b>	<b>\$4,653</b>	<b>\$8,119</b>	<b>\$39,695</b>	<b>\$51,570</b>	<b>\$55,192</b>	<b>\$23,034</b>	<b>\$16,683</b>
<b>Livestock Purchases</b>	<b>\$144,000</b>	<b>\$144,000</b>		<b>\$36,800</b>		<b>\$36,800</b>						

<sup>a</sup>All costs incurred in period prior to freshening of first cows are charged to first quarter of first year.  
<sup>b</sup>In revenue and expense projection, feed cost includes feed fed to replacement stock.

## CHAPTER 3

### MARKETING AND COMPETITIVE POSITION

#### Marketing

Milk is one of the few agricultural products having a well-organized marketing system in Alaska. Matanuska Maid, a dairy farmer cooperative, has identified the fresh milk market in Alaska, excluding the southeast portion of the state, at approximately 6,500,000 pounds per month. About 19 per cent is milk produced in Alaska, with the remaining 81 per cent shipped in by bulk and processed here or processed and packaged for retail sales outside the state before shipment to Alaska.

There are currently two major milk processors in Alaska—Matanuska Maid and Arden Farms—both located in Anchorage. Matanuska Maid processes all the milk produced in Alaska. The problem for these two processors lies in retaining a market share sufficient to maintain a volume of milk for efficient processing while competing with falling prices for imported milk. In-state milk production has declined from 22.1 million pounds in 1961 to 14.4 million pounds in 1978 with imported milk replacing the loss.

Fresh-milk producers in Alaska are being pressured by high land values in the Matanuska Valley. Dairy men are now able to realize significant gains by selling their land to speculators and subdividers, gains much higher than would be realized by continuing to farm or by selling to another farmer. As a result, since the 1960s dairy farms have been declining rapidly. The industry, thus weakened, has had a difficult time meeting increased competition from "outside" dairy men. Increased milk production from Point MacKenzie farms may help increase the competitiveness of the industry.

An important question is whether or not new milk producers at Point MacKenzie can reasonably expect to have a market for their milk. Some consumers may not choose Alaska-produced milk, even if it is price competitive, while others would probably be willing to pay a premium for local milk. Some retail firms may prefer, due to economic pressure, not to handle local milk unless it is competitive with out-

side milk. It is probable that considerably less than 100 per cent of the market will be supplied by local milk even with the additional production from Point MacKenzie.

#### Competitive Position of Alaskan-Produced Milk

The current competitive position of Alaskan-produced milk compared with alternative sources is analyzed below. Such analysis is important in considering the future of the Alaskan dairy industry. While disagreement is possible for any figure given, cost data in the analysis are as accurate as possible at this time. The magnitude of any inaccuracies would not be great enough to alter the conclusions.

Milk produced in Alaska must compete for a reasonable share of the market with milk shipped in from outside the state. As shown in Table 22 (pg. 20) Alaska farmers were receiving \$16.84 per hundred weight in November, 1979. Farm-to-processor transportation cost by regulated carrier was \$1.36 per cwt. Therefore, the total cost for Alaska-produced milk to an Anchorage processor was \$18.20 per cwt. Local processing cost adds another \$13.61 per cwt and brings the total cost, when delivered to the retail store dock, to \$31.81 per cwt. Milk shipped in by bulk and processed locally had a slightly higher wholesale cost of \$33.04 per cwt. This is primarily because regulations require that bulk milk shipped into Alaska must be pasteurized a second time, adding a cost of \$2.00 per cwt. Prepackaged milk shipped in from the Puget Sound had a significantly lower wholesale cost. Table 22 presents the cost of prepackaged milk using a Class I price (regulated handler) and blend price (non-regulated producer/distributor). These total \$27.66 and \$26.66 per cwt which is \$4.15 and \$5.15 less than Alaskan produced and processed milk, respectively. Recombined milk (dry skim milk and butterfat shipped in from out of state and recombined with water in Alaska) was competitive with the prepackaged milk even with the higher Alaska processing costs.

**Table 22: Estimated Costs Per Hundred Weight and Per 1/2 Gallon for Alternative Sources of Milk Delivered to Anchorage Retail Stores, November 1979**

