1866 SRES AGRICULTURE BRIEFING 1/19/81 - 3/12/82

1866

FIGURES IN ORDER TO SAY THE LOCAL INDUSTRY IS VIABLE IN THE LONG TERM.

THE CATTLE INDUSTRY WILL BE ANALYZED FIRST. THE FIRST SEGMENT OF THE INDUSTRY IS THE COW-CALF OPERATION. THE KENAI PENINSULA AREA IN THE JUNE, 1980 ALASKA AGRICULTURAL STATISTICS SHOW CLIMATOLOGICAL CONDITIONS VERY SIMILAR TO SOUTHERN MISSOURI, OKLAHOMA, NORTHERN ARKANSAS, AND TENNESSEE AREA OF THE LOWER 48 WHICH HAS FOR YEARS PRODUCED CALVES VERY ECONOMICALLY. THE CALVES COMING FROM THIS PORTION OF THE LOWER 48 HAVE TRADITIONALLY BEEN FINISHED IN WESTERN TEXAS, ARIZONA AND NORTHEASTERN COLORADO. THE KENAI PENINSULA CAN PRODUCE 400 LB. FEEDER CALVES AS ECONOMICALLY AS THE LOWER 48 WITH PROPER BREEDING AND CULLING TECHNIQUES. THE NUMBER OF CATTLE NEEDED IS THE NEXT QUESTION. ASSUMING THE RAILBELT AREA IS OUR MARKET, WE WANT TO SUPPLY BEEF FOR 50% OF THAT AREA. THE FOLLOWING CALCULATIONS DETERMINE NUMBERS OF ANIMALS NEEDED:

POPULATION - 300,000

CONSUMPTION OF BEEF PER CAPITA PER YEAR - 105 LBS.

TOTAL CARCASS BEEF CONSUMPTION - 31,500,000 LBS.

WEIGHT PER BEEF CARCASS - 600 LBS.

TOTAL CARCASSES NEEDED - 52,500

50% OF MARKET PER YEAR - 26,250

WEEKLY MARKETINGS - 504 OR 500

DAILY KILL RATE - 100

THE ANIMAL SCIENTIST OF THE AGRICULTURAL EXPERIMENTAL STATION OF UNIVERSITY OF ALASKA, DR. FRED HUSBY, HAS ESTIMATED

THAT THE KENAI PENINSULA AREA HAS 230,000 ACRES OF POTENTIAL GRAZING LAND THAT CAN SUPPORT 30,000 COW-CALF UNITS. THE TOTAL 26,250 HEAD NEEDED COULD COME FROM THIS AREA ALONE IF NEEDED. OTHER PARTS OF THE STATE, HOWEVER, WILL BE PRODUCING CALVES. IT IS ESTIMATED 30% OF THE PRESENT BEEF CONSUMPTION IS IN THE FORM OF MANUFACTURING BEEF (LESS THAN U.S.D.A. GOOD GRADE) IN THE PRODUCTION OF GROUND BEEF. ANIMALS PERFECT FOR SUCH USE COME FROM DAIRY HERD STEERS AND CULL COWS AND BULLS. THE 30% FACTOR WOULD AMOUNT TO 7,875 PER YEAR WHICH SHOULD BECOME AVAILABLE WHEN THE POINT MACKENZIE AREA IS DEVELOPED FOR DAIRY PURPOSES. THE SOUTHWEST OF ALASKA AND KODIAK ISLAND ALREADY ARE PRODUCING OVER 2,000 HEAD OF CALVES A YEAR. UNDOUBTEDLY THIS AREA COULD BE UPGRADED TO PRODUCE MORE. FEATHERSTONE ESTIMATES THAT IF THE KENAI COULD PRODUCE 50% OF ITS CAPACITY OR 15,000 HEAD PER YEAR, THE REST OF THE STATE CAN PRODUCE THE BALANCE NEEDED OR 11,250 PER YEAR. THESE CALVES SHOULD HAVE NO APPRECIABLE COST DIFFERENTIAL FROM THE SAME AGE AND WEIGHT CALVES OF THE LOWER 48. (FACTORS THAT CAN BE USED TO STIMULATE THE KENAI PRODUCTION OF CALVES WILL BE DISCUSSED IN THE FINAL REPORT.)

THE NEXT SEGMENT OF THE MARKET IS THE GROWING AND FINISHING OF STOCKERS AND FEEDERS. THE AREAS BEST SUITED TO PRODUCE BARLEY HAVE BEEN IDENTIFIED AS THE DELTA-CLEARWATER AREA AND THE NENANA-TOKLAT AREA. EXPERIENCE IN THE LOWER 48 SHOW THAT CATTLE IDEALLY SHOULD BE GROWN AND FINISHED NEAR THE SOURCE OF GRAIN WHICH APPEARS TO BE THE BARLEY PRODUCING AREAS. TRANSPORTATION

OF CALVES FROM THE SOUTHERN AREAS TO GROWING AND FINISHING AREAS OF ALASKA IS NO DIFFERENT THAN SHIPPING THEM WEST OR SOUTH AS IS DONE IN THE LOWER 48. IN THE FINAL REPORT FEATHERSTONE WILL DISCUSS THE POSSIBILITY OF FREIGHTING IN FEEDER CALVES FROM THE LOWER 48 TO START UP THE INDUSTRY. THIS SUPPLYING SHOULD BE VIEWED AS A SHORT TERM START UP COST THAT DOES NOT ACCRUE TOWARD THE INDUSTRY'S COST DIFFERENTIAL OF $54.00.

THE MONTANA LIVESTOCK COOPERATIVE AND THE UNIVERSITY OF MONTANA AGRICULTURAL SCHOOL WERE REQUESTED TO WORK UP PRESENT DAY LEAST COST FEEDING FORMULAS AND RATES OF DAILY GAIN. THE RATE OF GAIN WAS ESTIMATED TO BE 10% LESS IN ALASKA DUE TO THE COLD WEATHER WHICH IS A HIGH DIFFERENTIAL IN FEATHERSTONE'S OPINION AND WILL GIVE A CONSERVATIVE DIFFERENTIAL COST FIGURE. THE FEED CONVERSION WAS DETERMINED TO BE 6.5 TO 1 FOR GROWING AND 8 TO 1 FOR FINISHING USING THE FOLLOWING RATIONS:

STANDARD CATTLE RATION USING BARLEY AND CONSUMPTION DATA

	GROWING RATION		FINISHING RATION	
	PERCENT	ANIMAL**	PERCENT	ANIMAL***
BARLEY*-STEAMED & ROLLED	68.57	1560.00	87.27	1745.00
ROUGHAGE HAY	28.57	650.00	9.09	182.00
LIMESTONE	.90	20.50	1.14	23.00
CALCIUM PHOSPHATE	.36	8.00	.45	9.00
TRACE MINERALIZED SALT	.36	8.00	.45	9.00
MOLASSES	1.255	28.50	1.59	32.00
VITAMIN A 50,000 IU/DAY/ANIMAL		140.00		100.00

*ASSUMES 12% PROTEIN BARLEY WHICH WILL NOT NEED PROTEIN SUPPLEMENT. ALASKA BARLEY IN 1980 HAD A 12.6% DM PROTEIN.
**FEED FROM 400 LBS. TO 750 LBS. OR 350 LBS. TIMES 6.5 CONVERSION EQUALS 2,275 LBS. OF RATION PER ANIMAL.
***FEED FROM 750 LBS. TO 1,000 LBS. OR 250 LBS. TIMES 8.0 CONVERSION EQUALS 2,000 LBS. OF RATION PER ANIMAL.

TOTAL CONSUMPTION OF BOTH RATIONS AND PRESENT ESTIMATED COST IS:

ITEM	TOTAL CONSUMPTION	COST/UNIT	TOTAL COST PER ANIMAL
BARLEY - STEAMED & ROLLED	3305.0	.0694 (a)	$229.37
ROUGHAGE HAY	832.0	.0660 (b)	54.91
LIMESTONE	43.5	.0135 LB. (c)	.59
CALCIUM PHOSPHATE	17.0	.1486 LB. (c)	2.53
TRACE MINERAL SALT	17.0	.05 LB. (c)	.85
MOLASSES ($94.00/CWT.)	60.5	.0715 (d)	4.33
VITAMIN A 50,000 I.U.	240 DAYS	.01¢ DAY (c)	2.40
TOTAL COST			$294.98

(a) PRICE WINNEPEG - NOVEMBER 25, 1980.

(b) AVERAGE PRICE PD. IN ALASKA IN 1977 TO 1979 FOR ALL HAY JUNE, 1980 ALASKA AG. STATISTICS.

(c) PRICES FURNISHED BY BIO-ZYME INDUSTRIES 11-26-80.

(d) PRICES DELVD. ATCHISON, KS DELVD. BY BARGE 11-26-80.

THE 10% SLOWER RATE OF GAIN WOULD EQUAL A 10% INCREASE IN FEED COST OR $29.50 PER ANIMAL DIFFERENTIAL WITH THE LOWER 48. FEATHERSTONE IS IN THE PROCESS OF DETERMINING COST OF CONFINED FEEDING OF CATTLE WHICH MAY SUBSTANTIALLY REDUCE THIS FIGURE.

ONCE THE CATTLE ARE FINISHED THEY MUST BE SLAUGHTERED. USING FIGURES OF A LARGE BEEF SLAUGHTER THAT FEATHERSTONE DOES CONSULTING WORK FOR AS A BASIS, IT HAS BEEN DETERMINED THE ADDITIONAL COST TO PROCESS BEEF IN ALASKA IS APPROXIMATELY $5.06 PER

ANIMAL.[4] THIS PROJECTION WAS MADE ON THE FOLLOWING ASSUMPTIONS:

1) LABOR RATES AND EFFICIENCY DUE TO SMALL KILL RATE WOULD INCREASE LABOR COST 50%.
2) UTILITY RATES WOULD BE HIGHER DUE TO DIFFERENCE IN RATE AND SMALLER KILL CAUSING A 50% INCREASE IN POWER COSTS.
3) GENERAL AND ADMINISTRATIVE EXPENSES ARE ESTIMATED LOWER FOR ALASKA DUE TO LARGE LEGAL FEES AND INTEREST PAYMENTS MADE BY THE PLANT IN THE LOWER 48.

ADDING THE INCREASED COST OF FEEDING AND THE INCREASED COST OF SLAUGHTERING, THE DIFFERENTIAL COST OR BEEF PRODUCED IN ALASKA IS $34.56 PER HEAD. THIS FIGURE BEING LESS THAN $54.00 PROVES A BEEF INDUSTRY IN ALASKA IS ECONOMICALLY VIABLE.

TO DETERMINE THAT VIABILITY OF THE SWINE INDUSTRY IS CONSIDERABLY LESS COMPLICATED DUE TO THE CONFINEMENT METHOD OF FEEDING. IT HAS BEEN ESTIMATED THAT 50% OF ALL COMMERCIAL PORK PRODUCTION IS PRESENTLY DONE IN CONFINEMENT. IN CONFINEMENT WITH THE TEMPERATURE AND HUMIDITY CONTROLLED, SWINE WILL GROW AT THE SAME RATE AS IN THE LOWER 48. THE COST OF CONSTRUCTION AND OPERATING THE CONFINEMENT UNIT WILL BE GREATER AND THOSE INCREASED COSTS MUST BE COMPARED TO THE $16.32 PER HEAD TO DETERMINE VIABILITY.

THE COST OF CONSTRUCTING A CONFINED HOG OPERATION IN THE LOWER 48 IS $375,000 FOR A 144 SOW OPERATION. ELLERBE ALASKA

HAS ESTIMATED BUILDING COSTS IN ALASKA TO BE APPROXIMATELY 20% HIGHER BECAUSE OF FREIGHT, AND LABOR COSTS. THE ADDED 20% WOULD MAKE THE UNIT COST $450,000 OR A DIFFERENCE OF $75,000. IF THAT DIFFERENCE IS AMORTIZED OR DEPRECIATED OVER THE 20 YR. LIFE OF THE BUILDING AND ON THE BASIS OF 2,500 HEAD PER YEAR THE ADDED COST AMOUNTS TO $1.50 PER HEAD. IF THE ADDITIONAL MONEY REQUIRED COULD BE BORROWED AT 10% INTEREST AND DISPERSED OVER THE SAME 2,500 HEAD ANNUALLY, THE ADDED INTEREST COST WOULD BE $3.00 PER HEAD.

THE ADDED POWER COSTS TO HEAT THE BUILDINGS AND HANDLE WASTE PRODUCTS HAS BEEN ESTIMATED TO COST $3.00 PER CWT. OF FINISHED ANIMAL OR $6.60 PER HEAD.

THE FOLLOWING IS A SUMMARY OF THE TOTAL COSTS TO RAISE SWINE IN ALASKA:

ADDED BUILDING COSTS	$1.50/HEAD
ADDED INTEREST COSTS	$3.00/HEAD
ADDED POWER COSTS	$6.60/HEAD
TOTAL ADDED COST	$11.10/HEAD

AS WITH BEEF, SWINE WILL HAVE AN ADDITIONAL COST OF SLAUGHTERING BECAUSE OF CLIMATE, RELATIVELY SMALL CAPACITY, AND ADDED POWER COSTS. FEATHERSTONE ESTIMATES THAT THESE COSTS SHOULD NOT EXCEED $1.25 PER HEAD.

WHEN THE $1.25 PER HEAD IS ADDED TO THE $11.10 ADDED RAISING COST, THE TOTAL ADDED PRODUCTION COST FIGURE IS $12.35 WHICH IS LESS THAN THE $16.32 PRESENTLY USED TO TRANSPORT FRESH PORK TO ALASKA. WITHOUT A DOUBT THE SWINE INDUSTRY IN ALASKA IS ECONOMICALLY VIABLE.

VII. GENERAL FUNDING REQUIREMENTS AND SEQUENCING OF A SWINE AND BEEF CATTLE INDUSTRY IN THE STATE OF ALASKA

FEATHERSTONE HAS ENVISIONED THE INDUSTRY BEGINNING WITH A COOPERATIVE VENTURE WHICH IN REALITY MUST BE INITIALLY FUNDED BY STATE FUNDS. THE FUNDS WHICH WILL BE NEEDED, WILL HAVE TO BE ON AN INTEREST FREE BASIS FOR SEVERAL YEARS OR HAVE TO ACCUMULATE INTEREST UNTIL A POSITIVE CASH FLOW CAN BE GENERATED FROM OPERATIONS. FEATHERSTONE HAS NOT PROJECTED ANY FINANCIAL CARRYING COSTS BECAUSE THE AMOUNT WILL DEPEND ON HOW RAPIDLY THE STATE LEGISLATURE WANTS A SELF SUSTAINING INDUSTRY. THE LONGER THE INDUSTRY TAKES TO RELIEVE ITSELF OF ITS STATE DEBT, THE LONGER IT WILL TAKE TO BECOME SELF SUFFICIENT.

FEATHERSTONE WILL NOW GIVE A BROAD VIEW OF THE TIMING AND THE INITIAL COSTS OF EACH PHASE.

A. PROCESSING UNIT - WORK AND FUNDING ON THIS PHASE SHOULD BEGIN IMMEDIATELY. THE COMBINED SWINE AND CATTLE UNIT PROJECTED BY FEATHERSTONE SHOULD HAVE A CAPACITY OF 100 HEAD OF CATTLE PER DAY AND 320 HEAD OF SWINE PER DAY WHICH COST APPROXIMATELY $1.5 TO $1.7 MILLION TO BUILD IF AN ADEQUATE SITE IS FOUND WITH PROPER UTILITIES. WORKING CAPITAL REQUIREMENTS OF THE PLANT ON TODAY'S LIVESTOCK PRICES WILL BE APPROXIMATELY $1,400,000 FOR INVENTORY AND PAYROLL NEEDS. SITE SELECTION AND DESIGN WILL TAKE A MINIMUM OF SIX MONTHS. CONSTRUCTION OF THE BUILDING AND

INSTALLATION OF EQUIPMENT WILL TAKE APPROXIMATELY 18 MONTHS AFTER THE DESIGN PHASE. IF APPROVAL FOR THE PROJECT WAS GIVEN IN MAY OF 1981, THE FIRST ANIMALS WOULD PROBABLY BE PROCESSED IN MAY OF 1983.

B. THE COW-CALF OPERATION WHICH HAS MINIMAL BEGINNING NEEDS TO BE UPGRADED AND STOCKED WITH A MINIMUM OF 20,000 YOUNG COWS AND 1,000 BULLS. THIS INVESTMENT IN THE INDUSTRY WILL COST APPROXIMATELY $26,500,000 ON TODAY'S MARKET. IF THE COWS ARE BROUGHT TO ALASKA ALREADY BRED, THEY NEED TO START ARRIVING IN THE SPRING OF 1982 IN ORDER FOR THEIR CALVES TO BE READY IN THE SUMMER OF 1983.

ALONG WITH THIS COW-CALF OPERATION THERE SHOULD BE AN EXPERIMENTAL RANCH STARTED FOR THE UNIVERSITY OF ALASKA PROBABLY NEAR THE HOMER EXTENSION STATION. THE LAND, BUILDINGS, EQUIPMENT, AND STOCK SHOULD COST APPROXIMATELY $1,800,000. THE SOONER THIS DEMONSTRATION UNIT IS STARTED, THE SOONER THE PRESENT RANCHING OPERATIONS WILL BE IMPROVED.

C. THE FEED LOT AND FEED MILL SHOULD BE BUILT TOGETHER AND SHOULD TAKE APPROXIMATELY 6 MONTHS OF CONSTRUCTION. THESE FACILITIES SHOULD BE READY FOR USE IN THE EARLY SPRING OF 1983 OR ABOUT 4 MONTHS PRIOR TO THE PROCESSING FACILITY. THE FEED LOT EQUIPPED SHOULD COST APPROXI-

MATELY $500,000 AND THE FEED MILL ABOUT $1,000,000. THE INITIAL ANIMAL INVENTORY SHOULD COST $5,200,000 ON TODAY'S PRICES AND THE INITIAL FEED $3,900,000. THESE INVENTORY FIGURES WILL BE NEEDED FOR THE INDUSTRY WHETHER THE RANCHER OR THE FEED LOT INITIALLY BUYS THE STOCK.

D. THE CONFINED SWINE UNITS WILL COST $475,000 A PIECE AND 22 WILL BE NEEDED TO GET 50% OF THE MARKET WHICH WILL COST $10,450,000. THE BEGINNING BREEDER STOCK WILL COST $825,000 FOR ALL 22 UNITS AND THE INITIAL FEED INVENTORY WILL COST $1,300,000. THE CONFINED UNITS SHOULD BE BUILT AND FINISHED 180 DAYS OR 6 MONTHS PRIOR TO THE COMPLETION OF THE PROCESSING UNIT IN ORDER TO HAVE ANIMALS READY ON TIME. THE EXPERIMENTAL UNIT IS CONSIDERED ONE OF THE 22 UNITS.

SUMMARY OF COSTS OF LIVESTOCK INDUSTRY

A.	PROCESSING UNIT - PLANT AND EQPMNT.	$1,600,000
	WORKING CAPITAL	1,400,000
B.	COW-CALF OPERATION - BREEDING STOCK	26,500,000
	- EXPERIMENTAL RANCH	1,800,000
C.	FEED MILL AND LOT - BUILDING COSTS	1,500,000
	- ANIMAL COSTS	5,200,000
	- FEED COSTS	3,900,000
D.	SWINE OPERATION - CONFINED UNITS	10,450,000
	- BREED STOCK	825,000
	- FEED INVENTORY	1,300,000
	TOTAL INITIAL COSTS	$54,475,000

ALL OF THESE COSTS ARE WITHOUT LAND COSTS OR THE COSTS OF ANY INFRASTRUCTURE. IT MUST BE REALIZED THAT THE TOTAL COSTS OF $54,575,000 REPRESENTS THE TOTAL INVESTMENT IN THE LIVESTOCK INDUSTRY AND IS NOT JUST THE ANIMAL EXPENSE. THE FIGURES ARE COSTS OF BUILDING AND INVENTORY. THE DECISION THAT THE STATE HAS TO MAKE IS WHETHER THIS INVESTMENT BY THE STATE OR ITS RESIDENCE IS WORTH THE RETURN ON 25,000 HEAD OF CATTLE AND 80,000 HEAD OF SWINE PROCESSED PER YEAR. IN MAKING THAT DECISION NOT ONLY THE PROFIT SHOULD BE CONSIDERED BUT ALSO THE BALANCE OF THE ADDED COSTS WHICH WILL STAY IN ALASKS INSTEAD OF GOING TO SEATTLE. AT $54.00 PER HEAD FOR CATTLE AND $16.30 FOR SWINE THE TOTAL FIGURE THAT STAYS IN ALASKA IS $2,654,000 PER YEAR. IT ALSO MUST BE REMEMBERED THAT THIS FIGURE WILL GROW IF THE INDUSTRY GETS MORE THAN 50% OF THE MARKET OR IF THE POPULATION OF THE RAILBELT GROWS. ADDITIONALLY THE NORMAL PROFIT MADE BY THE LOWER 48 IN THE COW-CALF OPERATION, THE FEED MILL AND FEED LOT OPERATIONS, THE CONFINED FEEDING OPERATION, AND THE PROCESSING UNIT WILL BE MADE IN ALASKA AND STAY IN ALASKA. A SUMMARY OF THESE AVERAGE PROFITS WILL BE PUT IN THE FINAL REPORT. THE STATE OF ALASKA WILL GAIN MANY ADDITIONAL BENEFITS AS WELL; SUCH AS THE JOBS CREATED, INCREASE IN INDUSTRIAL TAX BASE, AND DECREASE IN DEPENDENCY ON THE SHIPPING YARDS OF SEATTLE.

FOOTNOTES

[1] Christopher A. Stevens et al., Supplying Alaska's Red Meat and Poultry Markets (Institute of Agricultural Sciences, Bulletin 41, May, 1975).

[2] The total dollars per head were calculated as follows:

	Cattle	Swine
Live Wt. Per Hd.	1,000 Lbs.	220 Lbs.
Dressing Percent	60%	62%
Dressed Weight	600 Lbs.	136 Lbs.
Fabricating Percent	73%	--
Market Wt. Delvd.	450 Lbs.	136 Lbs.
Transportation Cost	12¢/Lb.	12¢/Lb.
	$54.00	$16.32

[3] Christopher A. Stevens et al., Supplying Alaska's Red Meat and Poultry Markets (Institute of Agricultural Sciences,) p. 9.

[4] Slaughtering Costs Based on 100 Lb. Dressed Weight

	Lower 48	Alaska	Diff.
1. Direct Labor including Taxes and Fringes	$2.407	$3.610	+1.203
2. Operating Expenses	1.466	1.585	+ .119
3. General and Administration	1.042	.563	- .479
Total	$4.915	$5.758	$ .843

600 Lb. Carcass x .843 = $5.06

[5] Time was not available to get this figure verified. The final report will have this figure verified.

AGRICULTURE
BRIEFING
3-12-82

7C Analysis of Governor's Decisions

ITEM	AMOUNT	FUNDING SOURCE	EXPLANATION
Livestock Processing Facility			It is Governor's intent that funds for this project be loaned at 9.5% to match the interest rate on State Business Loans.
Agency Request	$2,650.0	RRIF	
Governor's Recommendation	2,650.0	GF	

CATEGORY Development AGENCY AAC PROGRAM Economic Development

7C ANALYSIS OF GOVERNOR'S DECISIONS

00298

01-1007C(Rev. 7/77)

Project Title	Location(s)	Election Districts Served	Start Date	Completion Date
Livestock, Slaughter & Processing Fac.	Statewide	Statewide	FY 1982	FY 1983

AGENCY REQUEST			Operational Cost & No. Personnel Increase - (Decrease)		First Operating Year ____	Ultimate Annual Year ____	GOVERNOR'S REQUEST Approved ✓	Deferred	Disapprove
1002	Federal Receipts		Funding Source	Federal Receipts			1002	Federal Receipts	
1003	G/F Match			General Fund			1003	G/F Match	
1004	General Fund						1004	General Fund	2650.0
1005	I/A Receipts						1005	I/A Receipts	
	G.O. Bonds		Total Annual Operational Cost		-- no change --			G.O. Bonds	
	RRIF	2,650.0	Position (FTE)						
			Previous Year Priority	Agency Priority	Governor's Priority				
	Total	2,650.0	0	82-4				Total	2650.0

PROJECT DESCRIPTION

Under this project, the Alaska Agricultural Action Council will determine the basic information necessary to provide a complete, modern and efficient livestock slaughtering, processing, and marketing facility. This project will entail the administration, necessary investigations, design, engineering, and construction of the complete facility. It will also explore feed lot organization and various marketing alternatives for livestock and their by-products.

35a PROJECT DESCRIPTION – PROPOSED CAPITAL PROJECT

CATEGORY Development

AGENCY Offi[illegible] Governor/AAAC

PROGRAM E[illegible] Development

Page ____ of ____

Revised Date

FY 82

00298

OI 1143(8/80)

JAY S. HAMMOND
GOVERNOR

STATE OF ALASKA
OFFICE OF THE GOVERNOR
JUNEAU

May 11, 1981

The Honorable Donald E. Gilman
Alaska State Senate
Pouch V
Juneau, Alaska 99811

Dear Senator Gilman:

RE: Homer Red Meat Station

The Special Projects Office, Office of the Governor, hereby agrees to serve as the vehicle for the pass-through of funds appropriated to the Homer Red Meat Station for the University of Alaska's continued use and operation of this facility.

Sincerely,

W. I. "Bob" Palmer
Special Projects Coordinator

Sig Rustad

UNIVERSITY OF ALASKA, FAIRBANKS
Fairbanks, Alaska 99701

School of Agriculture and Land Resources Management
Agricultural Experiment Station

February 20, 1979

Senator Clem V. Tillion
President, Alaska State Senate
Pouch V
Juneau, Alaska 99811

Dear Senator Tillion:

The first four articles in the enclosed issue of Agroborealis outline the results of the initial year of operational research in red meat production at the Homer Research Center. Funds for research at the Center were provided to the University of Alaska Agricultural Experiment Station through the FY 78-79 budget for the Division of Agriculture, Department of Natural Resources. Commissioner LeResche has indicated that funds to continue this work for a third year were included in the FY 80 budget request for the Department of Natural Resources. It is my understanding, however, that these funds were removed from the Department of Natural Resources budget request by the Budget Review Committee. Although funds were provided to construct the Homer Research Center through bond issues in 1970 and 1974, the Agricultural Experiment Station has never been successful in obtaining operational funds for the Homer Research Center through the normal University budget process.

I believe the information presented in the enclosed issue of Agroborealis indicates potential for increased red meat production on the Kenai Peninsula. Improved management practices based on this information will benefit ranchers with relatively small operations and those who may wish to expand the number of livestock on their ranches. Research aimed at reducing costs and increasing the efficiency of beef production on the Kenai peninsula is essential if Alaska's beef industry is to meet even a fraction of Alaska's red meat requirements.

Senator Clem V. Tillion
President, Alaska State Senate

I hope we will be able to continue the research described in the enclosed periodical. We cannot do it without your support.

Sincerely,

James V. Drew
Dean and Director

JVD:ds
encl.

Alaska State Legislature

BETTYE FAHRENKAMP, CHAIRMAN
VIC FISCHER, VICE-CHAIRMAN
BRAD BRADLEY
DICK ELIASON
DON GILMAN
BOB MULCAHY
ARLIES STURGULEWSKI

POUCH V
STATE CAPITOL
JUNEAU, ALASKA 99811
(907) 465-3834
(907) 465-3835

Senate

Committee on Resources

May 8, 1981

Senate Finance Committee
Juneau, Alaska 99811

Dear Senators:

The Senate Resource Committee would like to request your reconsideration of the budget for the University of Alaska for inclusion of the operating funds for the Homer Research Center at Homer, Alaska.

The University of Alaska is considering closing the Center December 1981 due to a lack of operating funds. This would result in the loss of vital agricultural research and data necessary for the maintenance and expansion of agricultural projects in the state.

The operating budget is broken down into:

Salaries	$155,011.58
Travel	3,368.39
Contractual services	29,404.20
Supplies	30,274.00
Total operating budget	$218,058.17

Your reconsideration on this matter is greatly appreciated.

Bettye Fahrenkamp
Senator Fahrenkamp, Chairman

Vic Fischer
Senator Fischer, Vice Chairman

Brad Bradley
Senator Bradley

Bob Mulcahy
Senator Mulcahy

Don Gilman
Senator Gilman

SENATOR
DON GILMAN
Juneau Ph.
(907) 465-4934

Alaska State Legislature

HOME ADDRESS
P.O. BOX 630
KENAI, ALASKA 99611
(907) 283-4182

DURING SESSION
POUCH V
JUNEAU, ALASKA 99811

State Senate

March 12, 1982

MEMORANDUM

TO: Senator Bettye Fahrenkamp
Chairman, Senate Resources Committee

FROM: Senator Don Gilman

RE: Status of Homer Research Center

Dear Bettye:

I'm sorry I will not be able to attend today's committee meeting due to other commitments. I do, however, have a concern which I consider germane to the scheduled presentation: "Alaskan Agriculture - An Overview." My concern relates to agricultural research, specifically the Homer Red Meat Research Center.

The Homer Research Center was established with bond issue funds provided to the University in 1970 and 1974. Research conducted by the center has provided information on forage production of various native grasses, fertilizer rates, winter feed management systems for beef cattle, rates of gain for beef on native grass, hay quality evaluation and demand feed selection by cattle.

The Center has research planned to:

- Provide a scientific basis for reducing the costs and increasing the efficiency of beef production on the Kenai Peninsula and in other grazing areas of the state.

- Develop beef management systems for use in the developing Alaskan cattle industry.

- Investigate the use of high-protein fishery by-products for use in small grain fishery by-product feed mix supplement.

The Kenai Peninsula is an area rich in native grasses suitable for grazing and has supported cow/calf production units for many years. The area farmers and ranchers have worked closely with the facility and been extremely supportive.

Last year, operating funds for the Center were not included in the Regents' request for the University system. The Senate Resources Committee sent the attached letter to the Senate Finance Committee requesting the re-inclusion of funding. An agreement was reached with the Governor's Office on Special Projects and the University of Alaska to administer the funds to the Homer facility. This year we are again faced with the problem of looking for continuance funding.

In light of this situation, I would like to ask for the views of the witnesses before the Committee.

1. Inasmuch as there is a close relationship between the development of the Alaska small grain agricultural development and the development of an Alaska red meat industry,

Question 1: Do you feel that beef cattle research should be a significant part of an Alaskan agricultural research program?

a. Page XIII, Section 4, Articulation of Goals, part F, Support agricultural development with research, teaching, and public service programs. This is a goal stated by DNR as necessary to put 500,000 acres into production by 1990.

The study also lists as a specific goal, (b), produce a major portion of the meat consumed by Alaskans (beef, pork, other).

Last year $2.65 million was appropriated to the Office of the Governor, AAAC, to provide a livestock slaughtering, processing and marketing facility. This facility, under study, will be designed as an expandable system to handle increasing production of the beef industry.