	Fresh Milk from Seattle				
	Local Farmers	Bulk	Class 1	Prepackaged Processor-Distributor	Ingredients to Recombine
Farm Value	\$16.84 <sup>a</sup>	\$12.85 <sup>b</sup>	\$12.85 <sup>b</sup>	\$11.85 <sup>b</sup>	
Delivered to Plant	18.20 <sup>c</sup>	13.10 <sup>d</sup>	13.10 <sup>d</sup>	12.10 <sup>c</sup>	\$11.34 <sup>f</sup>
Haul to Washington Pier		.65 <sup>g</sup>			
Transportation to Alaska		3.68 <sup>g</sup>	8.83 <sup>h</sup>	8.83 <sup>h</sup>	.70 <sup>i</sup>
Service charges		2.00 <sup>j</sup>			
Processing Cost	13.61 <sup>k</sup>	13.61 <sup>k</sup>	5.73	5.73	13.61
Butter and Powder					1.00 <sup>l</sup>
Recombining Cost					.10 <sup>l</sup>
<b>Cost at Wholesale</b>					
Per 100 Pounds	<u>\$31.81</u>	<u>\$33.04</u>	<u>\$27.66</u>	<u>\$26.66</u>	<u>\$26.75</u>
Cost Per 1/2 Gal. Wholesale	\$1.37	\$1.42	\$1.17	\$1.15	\$1.15
Cost Per 1/2 Gal. Retail <sup>m</sup>	\$1.58	\$1.63	\$1.37	\$1.32	\$1.32

<sup>a</sup> FOB price at farm for milk produced in the Matanuska Valley.

<sup>b</sup> Transportation cost of \$.25 from farm to processor in Puget Sound area is an estimate.

<sup>c</sup> Cost of local milk at an Anchorage processing plant.

<sup>d</sup> Estimated Puget Sound Class 1 price, November 1979.

<sup>e</sup> Estimated Puget Sound Blend price, November 1979.

<sup>f</sup> Estimated manufacturing milk price in all federal order marketing areas.

<sup>g</sup> Source: An Anchorage milk processing firm.

<sup>h</sup> \$.38 per half gallon transportation cost between Seattle and Anchorage.

<sup>i</sup> \$4.50 transportation cost per 100 pounds of non-fat dry milk or 100 pounds of butter.

<sup>j</sup> Primarily the cost of pasteurization before transporting bulk milk to Alaska. This milk is pasteurized a second time in Alaska. Source: An Anchorage milk processing firm.

<sup>k</sup> Includes fluid bottling and distribution to retail. Source: An Anchorage milk processing plant.

<sup>l</sup> Source: Hammond, Buxton and Thraen, 1979.

<sup>m</sup> Assumes 15% markup.

**Table 23: Estimated Cost Per Hundred Weight of Milk Through a Typical Anchorage Milk Processing Plant and Delivered to Retail Stores**

	VOLUME PER MONTH		
	2 Million Pounds	5 Million Pounds	
		No Change in Technology	No Change in Technology
Milk and Carton	\$19.64	\$19.64	\$19.18 <sup>a</sup>
Plant Labor	1.80	1.17	.99
Plant Overhead	1.77	1.15	.98
Distribution to Retail	6.28	4.08	4.08
Administration and Profit	2.32	1.50	1.50
<b>TOTAL</b>	<u>\$31.81</u>	<u>\$27.54</u>	<u>\$26.73</u>

<sup>a</sup> Reduction in bulk transportation cost from Matanuska Valley/Point Mackenzie to Anchorage due to deregulation of intrastate bulk milk movement. SOURCE: An Anchorage milk processing firm.

This is a large difference in processing cost between local and outside processors. Further consideration is required to understand this large difference. Anchorage milk-processing plants have substantially lower volume than do their Seattle competitors, therefore incurring a higher cost per processed unit. Additional sources of higher costs for Anchorage plants arise from outdated plant equipment and higher labor costs. Can these economic disadvantages be overcome? Table 23 represents the costs associated with a typical processing plant in Anchorage. Assuming a monthly volume of 2 million pounds, the total cost per cwt

was determined to be \$31.81. The typical plant capacity is 5 million pounds per month. This production level, therefore, implies that such a plant is substantially underutilized. If volume were to increase to 5 million pounds per month (production from existing dairy herds and 3,000 additional cows in Point Mackenzie), plant costs per unit of production would drop substantially. Cost per cwt at this volume would be approximately the same as prepackaged Class 1 milk shipped in from Seattle. Further, if improved technology were incorporated into this plant and intrastate bulk milk shipment was deregulated, then

local milk could be produced and processed at a cost approaching processor-distributor milk from Puget Sound. In other words, with changes in the industry, Alaska milk can again become competitive.

Is this scenario a real possibility? First, 5 million pounds is 76 per cent of the current market for fresh milk in Alaska excluding southeast. State population is expected to grow to 496,000 in five years (Kruse, 1979). This means that the milk market, assuming no change in consumption patterns, would increase to 8 million pounds. The 5 million pounds of locally produced milk would then account for only 62 per cent of total consumption compared to 20 per cent currently. Because Alaska milk would be merely competitive in production and processing costs with outside milk, not lower priced, it is difficult to determine whether consumers would prefer comparatively priced Alaskan or outside milk. Nevertheless, for 5 million pounds of Alaska-produced milk to be sold annually, assuming the above population growth, 62 per cent of the market would have to be captured.

It is clear that, without greater volume and plant modernization, dairy farmers in Alaska must bear a greater portion of the cost differential that currently exists between prepackaged outside milk and local milk to be fully competitive. The existing small-dairy industry may be able to survive with its premium-priced product. However, the only way to lower the price of Alaska milk to the consumer, assuming no relative cost changes, is through expansion of local

milk production, subsequent increases in processing volume and additions in processing technology.

An additional marketing question for which no analysis has been undertaken is the response of sellers of prepackaged outside milk to competitively priced Alaskan milk. If Alaskan milk begins to capture a larger share of the market, what will be the response of these outer sellers. Will they be in the position to reduce prices? If they do, can Alaskan producers compete? If Alaskan producers cannot compete, should the state of Alaska attempt to interfere in the market to protect the Alaskan producers?

Economists generally hold that competition brings about the most desirable balance between production and consumption and leads to maximum welfare for all citizens. The major force that brings about this ideal pattern is price. Prices provide signals to producers and consumers which lead to the most desirable level of production and consumption. Interference in the market by the state would probably distort these signals. Thus, any interference by the state in the market through either marketing orders, fair trade legislation, or producer subsidies should be undertaken only after careful and thorough consideration of the welfare implications resulting from any such action. However, such involvement may be necessary if outside producers should sell their milk in Alaska below production cost in an effort to maintain their market share.

## CHAPTER 4

### FINAL THOUGHTS

Dairying at Point MacKenzie appears economically feasible if the price paid to dairymen remains at \$16.84 per cwt. The largest herd size considered, 150 cows, was the most economically viable. A positive revenue and expense flow could be generated for this dairy enterprise by the middle of the second year of operation. Table 24 indicates the number of pounds of milk per cow required annually to cover all costs at \$16.84 per cwt.

A critical aspect of an expanded milk industry in Alaska is processing. The dairy farmers, both old and new, must press for greater efficiency in processing. A major concern is high labor costs relative to "outside" competitors. For an efficient, competitive milk-processing capability in Alaska, careful attention must be given to the cost and productivity of each unit of labor and capital. The optimum combination of these two factors of production in terms of costs and returns is essential for efficient processing.

Although it is possible that private financial institutions would finance a modernization program, it is more likely that milk processors will depend on the state for capitalization through several existing low-cost loan programs. In this event, the state may exercise some degree of control over the management of milk-processing firms. This could ensure reaching and maintaining a high level of efficiency in order to make certain that Alaskan milk could capture and hold the necessary 62 per cent of the market.

There is an advantage to the Alaskan processor if state loan programs are used. State loan-program managers can exercise a degree of flexibility in pay-back periods. If outside milk processors consider maintaining their share of the Alaskan market to be

important enough, prices could be lowered below those of Alaskan milk over the short run. The state could delay payments on capital loans to allow Alaskan processors to engage in price competition and attempt to maintain their market share.

Future transportation rates to Alaska may reflect a greater-than-relative change in comparison to other costs due in large measure to the higher costs of petroleum. If so, the transportation advantage currently available to imported prepackaged milk may be reduced. If this situation develops, the competitive position of Alaskan dairy farms and milk processors vis-a-vis outside competitors will improve.

In conclusion, several points should be made. The analysis presented is a reasonable approximation of present conditions in the Alaskan dairying industry. Although some of the data are estimates, they are based on relevant components of the dairy industry in other states.

There is risk associated with any action. However, if two conditions are met, it is quite reasonable to believe that the dairy industry in the state can grow. First, individual farms must utilize best management practices. Second, the processing sector must become more efficient. If the first is realized, milk production will increase. This will partially affect the second condition with no action required by the processing sector. Full realization of potential plant efficiency will come if processors take advantage of cost reductions available through installation of equipment utilizing new technology. With the prospect of a continuing industry and possible low-cost state loans, milk processors should be able to realize a high efficiency for the present size of plant.

Table 24: Production Rates and Returns for 50-, 75-, 100-, and 150-Cow Dairy Farms

	50 Cows	75 Cows	100 Cows	150 Cows
lbs per cow to cover all costs at \$16.84 per cwt	16,646	15,122	15,348	15,124
Net return per cwt (17,000 lbs per cow <sup>a</sup> )	\$ .35	\$1.85	\$1.63	\$1.85
Net return per cwt (16,000 lbs per cow <sup>a</sup> )	(\$ .68) <sup>b</sup>	\$ .92	\$ .68	\$ .92
Net return per cwt (15,000 lbs per cow <sup>a</sup> )	(\$1.85)	(\$ .14)	(\$ .39)	(\$ .14)

<sup>a</sup>Calculated using  $[(\text{lbs. production per cow})(\$ \text{ per lb.})] - (\text{Total production cost} - \text{Revenue from cattle}) / \text{total no. cows}$   
 $\text{lbs. production per cow} / 100$

<sup>b</sup>Implies negative returns.

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