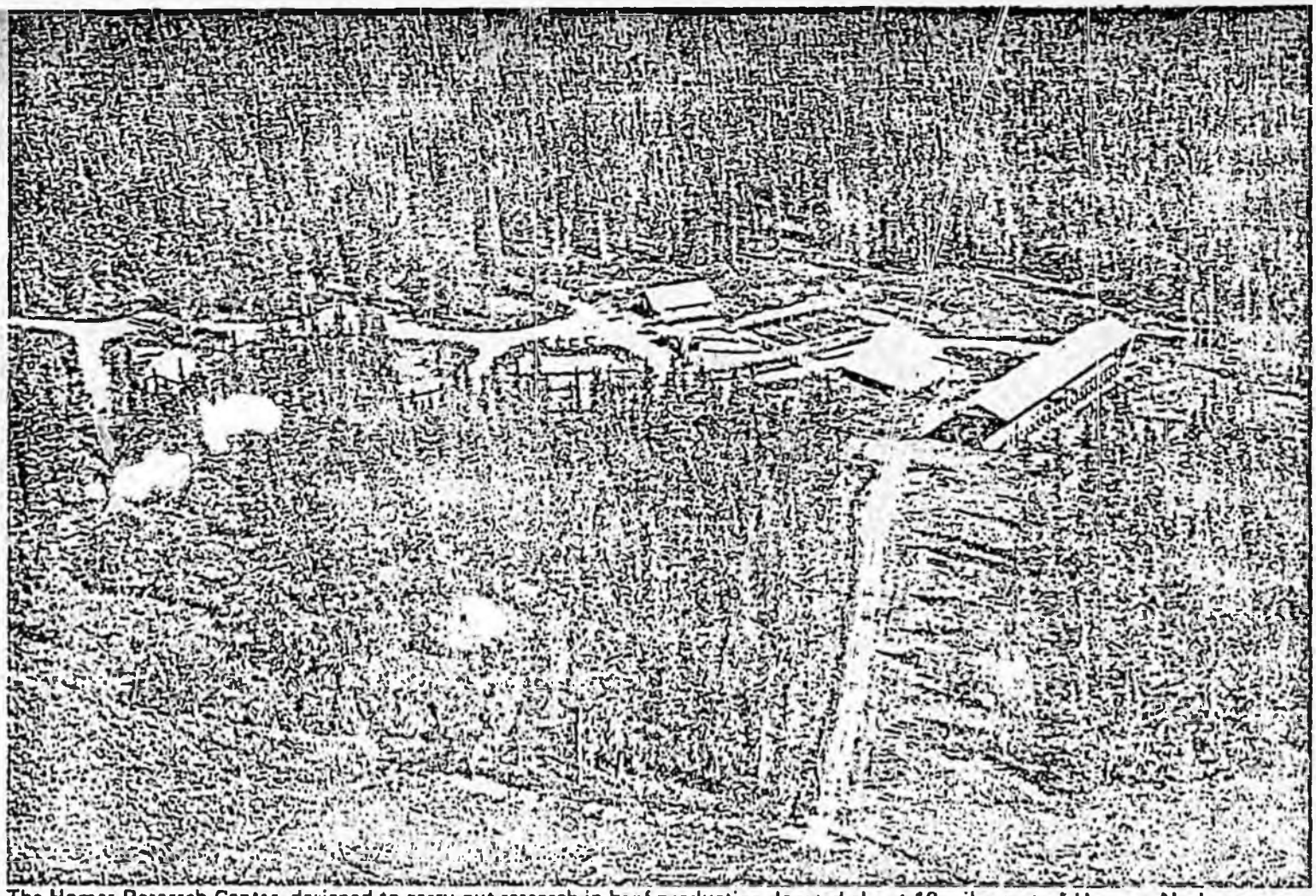
Question 2: Do you feel that research could play an important role in providing sufficient slaughter beef to eventually run the system at capacity?

2. One of the studies, "Recommendations for Legislative Action," page XXI, item 7, is listed as "Assure research support for agricultural development." The Homer facility is named on Page XXIX under the section of Institutional Support.

Question 3: Inasmuch as the Homer facility is the only unit with a current mission to do beef cattle research, do you feel the Homer Research Center is or should be a valuable part of Alaska's agricultural research program?

3. The "Overview" lists 195,000 acres of good range land in the Aleutians, the lower Alaska Peninsula, Kodiak, with approximately a quarter lying along Cook Inlet.

Question 4: Given the current status of transportation, access, existing ranching units, and available facilities, do you think that Homer is a suitable location for this installation?



The Homer Research Center, designed to carry out research in beef production, located about 10 miles east of Homer, Alaska.

The Homer Beef Production Project

A Cooperative Effort in Applied Research

Jay D. McKendrick*
Wm. W. Mitchell**
Fredric M. Husby"***

Alaska's relatively small but growing population imports over 90% of the red meat consumed in the state. Yet Alaska's tall-grass-forb range resources are vast and underutilized by either wildlife or domestic grazers. This incongruity has led to the belief that expanding Alaska's agricultural beef industry would benefit the state and its consumers by utilizing local renewable resources and by reducing dependence on distant food production. The Homer Beef Production Project is a cooperative effort between ranchers, researchers, and state government which is aimed at increasing and properly utilizing local range resources. Applied research is being directed at specific beef production problems on the lower Kenai Peninsula.

Range Resources Equate with Beef Prices

Lush summer growth on native rangelands of the Kenai Peninsula and at other locations where the tall-grass-forb plant communities occur has for years attracted stockmen's interests in Alaska. To ranchers, range forage production means low-cost feed, a component essential for economically viable livestock operations. To a nation of consumers, large rangeland resources mean low-cost beef relative to nations without such resources (Table 1). Pioneering Alaskan ranchers readily

* Associate Professor of Agronomy, Agricultural Experiment Station, Palmer.
** Professor of Agronomy, Agricultural Experiment Station, Palmer.
*** Assistant Professor of Animal Science, Agricultural Experiment Station, Fairbanks.

Hay Quality Survey for the Homer Beef Production Project-1977

Jay D. McKendrick*

To go from one point to the next, a traveler must constantly maintain a sense of position and direction. So it is with research—without knowing where we are, we cannot proceed to our destination in an orderly fashion. An important part of the Homer Beef Production Research Project at the Alaska Agricultural Experiment Station (16) was assessing the need for improving nutritional quality as well as yields of Alaskan hays. The quality of hays produced by Alaskan farmers is largely unknown. Occasionally a farm-produced hay is tested for protein, but other nutrients are almost never measured. Without such information, stockmen cannot know which nutritional components need supplementing in order to provide a balanced ration.

Methods of improving forage and hay production have been researched for several decades in Alaska by federal and state agricultural plant scientists (8, 11, 12, 14, 13, 19). Forage quality research has been one of lesser agronomic effort, relative to production studies. Inadequate laboratory space, equipment, and numbers of technicians for routine testing of forage quality were primarily responsible for that situation.

Traditionally, experimental hay crops in Alaska and elsewhere have not been simultaneously tested for both mineral and organic constituents. Plant scientists, whose efforts were aimed at forage-plant growth, have usually examined major mineral fractions, N, P, K, Ca, and Mg, with respect to fertilizer and crop variety experiments. Animal scientists, concerned with animal growth experiments, have usually examined digestibilities, fiber, lignin, carbohydrate, and protein fractions (2, 3, 4). Costliness of comprehensive analyses for both mineral and organic fractions has dictated the dichotomy of past experiments more than has divergence of interests between the two scientific disciplines. Both research groups recognized the importance of mineral and organic constituents to hay quality, and the current tendency in Alaska is toward a more unified and cooperative multidisciplinary approach.

Quality may differ substantially between hays grown in experimental plots and those of farm fields. Test-plot crops have usually been cured in dryers and those hays may have substantially higher quality than hays on local farms that have been subjected to weather damage during field curing. Furthermore, there are rather wide variations in protein levels among Alaska's native grasses. Irwin (8) cites total crude protein values of 4.58% for Alaskan bluejoint (*Calamagrostis canadensis*) hays. Similar protein levels, 4.6%, were noted for that grass in a more recent Alaskan study (15). Total crude protein levels of 2.5% are common in bluejoint plants after autumn frosts. Such levels are too low to meet animal nutrient requirements. Contrastingly, in a seasonal study of two Alaskan tundra grasses (*Arctagrostis latifolia* and *Dupontia fisheri*) the minimal level of total crude protein in shoots was about 7.5% (17), a level suitable for the diets of several livestock classes. Protein levels in naturally cured grasses may not be the most limiting quality factors in terms of animal dietary needs in other Alaskan hays and forages.

Expert farmers can, within broad limits, judge the quality of hay by its outward appearance, and they can similarly assess the effectiveness of such feeds on animal performance. But when deficiencies occur, it is difficult to identify the specific cause by visual inspection. Protein, minerals, digestibilities, and other nutritional components of hays are not evidenced by outward appearances; those components can be measured only by laboratory analyses.

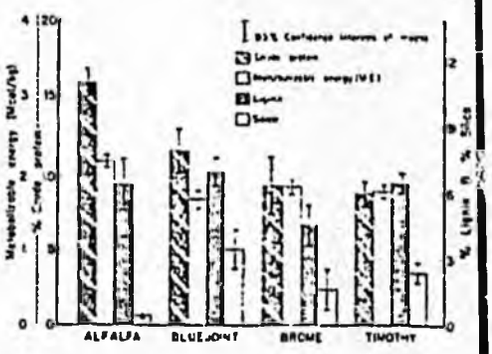


Figure 1: Means and their 95% confidence intervals for crude protein, lignin, silica, and metabolizable energy (M.E.) in four species of Alaskan hay crops. All alfalfa data but one sample came from crops produced outside Alaska and were included in the survey for comparison purposes.

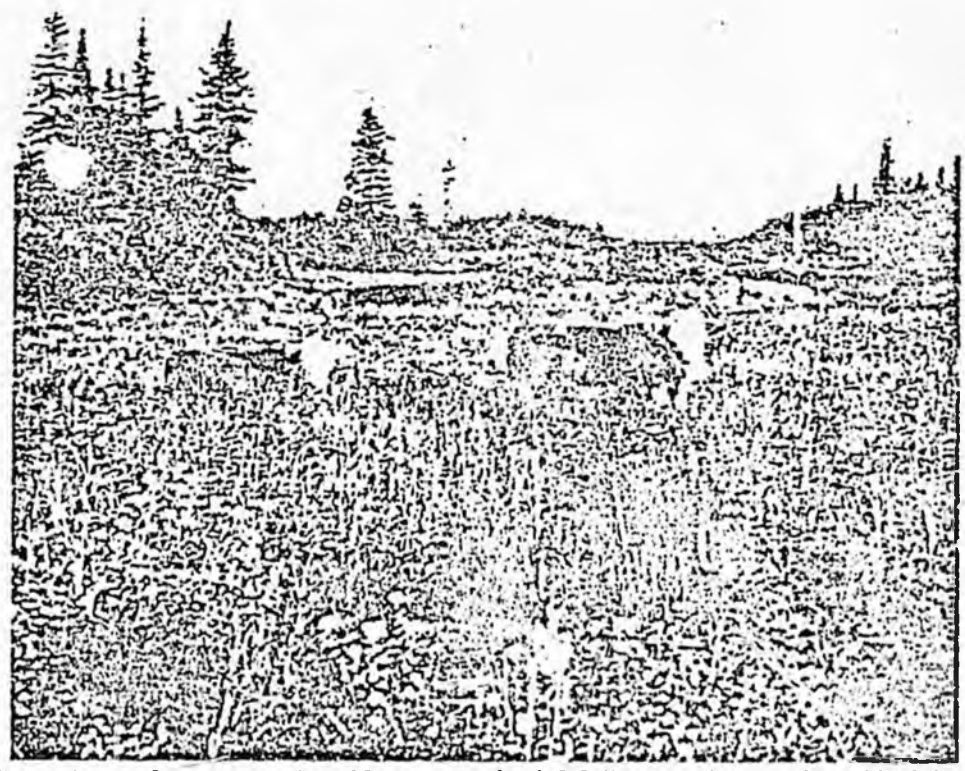
* Associate Professor of Agronomy, Agricultural Experiment Station, Palmer.

Gains of Beef Calves during Winter-Feeding and Summer-Grazing Trials on the Lower Kenai Peninsula, Alaska

By F. M. Husby*

Approximately 230,000 acres of potential grazing land occurs on the Kenai Peninsula of Alaska. However, the present grazing leases in the area are only carrying about 700 head of cattle. One of the major problems restricting the expansion of cattle production is the lack of a high-quality winter feed. The most abundant native grass in the area is *Calamagrostis canadensis* (bluejoint) which can yield between one and two tons of dry matter per acre (7). However, this grass as hay is usually of low quality due to rapid maturation. In addition, adverse weather conditions at the time hay quality is high make harvesting difficult (5). Bluejoint has also been reported to be intolerant to heavy grazing or repeated harvests without fertilization (4, 6), although grazing trials have not been conducted to determine the effect of grazing on native bluejoint stands.

The objectives of this study were to determine the cost of feeding beef calves varying levels of average-quality forage during the winter and to evaluate the effect of winter gains on subsequent gains during summer grazing on native bluejoint grasslands.



From June 16 to September 16, calves gained 2.2 lbs. per day on these bluejoint grasslands.

EXPERIMENTAL PROCEDURE

This study was conducted between December 23, 1977, and September 15, 1978. It consisted of a winter-feeding trial to determine weight gains of calves fed varying levels of all forage diets and then subjected to a summer-grazing trial on native bluejoint grasslands to determine the effect of winter-feeding levels on subsequent summer gains.

Winter-Feeding Trial: Thirty Hereford weaner calves (fifteen steers and fifteen heifers) weighing approximately 412 lb. each were randomly allotted to three groups of ten calves on the basis of weight, sex, and herd of origin. Each group was fed a different amount of hay for a 175-day period. Prior to allotment, all animals were dehorned, wormed, and treated with a pour-on insecticide. Each calf was injected with 1 million IU of vitamin A and 150,000 IU of vitamin D_2 before the start of the trial, with a similar injection repeated in March. Calves were kept in pens with 162 sq. ft. per head including 35 sq. ft. per head under an open-sided shed with 2.5 linear ft. of feed-bunk space per head. Water and a mineral supplement composed of 70% steamed bonemeal or dicalcium phosphate and 30% trace mineral salt was available *ad libitum;* and the hay was weighed and group fed once daily. The three forage treatments were: maintenance, intermediate, and full-feed levels. The maintenance-level animals received only enough hay to maintain live weight over the entire 175-day period while the full-feed animals were allowed access to hay at all times. Live-weight gains and hay consumption were determined weekly. The amount of hay for the intermediate feed level was calculated and adjusted to be fed the next week at a level midway between the quantities consumed in the maintenance and in the full-feed treatments. Initial and final body weights and feed consumption were used to calculate the average daily gain and feed performance for the 175-day trial.

Locally produced timothy hay was analyzed for crude protein (1) and *in vitro* dry matter disappearance (IVDMD) (11). The hay was selected on the basis of a minimum crude-protein content of 8% to provide the level of protein required to maintain the body weight of a 440-lb. calf (8). During the course of the feeding trial, the protein content of the hay was reanalyzed and

* Assistant Professor of Animal Science, Agricultural Experiment Station, Fairbanks.

Managing Native Bluejoint Reedgrass for Forage Production

Wm. W. Mitchell*

Bluejoint reedgrass (*Calamagrostis canadensis*) is the most commonly used native forage grass in Alaska. It is particularly important in the forage program of ranchers and hay growers on the lower Kenai Peninsula, where it occurs in dense, extensive stands.

Prior to research efforts on management of this grass, there was a growing opinion among operators on the Kenai Peninsula that bluejoint should be eliminated from the forage program and replaced with some other grass. This resulted from observations of declining production in harvested fields and from uncertainties about the forage qualities of bluejoint.

Some Canadian workers (1) assigned a low palatability rating to bluejoint but considered it worthy for hay if cut in early July. Early studies conducted with the grass in Alaska (2, 11) demonstrated a sharp decrease in crude protein and an increase of crude fiber through the growing season. A more recent study (8) documented a serious loss of metabolizable energy with maturation.

However, management trials with bluejoint in the Matanuska Valley showed that, with fertilization, annual harvests of 1 to 2.5 tons per acre of medium- to high-protein hay could be sustained (4, 6, 7). These research efforts indicated the grass should be harvested in the boot to head-emergence stage to achieve good yields with adequate quality. Waiting for the highest yields at the fully headed stage resulted in considerable loss in quality. A Canadian trial (3) demonstrated benefits from fertilization and indicated that relatively good production could be maintained with the best balance of yield and quality obtained with two harvests—the first in late June and the second about two months later.

The trials conducted in the Matanuska Valley have been followed by studies on the lower Kenai Peninsula in order to answer better management questions pertaining to that area with its more acid soils and cooler growing seasons. These studies have produced additional information that has encouraged operators to continue with bluejoint as a forage crop.

Bluejoint is well adapted to the acid soils of the lower Kenai Peninsula, does not require liming to maintain a productive stand, is exceptionally winterhardy, and is possibly the fastest-drying forage of those currently available. This last characteristic is important where periods of good haying weather are generally brief. With proper management, bluejoint can make an important contribution to the forage system of a stockgrower or hay producer on the lower Kenai Peninsula and similar areas. The following provides some guidelines for management of bluejoint from the research being conducted on the lower Kenai Peninsula. As is the nature of research, however, it also has raised questions that will be addressed with further studies.

* Professor of Agronomy, Agricultural Experiment Station, Palmer, Alaska.

Figure 1: Bluejoint grassland on the lower Kenai Peninsula in early spring prior to the initiation of growth, illustrating the extremely hummocky nature of undisturbed grassland of this type. A deep layer of litter accumulates at the surface and is underlain with a layer of humic material.

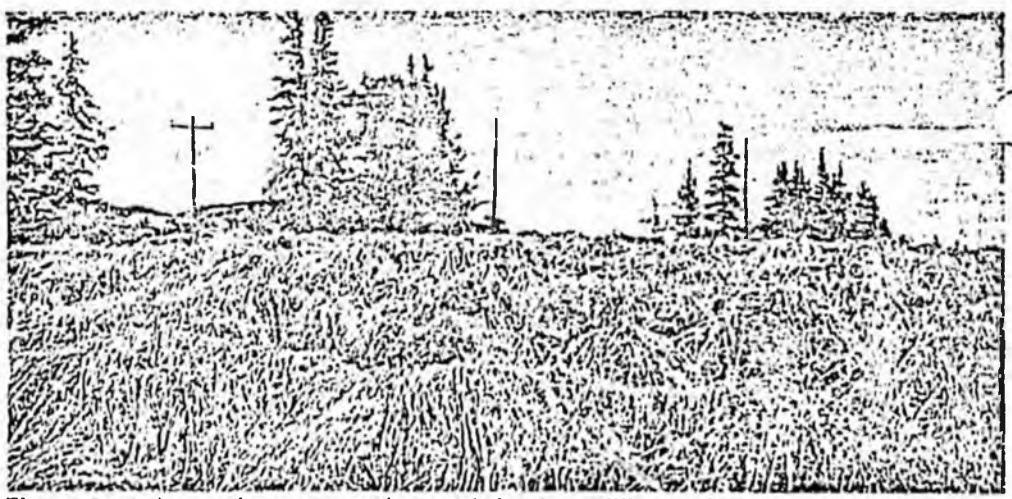


Figure 2: A heavy-duty rotary plow with its deep tilling action eliminated the hummocks and incorporated surface litter and humic material with mineral matter in this bluejoint field. The plowing was conducted in late summer 1972. This picture was taken in spring 1973.

PREPARING GROUND FOR HARVEST

The extremely hummocky nature of bluejoint stands render them unsuitable for machine harvest in their native state (Figure 1). Bulldozers, tillers, brush hogs, and plows have been used to eliminate the hummocks and reduce the thick layer of litter and humic material that occurs at the surface. One of the more successful methods employed a heavy-duty tiller powered by a 250-hp motor, termed a "rotary plow," that incorporated much of the litter and mulch in the mineral soil while eliminating the

Alaska State Legislature

Official Business

SENATE
Resources Committee

465-3834

Pouch V
State Capitol
Juneau, Alaska 99811

March 12, 1982
1:35 p.m.

Beltz Room
Room 211 - Capitol

MEMBERS PRESENT

Senator Fahrenkamp
Senator Fischer
Senator Bradley
Senator Mulcahy
Senator Sturgulewski
Senator Kertulla
Representative Sutcliffe

Hearing:
Alaskan Agriculture Overview--by Bill Heim, Charles Logsdon, and Roland Snodgrass
SB 608 An Act making a special appropriation to the power development fund of the Alaska Power Authority for the Susitna River hydroelectric project and other hydroelectric projects: and providing for an effective date.

Agriculture Overview

Charles Logsdon stated that the overview establishes a philosophical base for agriculture actions, and defines the State's role as one of providing the proper climate for farming. He reviewed the report's 16 recommendations for legislative action:

1. Accelerate the disposal and production schedule of state agriculture lands.
2. Revamp the Agriculture Revolving Loan Fund, so that it is a development fund only, with no new loans to an agricultural enterprise after seven years.
3. Establish an office for market development and information for Alaska products with an "800" telephone number, to aid in the distribution phase of agriculture.
4. Establish a crop testing program for remote areas.
5. Fund the establishment of archives of all pertinent data related to State agricultural projects.
6. Fund the creation of an "Alaskan Agricultural Development" computer-simulation model in order to project future development feasibilities.
7. Assure research support for agricultural development by funding of the Agricultural Experiment Station with a separate budget.
8. Fund the development and service of an in-state agricultural data bank, available to the public through computer terminals.

9. Establish a joint quarantine facility at the Palmer Plant Material Center.

10. Establish a gene bank of northern-adapted plants useful in Alaska.

11. Fund a joint weed control demonstration with the Province of Alberta in the Delta Junction region.

12. Fund a once-a-year barge service to the Aleutian Islands to bring feeder cattle to the mainland for finishing.

13. Appraise the world market possibilities for Alaska products.

14. Express willingness to work with Native corporations in development of the agricultural capabilities of their land.

15. Consider the development of limestone and phosphate resources in Alaska for fertilizer.

16. Develop a modest but firm-priced source of electricity, which can have a great impact on agricultural productivity.

Bill Heim recommended that the Agriculture Revolving Loan Fund have a separate account for land clearing, with no payback for three to four years to allow time to get land into production. Land clearing funds are important for the development of small farms. Small farms should be located near large farms to use the existing infrastructure. Since most small farmers work off the farm, too, small farms should be located near other employment opportunities.

SB 608

Senator Fischer prepared a Committee Substitute consisting of items already before the Senate Finance Committee in the Governor's budget. There is concern that the Governor may change his budget in view of the projected revenue shortfalls. The Committee Substitute assures that all projects would remain before the Finance Committee.

Senator Fahrenkamp prepared an amendment to page 1, line 27, appropriating $2.5 million for an electrical generation unit at Cordova.

Senator Fischer asked for more time to prepare an amendment dealing with alternative energy sources.

Senator Fahrenkamp stated SB 608 would be held until Wednesday.

Senator Fischer moved the Committee consider the Committee Substitute. He then moved the adoption of the amendment to page 1, line 27.

The meeting was adjourned at 2:40 p.m.

Alaska State Legislature

Official Business

Senate
Resources Committee

Pouch V
State Capitol
Juneau, Alaska 99811

TO: Senate Resources Committee

FROM: Senate Resources Committee Staff

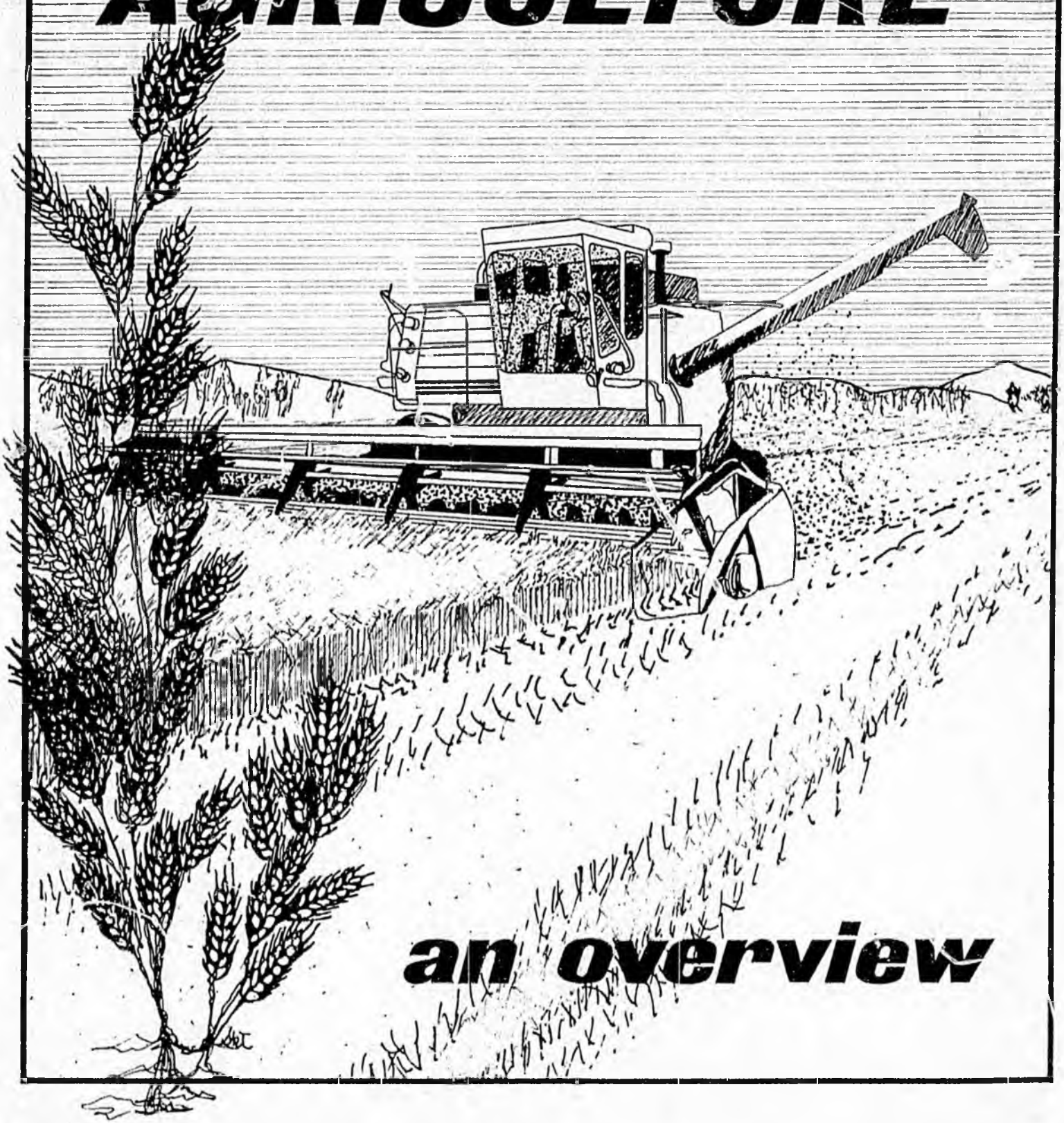
RE: Committee Meeting, Wednesday, 3/10/82

DATE: March 8, 1982

Please find attached background information for this Wednesday's briefing on Alaskan agriculture by Leland Snodgrass and Bill Heim.

The meeting will be held at 1:30 p.m. in the Beltz Room.

ALASKAN AGRICULTURE



an overview

AN OVERVIEW OF STATEWIDE AGRICULTURE

TABLE OF CONTENTS

PREFACE

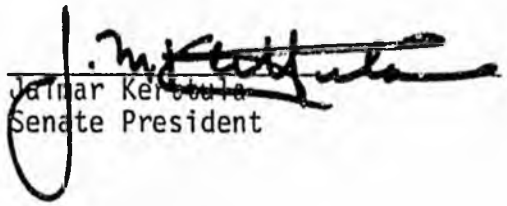
For the past 22 years what has been done by Alaskan government for the people's food supply has primarily originated with the Legislature. This report comes from the work commenced by the Governor's Agricultural Policy Task Force, a still-functioning committee resulting from legislation I had the privilege of introducing several years ago.

A few of my editorial notes are included. I also insisted on solid recommendations which are listed.

The report, ALASKAN AGRICULTURE: AN OVERVIEW, was prepared with the expressed intent of providing an analysis of the past, present and future status of statewide agriculture. My objective was to have this information gathered and prepared by individuals who have been uniquely involved with not only the Alaskan agriculture industry, but have long experience with U.S. agriculture from the Land Grant College level (when their mission was food) to all phases of government and industry. They possess a blend of unparalleled experience, education and agricultural training, much of it acquired in Alaska. Each of these individuals has worked extensively in a variety of agricultural and other endeavors throughout the State. Upon examination of the work you may well agree with me that Messrs. Heim, Logdson, and Snodgrass make up the most qualified combination in the United States to perform this undertaking.

The completed report is intended for presentation to the 1982 legislature, but will undoubtedly also serve as an invaluable record for future generations of Alaskan farmers, students, government and the plagiarizers of information who will compile and sell from these efforts as original work.

Additionally, Gordon Tope provided the management so necessary in getting multiple interests to organize and complete this project.



Jalmar Kerttula
Senate President

BIOGRAPHICAL SKETCH

ROLAND SNODGRASS

Mr. Snodgrass is currently a retired farmer, residing in Palmer. He has been a resident of the state since shortly after his birth in 1909. His residences include: 1909-1916 in Kodiak, 1916-1917 in Seward, 1917-1923 in Fairbanks, 1924-1928 in Matanuska, 1929-1935 in Fairbanks and from 1936 until the present in Palmer. A graduate of Anchorage High School in 1928, he earned a Bachelor of Science from the University of Alaska in 1932, Master of Science from Colorado State University in 1935 and completed additional PhD graduate work at the University of Wisconsin in 1955-1956.

Professional work experience includes Instructor at the University of Alaska from 1933-1935 (Bering Sea Archeological Expedition), Superintendent of Rural Development, Matanuska Colony from 1937-1939, General Manager-Matanuska Maid from 1942-1944, Dairy Farmer from 1939-1967, Instructor at the University of Wisconsin in 1956, Director of the Alaska Division of Agriculture from 1967-1970 and Science Specialist-Federal-State Land Use Planning Commission from 1970-1973.

Mr. Snodgrass is a second generation Alaskan farmer-educator; a member of a legendary Alaskan pioneer family of teachers and farmers. The Matanuska Valley farm industry was developed on land donated by Mr. Snodgrass, i.e. the town of Palmer began there. He is a member of the Governor's Agricultural Policy Task Force.

CHARLES LOGSDON

Dr. Logsdon was born in Missouri in 1921 and moved to Alaska in 1953 in order to assume the position of Research Plant Pathologist at the University of Alaska. He received his formal education at the University of Minnesota. Professional work experience includes Research Professor of Plant Pathology from 1953-1968 at the USDA, Professor/Plant Pathologist at the University of Alaska from 1958 to 1978, Associate Director and Instructor of Agricultural Science from 1971 to 1978, Emeritus Professor of Plant Pathology at the University of Alaska from 1978 to the present, and president of Agresources Co. from 1978 to present.

Dr. Logsdon is a member of the American Association for the Advancement of Science, the American Phytopath Society, Potato Association of America and the Mycological Society of America.

BILL HEIM

Mr. Heim was born in St. Charles, Minnesota in 1934 and shortly after graduating from school made his first trip to Alaska in 1952. During that period he worked on a dairy farm in the Matanuska Valley for two seasons. Mr. Heim returned to Minnesota but continued to visit Alaska to watch and advise farmers from the Matanuska Valley to the Yukon and reindeer regions of the north. After renting a farm in Minnesota he purchased a 270-acre farm in 1957, which he has continued to expand to over 1,000 acres of cultivated land with an emphasis on row crops, dairy, and beef. In 1970, Mr. Heim formed the South Branch Dairy Corporation which was responsible for the construction of an innovative modern dairy facility, prototype for the Point McKenzie ag project.

Mr. Heim has served on a variety of regional and state committees, including Board of Directors for Whitewater River Demonstration Farm, Organizer and President of Winona Co. Forage and Grassland Council, Board of Directors-Elba Co-op Creamery Association and was appointed to the Governor's Agricultural Policy Task Force for Alaska in 1978.

EXECUTIVE SUMMARY

We proceed from the premise that it is in the interest of all Alaskans to develop agriculture on the 5% of the State that is suitable for cropping, and that this would not interfere with the other interests which would use the remaining 95% for other purposes. Development should be accomplished in such a fashion, however, that proper attention is given to conservation of the soil resource.

Alaska was never a part of the American frontier, so it is inadvisable to consider agricultural development in terms of the great westward movement in America. Development must proceed from a basis of the present highly technological agriculture of the advanced nations, since Alaskan agriculture cannot be divorced from the economics of U.S. agriculture.

Alaska has the soils resources for a significant agriculture. The Exploratory Soil Survey issued in 1979 by the U.S. Soil Conservation Service classifies approximately 20.5 million acres as either good or fair for the production of common crops--those suitable for the upper North Temperate Zone. Temperatures and growing seasons are taken into account. The general picture of suitable soils is one of river basins.

Alaska has the climatic resources for agriculture. With adequate precipitation and good ground water sources in areas with tillable soils and 1800 to 2000 growing degree days in the better locations, climate poses few restrictions on adapted crops. Forage crops require about 800 growing degree days to reach harvest, while adapted varieties of grain demand 1400 to 1600 growing degree days. Potato requirements are similar to grain, but may be harvested early with some loss of yield.

As European civilization started its westward movement around 1500, so also it moved eastward. In the north, the hunt for furs played a most spectacular part. The movement from Russia extended eastward. From England and France, and to a lesser degree from other nations, it moved to the west. Progressing in opposite directions, these fur hunts led to the establishment of the Alaska boundary approximately halfway around the world from the points of origin.

In 1784, Grigori Shelikof founded a settlement at Three Saints Bay (now Old Harbor) on Kodiak Island, and brought with him some seeds and livestock. This would appear to be the first introduction of agriculture into Alaska. George Washington was president of the United States.

The Russian American Company under Baranof founded a short-lived agricultural colony at Yakutat. Later Russian records refer to small agricultural colonies at Ninilchik, Kasilof, Kenai, Tyonek, Knik, and Matanuska. Cereals did not ripen along the coastal areas to which the fur trade was extended, but some vegetables did quite well, and grazing animals were quite successful at Kodiak and the grassy islands to the southwest.

Agriculture was introduced into the interior of Alaska by Alexander Murray of the Hudson's Bay Trading Company, who established the trading post at Fort Yukon at the confluence of the Yukon and Porcupine rivers, well within Russian territory. He brought with him vegetables and cereal seeds as well as potatoes and had suprising success with vegetables and small grain production.

Miners and mining camps provided the basis for agricultural expansion in much of the territory. The Tanana Valley proved more

permanent for settlement than most mining communities. With the Homestead Laws extended to Alaska between 1898 and 1903, farming came into its own in the area prior to World War I, resulting in the establishment of the present Experiment Station at Fairbanks followed by the establishment of the University of Alaska as a land grant college. Farm emphasis shifted from subsistence gardens to grain, and in 1921-22 the farmers constructed a flour mill which produced three types of excellent wheat flour that were well received along the rail belt. The railroad provided a much cheaper freight rate on materials shipped into the country, and the local farmers could not compete with the growing technology and large scale operations of the western farmers. Farming was also carried on at Skagway, Haines, Chitina-McCarthy, and Juneau around the turn of the century.

In 1929, the Alaska Railroad emulated the Great Northern Railroad experience of recruiting settlers. The only inducements were cheap transportation from Seattle and assistance in finding suitable farms. Fifty-six families came to the Valley under this program, and a high percentage remained to become permanent residents.

During the Great Depression of the 30's, over a million farm families across the nation were unsettled. The Federal government responded by creating the Resettlement Administration to move stricken farmers to better locations. Matanuska was one of a hundred projects proposed. The cooperative established in support of this project is one of the oldest businesses in the State. Almost 50 years later, the Matanuska Valley still produces approximately 2/3 the value of farm products within the State in spite of subdivision pressures which appear to be reducing the readily available farm lands in private ownership.

The reason for the success of this farming venture may be due to the fact that the settlers had northern state agricultural experience

and as a group settlement, some institutional services were provided as a part of the settlement process. Institutional supports are as important to the farmer today as the land he tills. As the American frontier drew to an end, national and state governments entered into a policy of institutional support appropriate to a maturing economy and directed towards securing an adequate supply of cheap and healthful food. This policy has been carried out in the other states, and to a limited extent in Alaska by furnishing the agricultural industry with some services, including limited research, information and education, inspection, conservation, and credit. The underlying intent is to benefit the nation as a whole in terms of affordable, healthful food for all. This policy has also made the U.S. the world's largest exporter of food, which goes a long way toward paying for our needed energy imports.

HISTORICAL--WORLD WAR II TO PRESENT

World War II pointed out conclusively the strategic position of Alaska in a world in which air power would be significant in any future conflict, and it demonstrated the vulnerability of supply lines from the other states to Alaska during conflict. As a consequence, the defense department requested Congress to determine if there were sufficient agricultural resources in Alaska to support the continuing presence of the military. The report prepared by a U.S.D.A. task force in response was positive, and the federal government embarked on a new research program in Alaska in 1948 to increase the local food production base using the latest information and technology. This coupled to increased markets during the Korean Conflict changed the character of Alaskan agriculture from a subsistence base to a truly modern commercial agriculture in a period of less than ten years.

Agricultural production levelled off about 1960 as federal support went to competitive areas and the new State did not have the financial

resources to assist properly. Marketing did not keep up with the increased sophistication of transportation and marketing from the lower 48 states. The Soil Conservation Service continued during this period to put together the new information on Alaskan soils and by the early 1970's it became apparent that there were at least 15 million acres of tillable soils. This figure has since been increased to 20.5 million acres.

The Federal-State Land Use Planning Commission was very much concerned with resource inventory in the light of the Native Claims Settlement Act selections and they authorized a study by two internationally recognized agricultural economists to determine if Alaska might have a place in world agriculture. Their report concluded that there could be if the assumptions made on productive capacity were correct, and they recommended a large-scale study to verify the assumptions.

Four years ago a state-supported project was proposed for the Delta area, and an economic analysis by the University of Alaska Experiment Station indicated that barley could be produced in that area at world market price on farms of 3000 acres using a 1/3 fallow system. Barley was chosen as the preferred test crop with rapeseed proposed as a second possible crop. The State disposed of "agricultural rights only" to State land in the project area by a 1978 lottery. Delta I project had only 22 parcels which averaged 2600 acres in size. The State test-cleared 2000 acres to determine the most economical method and approximate cost for farmers. Chaining down the trees proved by far the best system.

In 1980, 700 tons of barley were produced on the project lands and another 80 tons were produced from other farms in the vicinity. Disappearance of the grains in the local market exceeded expectations

with the State's two major processors taking 2/3 of the crop. The new availability of feed grain has stimulated the development of two new dairies in the Delta Junction area plus two major hog operations; one in the project area and one in the Matanuska Valley. Some of the barley is going into the Matanuska Valley dairies, and some into the red meat industry elsewhere in state.

The legislature created the Alaska Agricultural Action Council to oversee Delta I and to manage similar future projects in other locations around the state.

As more grain comes on the market from increased production in Delta and elsewhere, the local market will not be able to utilize it, and an export market is necessary if gains made to date are to be maintained. This is the reason an export terminal in Seward is so vital--to take up the slack when grain growers produce more than the market can absorb locally. The profit margin is so slim that growers cannot take less than world market price and survive. An oversupply on the local market without the safety valve of the export terminal would probably spell the end to the infant barley industry.

Point MacKenzie is the second project under this program. Developed legislatively, it is to be a dairy project primarily taking advantage of the local infrastructure already in place in the Anchorage milk shed and decreasing the net outflow of wealth from the state of approximately $1,000,000 per month for dairy products. There are to be 19 dairy farms in this project plus 12 other farms, most of which would produce feed, raise replacement heifers, or feed out dairy beef.

The Point MacKenzie project effectively has been brought to a halt by a court injunction, on the basis of a suit brought by seven applicants who were disqualified from the lottery. The basis for the decision was the judge's opinion that the State exceeded its own

regulations by requiring a farm development plan prior to the lottery. The State has appealed the decision, but the project has been delayed at least one, if not two years beyond the original plans.

Land disposition in Delta II, an expansion to the Delta I project, is scheduled for 1982 and the Nenana project, initially a project of 46,080 acres west of the town of Nenana, will probably begin in 1983. In addition to special state project areas, the state has disposed of "agricultural rights only" to 302 parcels encompassing 52,816 acres since 1978. Many of these require no development until access is developed, and many owners are fighting access development because they have used this kind of title to acquire a wilderness retreat. Tanana Loop area is about 50% cleared, and development is proceeding. Potlatch Ponds, a sale of 61 parcels of 14,356 acres near Fairbanks in 1980, is still in court, so development cannot proceed.

A FUTURE VIEW AND SUGGESTED STRATEGY

Alaska has the land and human resources to make agriculture a viable part of our future economy if the people of Alaska want it to be so. Development of an economic agriculture should be viewed as a long-term undertaking because of the need to develop the infrastructure of a modern, state-of-the-art industry. Alaska should develop a "National" or "World Class" agriculture to be in the game at all; otherwise, the agriculture we develop will be either a subsidized recreational activity for the well-to-do on their country estates, or subsidized subsistence agriculture for the very poor. In neither of the latter two cases will benefits exceed cost.

There is a place for Alaskan agriculture in world markets if we are willing to compete, but there is no void out there just waiting for Alaskan agriculture to fill it. Our possible niche must be well

identified, and we must enter the market with every intention of staying in that market.

Although the legislature has been willing to fund agricultural development, there is a growing reluctance to do so because legislators, many urban and some rural, have not been able to determine the true stance of their constituents. Agricultural interests represent a small constituency and have not been organized to express their views to the legislature except through a few informed members. Competing interests have often been able to speak with a stronger voice. Agriculture plays a transitional role both geographically and culturally. It provides a physical transition from urban to wilderness and a conceptual transition from subsistence, self-sufficient life style to a money-based, job-oriented, industrial economy. It may therefore have a large social effect that could be as important to Alaska's future as the economic impact.

Alaska is often thought of in terms of a developing nation. Many of the concepts developed by a wide range of philanthropic and governmental agencies to improve food production capability of developing nations may apply to Alaska, but many do not. Most systems devised for developing nations assume an indigenous farm population needing only modernization to increase production. Alaska has a very modern and aware farm population, but one that is too small to provide more than a nucleus for development. The following list of requirements and prerequisites to development are discussed in terms of possible implementation through state (both legislative and administrative) action:

1. A general awareness of the potential for agriculture and the contributions agriculture can make to the long-term economic stability of Alaska in a world of rapidly increasing food needs. Hard data is

difficult to come by and often difficult to interpret, but certainly increased information is important to a thorough understanding and awareness.

2. A very careful assessment as to what production potentials of crops and livestock are, and what markets exist or can be realistically projected for these products. Enthusiasm for the good old days is not enough on which to invest state money. Information is needed on production potentials using the best of modern technology, and a realistic assessment of the market system as it applies to Alaska is mandatory.

3. Firm decisions between alternative uses of land. If all of Alaska's tillable lands were to be developed, it would amount to only 5% of the total area of the State. There will be areas of conflicting interest simply because more than one activity will want to use the same space. Definite areas must be designated for agricultural use even though those designations may not hold forever.

4. Articulation of goals and achievable objectives. A large step has been made in this direction through the State's commitment to bring 500,000 acres into production by 1990 in order to meet the goals and objectives as stated by the Department of Natural Resources. The general objectives are to:

a. Identify and maintain an agricultural land base.

b. Provide financial incentives to establish an agricultural industry not based on permanent subsidy.

c. Develop transportation and processing facilities.

d. Develop a cooperative management program with State, Federal and private land owners.

e. Develop marketing programs for Alaskan production.

f. Support agricultural development with research, teaching, and public service programs.

g. Increase public understanding of the agricultural industry.

h. Use Alaskan sources of fertilizer, lime and other soil aids.

i. Develop ample stable and competitive energy sources including electricity.

Specific goals to meet these general objectives are:

a. Produce sufficient grain and oilseed crops to meet Alaskan needs and to compete in world markets.

b. Produce a major portion of the meat consumed by Alaskans (beef, pork, other).

c. Produce the milk consumed in Southcentral and Interior Alaska.

d. Achieve seasonal self-sufficiency in fresh produce, and develop a viable vegetable processing industry.

e. Meet regional demands for reindeer meat.

f. Develop subsistence-scale agriculture to improve nutrition and reduce food costs in more remote areas of the State.

A 10-year plan is being developed by the Agriculture Action Council.

5. Conceptualization of initial systems from which growth and development can proceed. Farming systems devised for various areas must fit the climatic, soils, and market availability of the area; but at the same time, if they are to be a part of the larger scheme of agriculture, they must match or exceed standard modern production systems.

6. Availability of land and other inputs. Only 0.25% of Alaska's land is in non-Native private ownership with 88% in public ownership after settlement of the Native Claims. By contrast, in the rest of the U.S., 60% is in private ownership and 40% in public and American Indian ownership. Since land is a resource component of agriculture, land must be made available to those who can farm. There must also be made available the plant and animal resources adapted to various climatic zones, capital resources in the form of initial investment capital, and continuing production credit.

7. Identification of farmers. Identification of those who would have the best chance of success in the present state agricultural

projects has been a virtual disaster, because there is no good test of that particular ability. Competition for farm land is too keen to expect to be able to pick only those who will be successful. If enough land were to be made available, then title could be transferred on the basis of meeting performance criteria on-site. Constant emphasis on State lands and state-sponsored projects on those lands overlooks the fact that the Alaska Native Corporations will own the majority of the tillable lands in the State. State projects can only establish a base from which agriculture can grow, and assist in establishing the necessary support for a growing agriculture. Although the Natives themselves may or may not farm the land, they probably will soon take the leadership in agricultural development since they have a much better basic understanding of the need for a local food supply. Their development may be through joint venturing with other individuals and groups.

8. Surface transportation networks. The most important effort the State can make in support of agricultural development will be the establishment of surface transportation networks. Farmers must have access to the land they farm, and they must be able to move seed, feed, fertilizer, machinery, and other necessary inputs in a timely manner. Planners should try to link a variety of resources through such nets rather than expecting agriculture to pay the full cost to which all society should contribute and from which all society would benefit.

9. Settlement Policy. It is virtually impossible to have agriculture without having settlement. The service sector that makes agriculture possible has to have businesses in place, and people who can provide the necessary goods and services. These activities range from provision of specific inputs such as seeds and fertilizer to the community services such as energy distribution, communications, schools,

doctors, etc. Agriculture is a long term industry requiring communities with the whole range of social services that any community demands.

Like it or not, more and more people are going to come to Alaska to live. Alaska's population is vibrantly young, and apt to stay that way for some time to come. The median age is 26, and Alaska has the smallest percentage of population in what the Census Bureau calls the middle years (44-64) of any state, 14%. These early years are the creative years where the majority of the population is establishing families and careers. Alaska would do its future citizens a favor by providing maximum opportunity for these young people to participate in creative development of new centers of excellence through a settlement policy based on predictable transportation systems and resource areas in proximity.

10. Capital availability and credit. In any agricultural development scenario, it should be realized that capital inputs for developing large acreages will be exceptionally large. At even $1000 per acre, for instance, it would cost $1 billion to bring a million acres into production. The banking community does not have that kind of money for agricultural investment within the state, nor does it have the information to evaluate large-scale investment in agriculture. Investment in a development climate is not the same as investment in a well-developed situation. Experience in agricultural banking is only half the equation. The other half is in high risk, venture capital experience. The suggestion that the Alaska Renewable Resources Corporation was not a viable institution in the agricultural field was due to the perception by the banking community that they could get a better return with State funds by investing in other things. The banking community is right about short-term investments, but the object of venture capital-development banking is quite different. The returns

are long range, and may have other far-reaching but not easily perceived benefits.

The Commercial Fisheries and Agricultural Bank provides for continuing production credit financing. It is, however, structured to provide that kind of financing in a well-developed agriculture. The Agricultural Revolving Loan Fund, which was designed originally as a development fund, does a better job of production credit financing in a developing climate than CFAB since it can be a loan agency of last resort. It was never really funded sufficiently to provide for a great deal of development, and has always served better as a production credit operation.

Efforts by the banking community to take over the State agricultural loan functions should be resisted, since they do not have the expertise to evaluate the loans, nor are they apt to develop that expertise in any reasonable time frame. There should be no objection to their making loans to the agricultural support industries.

Development of long-range renewable resource industries such as agriculture is a better means of ensuring returns on investment to our children and our children's children than investment of State money in short-term, high interest commercial paper. The investment is surer and the returns more meaningful.

11. Public and private service institutions. Suggestions are made in this paper to improve research, education, information services, and quality control as means of enhancing agricultural growth and development in this state. This calls for review and possible realignment of institutions providing these services to get a better return for dollars spent. The University should be the core institution to provide many of these services; but if the Board of Regents of this

semi-autonomous agency are opposed to agriculture, then other arrangements for these services should be made.

12. Group action by farmers. Farmers must take responsibility for leadership in agricultural development and for organizing themselves to provide informational support to the legislators on farm needs. Organization is more important in Alaska than in most other places because of the very small farm block. They must be able to influence large numbers of their urban neighbors through local groups in order to have a large enough voice state wide to be heard. Attempts are being made to put the local farm organizations together into an effective statewide organization.

RECOMMENDATIONS FOR LEGISLATIVE ACTION

(not in order of priority)

1. Accelerate the disposal and production schedule of state agriculture lands.

In 1979 it was recommended that the State have 500,000 acres in production by 1990. At the time, it was the consensus that this figure could be easily attained. In 1978 the state had the Delta I Project that disposed of 60,000 acres. The state has sold another 52,800 acres in widely scattered areas. These were, for the most part, smaller sized parcels which did not have a development schedule or had a 10-year development schedule pending access. Because of this, very little of this land will be in commercial production by 1990. The Pt. McKenzie Project is 14,600 acres but is still held up in court. The Delta II Project's total acres have been cut almost in half with the postponement of Delta West. The Nenana Project is coming on line next, but still must run the gamut of Fish and Game, Forestry, Division of Lands, recreationists, non-developers, etc.

Reviewing these facts the state must accelerate its disposal plans if it wants anywhere near 500,000 acres in production by 1990.

2. Revamp the Agriculture Revolving Loan Fund (ARLF).

It is recommended that ARLF make no new loans to an agricultural enterprise after seven years. The ARLF would still service all its loans made to a particular enterprise before the seventh year. ARLF makes capital loans up to thirty years, chattel loans up to seven years

and one-year operating loans. With this requirement in place, the farmer would have to go either to the commercial market or other farm credit agencies for money after the seventh year.

This would wean the farmers from the use of public funds gradually and also make ARLF a development fund instead of a fund used for operating monies.

The ARLF should also have a separate account for land clearing. The clearing fund should be operated on the basis that is being used by the Delta I Project. This would get some of the smaller farms, that the Division of Lands sells annually, into production faster.

3. Establish an office for market development and information for Alaska products with an "800" telephone number.

This office could not only aid in the development of markets for Alaskan products stateside, but could be of service to Alaskan companies seeking products from outside companies that may not be aware of Alaskan producers. Agricultural products would be given high priority of attention. This office could also identify market needs that could be supplied by Alaskan producers and could assist in servicing complaints during the market development period.

4. Establish a crop testing program for remote areas.

Actual crop production data for most remote sites are limited or nonexistent. Agricultural expansion policy and production cost estimates should be based on the best available and obtainable information. The Native corporations will own the majority of the agricultural lands in Alaska when they receive title to their lands. Crop testing on-site could provide the State as well as the Native

corporations with best estimates of yield potential for the areas and assist in planning either commercial or subsistence operations.

5. Fund the establishment of archives at the U of A and State libraries of all pertinent date related to the "Delta" and other State agricultural projects.

At a minimum this should include computer retrievable microfilming of the documents.

6. Fund the creation of an "Alaskan Agricultural development" computer-simulation model into which hard data from state agricultural projects can be fed as they are accumulated from these large experimental developments in order to project future development feasibilities and to provide the legislature and others with up-to-the-minute cost/benefit estimates for future development proposals.

7. Assure research support for agricultural development by direct funding of the Agricultural Experiment Station budget as is presently done at many other land grant colleges. (The University does what it wants and ignores the Legislature. The Agricultural Experiment Station was given to the University of Alaska by statute. It may have to be removed and placed into the Department of Natural Resources to complement the Plant Materials Center-ed.) The Governor's FY '83 budget document, House Bill No. 666, does not identify money directed towards funding agricultural research at the University, nor how the figures for this purpose were used to calculate the amount requested. In addition, such a display to the legislators would be misleading anyway since the Regents of the University are not required to apportion

request. Line item funding would keep legislative intent from "falling through the cracks" when the University budget is apportioned for various purposes by the University administration.

8. Fund the development and service of an in-state agricultural production and marketing data bank available to the public through time-sharing computer terminals. A use fee could be charged if it were minimal. The data bank should be a function of the Division of Agriculture and an advisory board composed of farmers and agri-business people should be appointed to review available programs and their effectiveness.

9. Establish a joint quarantine facility at the Palmer facility of Plant Materials Center with the Federal Animal and Plant Health Inspection Service. This quarantine facility would be used to maintain plant materials introduced from foreign, high-latitude countries in a region of adaption for the introduced plants during the required quarantine years. Such material introduced at this time must be quarantined in the federal facility at Glen Dale, Maryland for three years before release to Alaska, and often these plants die before being released because they are not adapted to that climate. (The Legislature is working on this-ed.)

10. Establish a "gene bank" of northern-adapted plant material useful in Alaska and throughout high-latitude regions of the world in conjunction with the quarantine facility mentioned above. No gene depository exists which is dedicated to this function internationally, and Alaska could provide this service dedicated to the betterment of an improved food supply and environment in the north. A first step in this direction would be the funding of acquisition and importation of the

most promising plant material now used by countries of high geographic latitude.

11. Fund a joint weed control demonstration with the Province of Alberta to be done in the Delta Junction region, and fund a continuing research on weeds and weed control methods that can be used to protect our growing agriculture. Cleared lands at Delta Junction were relatively free of weeds, but after only two or three years of production, weeds are clearly increasing, as is to be expected, and weed control efforts should be most effective if started before the problem becomes too overwhelming. A major problem seems to be one of acquiring special use labeling of pesticides for our special needs. It costs a pesticide company about $13 million to register a single pesticide, and unless the company can see a future return in excess of cost, they will not bother. There is a procedure for minor-use testing and registration, and there is provision in the law to allow approval of labels under section 24c of the pesticide law. A suggestion is made here that the State Department of Environmental Conservation be funded to develop, maintain and control a 24c program for the state. The program of weed control research would provide data on efficacy and persistence of materials for a 24c approval.

12. Fund a once-a-year barge service to the Aleutian Islands to bring feeder cattle to the mainland for finishing. Many of the islands from Kodiak eastward have either cattle in a feral state or under management by individuals and Native corporations. These entities have been struggling to develop self-sustaining enterprises over a long period of time, but have the constant battle of trying to get a product to market in the population centers. This service would provide at

least a means of selling range stock into central Alaska for feeding and processing and marketing. The availability of feeder cattle from these western ranges could help develop a critical mass of animals to make slaughter facilities in central and interior Alaska more feasible at an earlier date.

13. Appraise world market possibilities for Alaskan products, especially among Pacific Rim countries, as they may be early in the 21st century. Present population forecasts indicate that the State may be entering a seller's market among hard-currency countries with growing populations and small land base, which are now looking to their future food supply. In this connection, South Korea appears especially noteworthy since it may be the only nation in the Orient in which barley is a dietary staple.

14. Express a willingness to work with the Native corporations and people in development of the agricultural capabilities of the lands which they receive under the Native Claims Act. As noted previously, these lands will include the major portions of the agricultural lands of the state. Whether the Natives choose to sell, lease, or farm should be a matter of indifference.

15. Seriously consider the development of limestone and phosphate resources in Alaska. Both are important to the future development of agriculture in the State, and extensive deposits of both exist. Extensive limestone deposits of good quality for agricultural use are known to occur in the King River area of the Matanuska Valley, in the Cantwell area just inside McKinley Park, and smaller deposits at Kachemak Bay and a number of other locations. Limestone deposits in the Isabel Pass region along the Richardson Highway not far south of Delta

Junction need to be examined more closely for amount and quality. The known phosphate deposits are in or near the Brooks Range. The question of feasibility of development of these deposits should be explored.(Ed.)

16. Develop a modest but firm-priced source of electricity. During the 1930's, few things had as great an impact on agriculture in the "lower 48" as did the development of regional hydroelectric projects such as the T.V.A., Bonneville, etc. The development of such an energy source, not subject to the uncertainty of OPEC or other worldwide organizations, will ensure a steady and constant growth of agriculture - to the benefit of all Alaska. (Ed.)

AN OVERVIEW OF STATEWIDE AGRICULTURE

SECTION I

GENERAL INFORMATION

At the outset, let us state that this report is compiled by agriculturists and must contain the bias of their point of view. This viewpoint includes some measure of traditional development as it occurred in the United States, a degree of the desire for partial self-sufficiency, recognition of the advantages of a regional economy based on renewable resources, and an awareness of prospects for food supply in the future as reported by such organizations as the Food and Agriculture Organization and Resources For The Future. For balance, we suggest the discerning work of Robert B. Weeden, Alaska - Promises to Keep (31).

In the ongoing debate over conservation versus development, we do not find the issues to be black and white nor of mutual incompatibility. Rather, they seem capable of rational compromise. We believe that foreseeable circumstances indicate, and almost demand, that serious consideration and continuing commitment be given to developing approximately five percent of the land area of the State for the production of agricultural crops. This would, incidentally, constitute an addition also of approximately five percent to the nation's cropland.

At the same time, we believe that it is imperative that conservation of the soil and moisture resources must be required and encouraged to a degree much greater than has been achieved in the other states. The framework exists. By State law, Alaska is a Soil

Conservation District. One department of State government and two Federal agencies assist or share in the responsibilties.

We do not believe that such developments are significantly incompatible with other amenities such as wilderness, or with the well-being of wildlife as a whole. While selective, there are many instances in which agriculture is beneficial to certain species. On an area unit basis, much of the land involved, in its natural state, is relatively nonproductive as wildlife range. However, there are problems which await future solutions.

1. Background

Food is a primary concern of most of the people of the world. Alaskans are not now concerned with this problem, and may not have to concern themselves for another generation. After all, we are part of the U.S. which is the largest producer of agricultural products in the world, and therefore have a call on U.S. production ahead of the hungry nations.

Of course, the Third World nations are already talking of world resources for the world's people, so geographic isolation of the U.S. may not always provide us protective access or first call on U.S. production. National policy has not yet addressed this issue just as it has not addressed the total issue of food politics for the future. The matter is not one of immediate priority for this nation.

If it were necessary, Alaska could develop a significant agricultural industry now. However, under present circumstances, it seems more prudent to maintain a commitment to a policy of a steady, slower, and consciously experimental development, somewhat in advance of

experienced needs, in order to minimize costly mistakes and to gain the information which will be needed when, and if, the time for more rapid development arrives.

The physical capabilities for relatively large-scale agriculture in Alaska have been recognized for some time. As stated in Alaska's Agricultural Potential (10), the reasons for lack of development are political, social, and economic. (These factors will be addressed in greater detail at a later time.) At present we wish to consider the political and economic environment.

Alaska was a part of the European frontier. For a time it was and partly remains its own little frontier. But in a strict sense, it never was part of the American frontier for a number of reasons. In the first place, it is not contiguous with the other states, and transportation was long and hard. Second, for a third of a century after becoming a possession of the U.S., settlement was discouraged both by its image as a frozen waste and by national policy. Third, although Alaska inherited the institutions of the American frontier, it came on the scene at the time of the post-frontier aftermath for which we shall borrow the term "conservation ethic". We would cite the closing of entry on coal and timber lands and the delay in extending the homestead laws as examples. Of lesser significance perhaps, the successful laying of the Atlantic cable put an end to attempts to build communication lines through Alaska and Siberia to Europe, which would have tied Alaska to the American frontier and encouraged settlement.

Early enthusiasts compared the visible resources of Alaska and the analogies in location and climate with those of the Scandinavian countries, Finland and Scotland, and offered bright predictions for

growth and development which have never been realized. Had the place and time been different, they probably would have been right. The reality is somewhat different. We are not surrounded by hungry countries. We do, however, live on the Pacific rim.

The economics of Alaskan agriculture cannot be divorced from the economics of state-side agriculture. We are immediate to, and within the influence of the largest exporter of agricultural products, a nation which for nearly a century and a half has been dedicated to a policy of cheap food. Even if it were desirable, we would not be allowed to place embargoes or tariffs on goods moving into Alaska from the other states. We could apply quarantines if sanctions were based on other than economic considerations.

The economic system of the U.S. is called capitalistic or "free enterprise". The theory behind this system is that decisions are made by individuals on the basis of self-interest; because of the number and complexity of decisions they will be, in the aggregate, balancing and in the interest of the majority. This theory may very well hold true as long as there are unlimited resources available equally to everyone. In fact, it worked in the U.S. for a long time, but was greatly modified.

The closing of the American frontier about 1890, however, had a traumatic effect. There was no more free land. The nation suddenly realized that land resources were limited, and that capital resources had been captured by the few. Among the reactions to these twin pieces of bad news, two have a special significance to the political and economic environment under which Alaskan agriculture will have to develop.

The first was recognition of "public interest" in the land, which, in addition to measures for conservation, resulted in numerous regulations and limitations which greatly broadened the decision-making powers formerly based on individual self-interest. Examples are the Wetlands and Clean Air Acts and the withdrawal of mineral rights from homestead lands. The recognition of "public interest" changes the free enterprise system, but decisions were basically left in the hands of property owners who are now required to consider this interest in their decisions. This has grown to a point where, as Philip Handler of the National Academy of Science has said, "more than 50% of decisions are no longer made in the marketplace."

The second, for lack of a better name, has been called "the vertical movement of capital". Essentially, it has to do with taxes. As a phenomenon related to the ending of the frontier, this has been outlined somewhat as follows (30): Most newly discovered lands were appropriated "in the name of the King", and hence fell into the hands of the government. Through devices such as land grants, scrip, homesteading, and sales on advantageous terms, the government passed ownership of land, along with other benefits, downward to the people with a relative equality of opportunity. This practice was conceived as being in the public interest. It certainly increased the stability of democratic government. However, with the closing of the frontier in the United States about 1891, most desirable land was gone. In order to continue the downward flow of benefits, the government found it necessary to increase greatly the upward flow of capital (in its symbolic form, money) in the form of taxes (duties, customs, fees, etc. included). A schedule of such duties, etc., is called tariff. At the

higher tiers of government, income taxes and tariffs were used, while at the lower tiers, license fees, sales and property taxes became more common.

To recapitulate for a moment, we have described two post-frontier institutions: 1) the recognition of "public interest" with its spin-offs which greatly diluted the decision-making power, and 2) the reversal of the flow of governmental benefits. These seem logical and necessary developments. There is no question of impropriety.

The point to be made is this: the highly productive, technologically-based American agricultural system, with which the Alaskan farmer has to compete in our modified capitalistic system, developed under institutions of a frontier age. Alaskan agriculture, on the other hand, must strive to continue under post-frontier institutions inherited from a developed nation. Another factor stems from the industrial revolution rather than from frontier considerations; as the proportion of the population directly engaged in agriculture has declined from 85% to less than 10%, agriculture has lost its voice in politics.

At higher levels of government, these factors are fairly well understood. At lower levels, they are ofter obscured by dependence on property taxes for revenue. The logic of "highest and best use" and of "comparables" is not necessarily in the national or regional interest.

The major resource harvested by agriculture is sunlight.* For this reason, the industry has high spatial requirements in proportion to

* Radiant energy reaching the earth's surface at Palmer is estimated to be approximately 1.5 million horsepower hours per acre during the 4-month period beginning May 1. Over wide areas, conversion of this energy by chlorophyll into plant material is considered to average between one and two percent.

the income to be derived. These requirements make it very vulnerable to the manner in which the revenue needs of local governments are met. Local zoning has been proposed as a solution to the problem. Alaska and Hawaii, at least, have some version of the Farm Use Assessments Act. In recent years, Alaska has retained all but "agricultural use" rights in disposal of lands for which such use has been considered to be in the public interest. Rhode Island has introduced a program to reacquire farmlands and issue conveyable leases of agricultural rights.

2. The Physical Basis for Agriculture

For convenience, some information must be presented in the form of tables. This tends to convey an illusion of certainty too great for our purpose. In Table I, the term "suitability" is used. The figures presented are arrived at by observation, measurement and a review of limiting soil factors and hazards such as too hot, cold, wet, dry, steep, shallow, subject to erosion, etc. When, in the professional judgement of soil scientists, these limitations are not too great to be overcome within reason, acreage is included in the various categories.

Similarly, the climatic factors presented in Table II are long term averages. This tends to obscure variability which may be a critical factor. Weather Bureau data is generally accompanied by statements of probability that certain values will not be exceeded. Also, in reporting the requirements of certain crops, we have tried to convey a reasonable sense of observed variability as a percentage of the data presented. There is more information than we have space or time to present.

(a) Soils Suitable for Common Crops

The surface area of Alaska is 375,304,000 acres,* of which 12,788,000 acres is covered by navigable rivers, streams and lakes. The Exploratory Soil Survey (20), issued in 1979 by the U.S. Soil Conservation Service, classifies 20.5 million acres as good or fair for the production of common crops, listing those most frequently raised in the upper North Temperate Zone. Temperature and length of growing season are taken into account. More detailed surveys would result in little change in the estimated areas. Table I presents a quantitative summary of the better suitability classes of soils used in agricultural endeavors in the major resource areas of the State. In the interest of clarity, the ratings "poor" and "unsuited" have been eliminated. For areas receiving the more favorable ratings, it was considered that soil or climatic limitations were not too severe to be overcome.

The general picture of soils suitable for the more conventional agricultural uses is one of the river basins and adjoining uplands and with some physical barrier to maritime influences. The largest such area is along the Yukon and its tributaries, extending from the head of the delta to beyond Dawson, Yukon Territory. The northernmost farm in the State, some sixty miles north of the Arctic Circle, is at the junction of the John and Allen rivers, tributary to the Koyukuk which joins the Yukon near Galena.

It is customary to differentiate the Tanana watershed from the

* Approximately twice the area of the Thirteen Colonies.

Table I.

Estimated Acreage with Suitability Indicated in Major Resource Areas - Alaska. (1,000 acres)

	Cropland		Rangeland			
			Cattle & Sheep		Reindeer	
	Good	Fair	Good	Fair	Good	Fair
Southeastern Alaska	5	11			15	
Southcentral Mountains	28	254		67	2,071	715
Cook Inlet - Susitna Lowlands	1,255	644	49	2,683	256	711
Alaska Peninsula - Aleutians		30	145	8,608	9,953	1,877
Copper River Plateau	19	351		155	6,535	1,280
Alaska Range	42	8		469	3,845	898
Interior Lowlands	8,685	909		15	15,387	4,623
Kuskokwim Highlands	2,605	1,147	1	3,586	27,877	6,557
Interior Highlands	3,911	415		934	32,566	4,782
Norton Sound Highlands	146	63		228	22,278	5,756
Western Coastal Plains and Deltas	2			1,661	11,201	5,806
Bering Sea Islands				81	2,125	398
Brooks Range				1	6,242	2,820
Arctic Foothills				23	28,003	2,759
Arctic Coastal Plain					10,667	1,581
TOTALS	16,698	3,832	195	18,407	179,021	56,290

Note: The same land may fall in more than one major category. They should not be added.
Source: Soil Conservation Service: Exploratory Soil Survey of Alaska - 1979.

Yukon. It then becomes the second largest area of arable land in the State, followed by the Kuskokwim watershed and the Cook Inlet-Susitna Lowlands.

Rangelands are somewhat differently divided. The largest area suitable for conventional grazing, that is by cattle and sheep, is found along the Alaska Peninsula and Aleutians, followed by the Kuskokwim Highlands, the Cook Inlet-Susitna Lowlands and the Western Coastal Plains and Deltas.

Rangelands suitable for grazing by reindeer are very extensive, covering virtually all of the State with the exception of the higher mountains or heavily forested areas. This is not to say that reindeer herding is practicable in all such locations.

(b) Climate

Climate consists of many things. From an agricultural point of view, the most significant are heat, moisture, length of growing season, incidence of summer frost, and sometimes wind. Microclimates may vary materially with slope and aspect (direction of slope), prevailing winds, maritime influences, persistence of cloudiness and other incidental factors. Different crops vary greatly in their response to climate

Other things being equal, vegetative growth is in direct response to availability of heat, and this, in turn, is related to sunlight in the lower levels of atmosphere. Direct measurements of Net Energy would be essentially the same at high elevations, too cold for plant growth. The most practical way yet devised of relating temperature to plant growth is the heat accumulation method. This consists of subtracting a base (temperature at which significant growth is observed to begin) from the daily mean temperature, and accumulating the results as Growing

Degree Days (GDD's). Thus, (Hi + Lo)/2 - Base = GDD's. Choice of a base is a matter of judgment and purpose based on observation. For corn or sugarcane, 50°F is used. For plant life in ocean water, 30°F might be appropriate. A base of 40° is most often used for common crops in Alaska. It is well understood that some climatic factors are more critical than others to crop growth. Available moisture is as limiting as heat. Summer frost, number of warm days, and length of growing season set limits which are difficult or expensive to overcome. The following table, arranged mostly in order of ascending heat accumulation, affords some means of estimating the capabilities of different locations in the State.

A handy although oversimplified estimate of seasonal variability might be to allow up to 10% either way to the averages in the Table, two thirds of the time.

Often, things are lost in translation. We assume column 3 to represent warm days, important for ripening grain. Occurrence of light frosts is usually damaging only to the extent leaf cells are ruptured by ice crystals. The amount of rainfall often may not be as essential as its seasonal distribution. Nothing in climatic tables is a measurement of crop response; yet everything in Table II is correlated with it.

By the standards of more southerly regions, some aspects of the climate of the interior of the State are relatively unfavorable: most winter precipitation is not ideal. And some aspects are uniquely favorable. These include the long photoperiod at the height of the growing season, and the relatively low rate of evaporation. Nevertheless, irrigation is almost always beneficial and often economical.

If one follows the GDD column of Table II from the Yukon Delta to

Table II

Averages of Some Limiting Climatic Factors at 16 Locations

Location	Summer GDD > 40°	Days ≥ 70°	Days ≥ 32°	Days ≥ 28°	Precipitation
Nome	917	3	77	112	13.1 in.
Adak	1,124	--	---	---	42.6
Homer	1,355	3	109	145	15.6
Bethel	1,412	13	105	132	14.4
Aniak	1,510	18	81	123	15.8
Kodiak	1,664	4	160	185	39.0
Holy Cross	1,732	25	105	132	13.8
McGrath	1,756	23	106	129	14.3
Talkeetna	1,798	36	87	118	21.5
Eagle	1,852	52	81	103	9.0
Anchorage	1,869	14	125	152	11.4
Big Delta	1,936*	35	116*	136*	10.5
Matanuska	1,939	29	108	138	12.3
Fort Yukon	1,947	47	90	113	4.8
Fairbanks	1,996	57	81	117	10.3
Yakutat	-----	4	124	167	182.4 (annual)

> means "over"

≥ means "on which temperatures may equal or exceed"

* Unreliable - instrument location at fault.

Source: Tech. Bulletin #2, U of A, Inst. Agric. Sciences (5)

the Canadian border, it is possible to sense a large "pool" of warm air centered around Fairbanks in the summer. This is more or less what occurs. In the winter, this is replaced by a similar body of cold air "deepest" in the vicinity of Snag, Yukon Territory. On occasion, the range of temperature may be as great as that between ice and boiling water. Something similar holds for other interior river basins. However, adapted plants hold no "memory" of the cold and use only the warm season after the soils at root level become warm enough to support plant growth. Despite the lower elevation of the sun, Fairbanks receives more Net Energy than either Seattle or New York City during the period April 1 and August 1. Heat accumulation values may be somewhat less.

3. Heat Requirements of Common Crops (1)

The heat requirements of all common crops raised in Alaska are not readily available. Those of a few typical plants will serve:

(a) Perennial Grasses

A dozen or so species of perennial grass, half of them native, constitute the major source of feed for domestic grazing animals in Alaska. They are grazed or harvested for hay or silage. Heat accumulation of 350-400 GDD will allow them to support grazing animals, and of 700± GDD will render them ready for harvest. Two or more cuttings are customary.

(b) Common Vegetables

Transplanted cauliflower requires 650-800 GDD, broccoli from 660-900 GDD, and celery 1570+ GDD. From seed, cauliflower requires 1070-1260 GDD, head lettuce 1200-1315 GDD, and carrots 1650± GDD. Potatoes have about the same requirement, although, like carrots, they may be harvested earlier with some loss in yield.

(c) Cereal Grains

With little or no loss in yield or quality, early varieties of grain have been produced or selected for northern latitudes. Barley requires 1450-1500 GDD, wheat and oats 1575-1650 GDD. In order to reach sufficient maturity for harvest as grain, apparently an equivalent of 10 to 12 warm (70°F. +) days is required. Immature cereal grains were formerly extensively harvested for forage.

4. Rangelands

The Exploratory Soil Survey distinguishes between conventional grazing by cattle or sheep and the practice, unique to all northern lands, of grazing by reindeer or domesticated caribou. Russian investigators differentiate as many as four subspecies, whereas American investigators generally make a distinction based on management - herding, roundup, and handling. Over time, apparently some selection has occurred. Individual animals are not readily identified. In groups, reindeer are reported to exhibit more white hair color and to be somewhat smaller.

(a) Grazing by Cattle and Sheep

The Exploratory Soil Survey identifies 18.6 million acres as "good" or "fair" for grazing by cattle or sheep. An additional 97 million acres is rated as "poor." Even the most optimistic outlook would require a question as to future use of the "poor" range except as would occur incidental to the use of better rangelands.

Three quarters of the "good" range occurs on the Aleutians and lower Alaska Peninsula, including Kodiak and the islands to the southwest. Virtually all the rest lies along Cook Inlet. The largest area of rangeland rated "fair" adjoins the areas of highest rating, with sizeable areas in the Kuskokwim highlands and western Coastal Plains.

Although horses, yak, and bison have survived in windy areas with suitable vegetation, such as Delta and Windy Pass, cattle and sheep require six to seven months winter feed, and preferrably some shelter at all points on the mainland. No sizeable commercial operation north of Homer has proved economically feasible. This situation could be reversed. If grain production in the interior valleys should prove successful, a sizeable number of convential grazing animals would become necessary to utilize grain falling below the standards of the export market. A feedlot system developed in England (26) would permit utilization of large portions of Alaska rangelands. Under this system, marketable finished beef is produced in under twelve months. Rangeland would become a major exploitable resource.

Kodiak is somewhat marginal for grazing year-round without winter feeding. At almost all locations to the south and west, it has been successful. Cattle have survived without assistance on Chirikof Island 80 miles further south for ninety years, at times increasing in numbers to exceed the sustained yield capacity of the island to support them. Both cattle and sheep have been on Umnak, Unalaska and other islands for a similar length of time. At times, without management, sheep have proved vulnerable to the elements because of the accumulation of wool when they remained unsheared. Some change of land status has occurred with creation of wildlife reserves, and with settlement of native land claims, but for the greater part of this century, approximately 1.2 million acres on the islands have been under 34 grazing leases. At last report, eight leases on the mainland covered .35 million acres. These are mostly for horses.

Rangelands vary widely in their composition, yield, and carrying

capacity. Undisturbed stands of the tall grass stands prominent on the islands and Cook Inlet have been estimated to yield as much as 2.5 tons of dry forage per acre, and roughly half this amount on a sustained yield basis (18). This type of growth invades cleared or burned-over timberland in most parts of the state. At higher elevations, it merges into a shorter grass range with a higher component of leafy and shrubby plants which also are grazed. Alders sometimes cover much of the land surface. Some wet areas support a dense growth of sedges. Tidelands and beaches may support a lush growth of wild rye. Mixed range of these types are considered to have a carrying capacity of 2.25 acres per animal unit (cow and calf or 5 or 7 sheep) per month during the growing season. This would be the equivalent of about 20# live weight of beef per year per acre. Winter range, where possible, supports little additional growth, but may maintain breeding stock. Allowing for bare ground and tree cover (most often alder), leases most often specify 30 or more acres per animal unit.

(b) Grazing by Reindeer

At the other extreme, alpine rangeland at higher altitude and latitude, or under maritime influence along the west coast of the state, is very extensive. The Soil Survey indicates some 220 million acres as "good" or "fair" for grazing by reindeer. For the most part, this range is treeless, with extensive areas of sedges and cottongrass in the wetter portions, and with short grasses, moss, lichens and short perennial shrubs in areas of better drainage. Leaves and tender annual woody growth of these plants makes up a large proportion of the material consumed. Because of the digestibility of their carbohydrates, lichens are the main source of feed-energy to reindeer during winter months. Unlike other plants used as feed, their regrowth rate is very slow.

Recovery after burning or overgrazing may require thirty to fifty years. Summer forage tends to be overly abundant and young reindeer make very rapid growth by any standard. Winter range is very critical to reindeer management and should be restricted to limited numbers of deer. Current rates of stocking range from 200 to over 1000 acres per deer. Most qualified estimates agree that grazing capacity on should be not less than 100 and may average 285 acres per cow-calf unit. Annual meat production would average not more than 0.50 pounds per acre.

Productivity of rangelands everywhere is comparatively low on the basis of area unit. However, they constitute a low energy-demand source of protein. When properly managed, they maintain vegetation in very much its natural state. And the physical extent of such lands is so great as to constitute a very large resource. As more than one person has pointed out, the animals do almost all the work.

SECTION II

HISTORICAL

A. 1784 to 1900

Alaska may have been "discovered" three or four times. There appears to be something very ancient around the junction of the Old Crow and Porcupine Rivers - for this continent, at least. It is well accepted that a stone age culture penetrated the interior basins some 7 to 10 thousand years ago. And the coastal people appear to have been around some 5 to 6 thousand years. Nikolski Village on Umnak has a fair bid to be recognized as the point of longest continuous settlement on the American continents, and perhaps one of the oldest in the world. Of course, it had to back up the beach as the oceans rose with the receding glaciation at the end of the last Ice Age.

About the year 1500 A.D., the frontiers of European civilization began to expand, a movement which was to last some four centuries, and of which some vestiges remain. To a great degree, this movement was propelled by the search for wealth in a concentrated form. In the north, the hunt for furs played a most spectacular part. The movement from Russia extended eastward. From England, France, and, to a lesser degree, other nations, it moved to the west. Progressing in opposite directions, these fur hunts led to establishment of the Alaska Boundary approximately half way around the earth from their points of origin. Together with succeeding searches for treasure in other forms, these hunts resulted in the introduction of agriculture into an area which, until recently, was written off as an icy wasteland.

The Russian Phase

In 1784, Grigori Shelikof founded a settlement at Three Saints Bay (now Old Harbor) on Kodiak Island. He brought seeds and livestock in

keeping with part of his negotiations with Empress Catherine II for a monopoly of the Russian fur trade. If we disregard the fictional Gulliver, who was supposedly captured by giants in a nearby field of barley in the same general area in 1703, this was the beginning of agriculture in Alaska. After eight years, Shelikof moved his headquarters to the present site of the City of Kodiak. The following year, Alexander MacKenzie reached the Pacific coast across Canada. George Washington was President of the United States.

In the forty-three years following Bering's second voyage, some ninety small ships departed from Okhotsk or Kamchatka in search of furs. Voyages lasted two to eight years. As many as a third of the ships were lost at sea or on the rocky coasts. Starvation and scurvy claimed perhaps as many lives. Shelikof's proposal included agricultural colonies, which, in addition to improving the food situation, would strengthen Russian territorial claims. His manager, Baranof, founded a short-lived agricultural colony at Yakutat,and some years later his son-in-law Rezanof founded a second colony at Ft. Ross in California in 1812. Later Russian records (11) refer to small agricultural colonies at Ninilchik, Kasilof, Kenai, Tyonek, Knik, and Matanuska.

Subsistence of the fur traders and hunters was based traditionally on marine animals. For many years no provision was made for land-clearing. Iron implements were rarely available. The work of gardening and tending animals was relegated to old men, women, and the clergy. Cereals would rarely ripen at any of the coastal areas to which the Russian fur trade was extended. Some vegetables grew very well. Grazing animals did well, but hogs and poultry acquired an unpleasant taste from fish offal which was a major part of their diet. Sauer (21) mentioned neat gardens and livestock at the Three Saints settlement,

Alitak, Karluk, and Afognak in 1790. Baron Wrangell (33), a later manager of the Russian American Company, reported 220 cattle and numerous other livestock in 1833. He also reported gardens at Sitka, Kodiak, Unalaska, Atka, Kenai, Sanak, Unga and Attu. Writing in the 1840s, Bishop Veniaminoff reported gardens at Isanotski Strait, False Pass, and nearly every island village west of Unalaska.

After 126 years of partial occupancy, the Russian phase ended with the Treaty of Cession to the United States in 1867. The fur hunt was over. In retrospect, it has been noted that Russian activity was largely limited to the narrow, cool, rocky coastal strip from 170° East to 130° West Longitude, and penetration of the Yukon to Nulato. Since there may never have been many more than five hundred persons of European origin at any one time in all that vast area, perhaps their small achievements in food production may have been sufficient to their needs. In the later years, they got their grain from the Spanish settlements in California.

Such agriculture as did develop was confined to settlements with some degree of permanence. It may have contributed to the disappearance of references to starvation and scurvy in historical records of the time. Some small tradition of gardening remains within Native villages at various locations. Visual evidence of the bloodlines of the early Siberian cattle persisted on the Kenai Peninsula and in the Matanuska Valley until the time of World War II. Some descendents of the Russian hunters and traders continue agricultural practices in the Kodiak-Cook Inlet region.

The Canadians and the American Phase

On the heels of Alexander MacKenzie, the Hudson Bay Company appeared both overland and by sea in the areas of southeastern Alaska to

which the Russians had extended their operations between 1798 and 1805 (2). The area was also visited by a number of American traders including the ships of John Jacob Astor's Pacific Fur Company with which Baranof was considering an alliance. American competition was rather effectively eliminated by the unsettled conditions surrounding the War of 1812. The remaining conflict between the Russian American and Hudson Bay Companies were settled by the Treaty of 1825 between Russia and England establishing the Alaska Boundary.

However, in the interior where there was no Russian presence, agents of the Canadian firm moved down the Yukon and Porcupine Rivers, well within Russian territory. In establishing the Hudson Bay trading post at Fort Yukon near the confluence of these rivers, Alexander Murray brought vegetable and cereal seeds and potatoes into the interior of the country in 1847. Until officially informed of their trespass by an American officer twenty-two years later, the Canadians had surprising success with garden vegetables and some small grains. A number of years later, in 1888, Canadian Catholic missionaries established a school at Holy Cross (13) where excellent gardens and some livestock have been maintained continuously ever since.

Shortly after cession of Alaska by Russia, the Alaska Commercial Company (17) put a small steamboat on the Yukon and took over the fur trade at Ft. Yukon. The names of Arthur Harper, Al Mayo, and L.N. McQuesten become associated with raising vegetables in the upper parts of the river, although they were traders and prospectors rather than farmers.

Since the times of Lewis and Clark and of Zebulon Pike, the U.S. Army has had a tradition of exploring the nation's frontiers. In this tradition, Lt. Schwatka explored the Yukon in 1883, and Lt. Allen went

up the Copper and down the Tanana Rivers in 1885. It may be somewhat ironic that at the most northern and farthest inland points reached by either expedition, they were furnished locally-grown vegetables very much as they might have eaten at home.

In 1870, W.H. Dall (7), senior scientist for the Western Union expedition, impressed by the grasslands of Kodiak and Aleutians, wrote "While Massachusetts has never exported anything from its soil except ice and granite, we may look, in two hundred years, to receive butter, wool, cheese, mutton and beef from Alaska". In 1880, Falkner, Bell and Co. of San Francisco shipped 150 sheep to Kodiak. Writing in 1886, Bancroft (3) reported that beef cattle were often shipped from the west coast to fatten in the Aleutians. In 1892, Axel Olson, master of the schooner Bertha placed three longhorn cows and a bull ashore on Chirikof Island where their descendents remain today. A generation later, Captain Olson appeared again with his family among the pioneer farmers of the Matanuska Valley.

B. 1900 to 1941

(a) Homesteading the early farms.

Between 1867 and the end of the century, there was a gradual increase in the number of persons no longer interested in pursuing high profit windfalls. The whaling industry had come and gone. The best cannery sites had been acquired with soldiers scrip. Some people desired to remain and live in the Territory, and some to acquire rights to good timberland. Between 1898 and 1903, the homestead laws were extended to Alaska. This coincided with a series of gold strikes in widely scattered regions, accompanied by a flood of prospectors and miners.

As communities came into being with some appearance of permanence, the most suitable lands nearby were homesteaded by individuals and

families generally more oriented, or resigned, to permanent settlement. Dwellings were built, land was cleared, and implements and livestock were acquired, much after the pattern of small farms in the lower states from which most early Alaskans of the American phase had come. With a time lag of one to three years, these settlers had their products on the local markets, usually green vegetables, root crops, hay, and livestock products, in that order. Most freighting was accomplished by horses, and hay was a major item. For a time, it was a very remunerative business. However, much of this market was transient; a rush of prospectors, a few miners, and the rush moved on to other strikes. In most cases, even the miners proved transient. As one Copper Center farmer wrote in 1910 "By the time you've got your land cleared and your buildings built, they're all gone".

Following is an incomplete list of homestead entries in Alaska by the year 1906. Most of these were on unsurveyed land since the first baseline was not established until 1905.

Circle	5	Knik	20
Copper Center	11	Seward	59
Fairbanks	82	Sitka	6
Hope	1	Skagway	33
Juneau	36	Valdez	39
Katalla	3	Yakutat	6

There was also some commercial production at Eagle and Tanana at that time, and as we have noted, on the Kenai Peninsula. These latter homesteads may have been among those recorded at Seward. In the following years, other gold strikes or construction activity led to

other homesteads. By 1917, activity in the Little Susitna Area, Nelchina stampede, Chickaloon coal field, and construction of the Alaska Railroad led to 400 entries in the Matanuska Valley. Kennecott and the Copper River Railroad resulted in a limited number of entries in the Chitina Valley. World War I and related activities attracted most of these homesteaders elsewhere. By 1923, only 175 of the entries in the Matanuska Valley had come to patent, and only 76 families remained. As the mining boom and construction activity declined, Alaska's population dropped to about 55,000 in the early '30s. As potential markets evaporated, farm population declined accordingly. However, in a few locations of continued economic activity, agriculture persisted.

As the small cities of Southeastern Alaska stabilized on the basis of fisheries, forestry, mining, and commerce, most came to support a small dairy and some vegetable production. Clarke farmed at Skagway, Anway at Haines, two dairies operated at Sitka. Knudson and three others at Juneau built a co-operatively operated milk processing plant. In Chitina Valley, Christenson, Holta and four others continued to supply McCarthy and Kennecott until it closed in the 1930s.

By 1909, the population of the Fairbanks region (13) was about 12,000. By 1915, mining began to decline and was taken over by large mechanized operations. Population of the region dropped to 3000 or less. At the time of World War I, there were more than thirty active full-time farms. The Tanana Valley Farmers Association* held frequent

* In 1918, names of pioneer farmers appearing on the roll call of the Tanana Valley Farmers Association were: Badger, Ballaine, Bentley, Berry, Bjerremark, Borden, Buzby, Charley, Colde, Creamer, Des Jardine, Hanford, Hinckley, Hyde, Johnson, Joy LaZelle, McCauley, McGrath, McIntire, McMahan, Miller, Rickert, Sabin, Slater, Tonseth, Waugh, Weiss, Williams, Young, M. Yankovitch, and V. Yankovitch.

meetings for over fifteen years. The Association was instrumental in building a flour mill in the early 1920s and producing three types of excellent flour from local hard red spring wheat. However, in addition to the fading market, two new factors contributed to the decline of farming. The first was mechanization of freighting by tractors and the small Tanana Valley Railroad, which eliminated the market for hay. The second was construction of the Alaska Railroad which reduced freight costs, placing local producers in more direct competition with the much larger and highly developed American agriculture and marketing system. Even these technological changes did not eliminate local farming completely, but they did affect the process of replacement of the aging farm group. As a matter of perspective, it may be noted that, at the same time, essentially the same changes had already taken place in the New England States. In any event, until 1935, the Tanana Valley remained the major center of agricultural production in the state.

With construction of the Alaska Railroad, some homesteading occurred in the Anchorage area. The most notable result was the operation of five dairy farms simultaneously or in near succession. Growth of the city and wartime activity absorbed the farmland, and the cattle went to the Matanuska Valley.

Meanwhile, in connection with the grazing leases mentioned under the heading "Rangeland", an undetermined number of 160-acre homesteads were entered on Kodiak and perhaps other locations. These were more in the nature of industrial sites as the clearing requirements would not ordinarily be appropriate.

In the Matanuska Valley, the remnants of old Russian agriculture and the newer American efforts came together in the vicinity of Kustatan and Knik. The traders, George Palmer and J.G. Herning, issued

enthusiastic reports from around Knik at the turn of the century (15). The Army is reported to have made some investigation in connection with a telegraph survey, and gold mining in the Little Susitna - Willow Creek district was followed by a number of homesteads. Subsequent developments have already been reported up until 1923. We will move back to the time of World War I. As at Fairbanks, the farmers formed the Valley (Forest?) Hall Association* for business and recreational "get-togethers". This was later followed by two short-lived co-operatives which yielded to the marketing organization coming with the Colony project. Some marketing was done through Pacific Woolgrowers.

(b) Group Settlement

Under the Russian occupation of Alaska, Yakutat and Ft. Ross were planned colonies under the policies of the Russian American Company and the national government. The small villages along Cook Inlet mentioned in the Russian literature were more or less subsistence undertakings on a voluntary basis, perhaps with some encouragement by the Church. All were group settlements. In contrast, the small farms established by American homesteaders were individual efforts to exploit the markets created by mining and fishing towns, and along transportation routes. They came into being and disappeared as these activities persisted or faded.

Whether for economic, religious, or other reasons, the idea of

* Pioneers who had developed farms in Matanuska by 1918: Abrahamson, Allen, Alma, Anderson, Bayles, Bergstom, Bodenberg, Bodine, Bogard, Bugge, Carter, Cobb, Cornelius, Cunningham, Danielson, Duncklee, Edlund, Edmundson, Egtvet, Ellexson, Engstrom, Felton, Fleckenstein, Flemming, Fosket, Fries, Gitchell, Harmon, Heady, Heckey, Higgins, Hunt, Johanse, Jones, Keeley, Krogh, Krueger, Larson, Leckvold, Loken, Lothrup, Marino, Martin, McArdle, McCloud, Metz, Miller, Murray, Neklason brothers, Nylen, Olson Sainden, Smith, Springs, St. Clair, Swanson, Thorsen, Walters, Watson, Werner, Winchester, Wise, Youngquist, Zorn, and others.

group settlement has always had a strong appeal. The first proposal in Alaska under American administration came in 1902 from the American Colony Company of Homer to transport a number of Finnish people to Kachemak Bay. Apparently nothing came of it. In the late 1920s, advance parties for two settlements visited the Cook Inlet Region. One was religious, the other foreign. Both parties were pleased with the possibilities, but skeptical of markets.

In 1929, the Alaska Railroad employed a colonization agent to recruit farm settlers to the Matanuska Valley, and planned a similar effort for the Tanana Valley. Some six hundred persons corresponded, 110 announced plans to sell out and come to Alaska. Because of the Great Depression which occurred at that time, only 56 families finally came. The only inducements offered were a special passenger and freight rate from Seattle, assistance in locating land, and some assistance in land clearing. The Railroad acquired one tracklaying tractor nearly worn out on the Panama Canal, and built a small buttermaking plant at Curry, half-way to Fairbanks. The Depression ended all further efforts.

(c) The Matanuska Colony

In 1932, the farm population of the United States was 32.8 million. More than a million farm families were on relief. The Federal government responded by creating the Resettlement Administration to move stricken families to better locations. One hundred projects were proposed. Matanuska was thirty-third on the list. In 1935, 202 families, 903 persons, were transported to the Matanuska Valley and settled on farms averaging little more than fifty acres in size. Turnover was high, and eighty additional families later joined the colony as replacements. Construction of dwellings and outbuildings at first absorbed the energy of the project, before land clearing or

serious production got under way. In 1939, the co-operative marketing and purchasing association, now known as Matanuska Maid, was transferred to the control of farmer members. Its growth has been steady, but not spectacular, from $480 thousand in 1940 to $12 million in 1981.

For many years, the project has been the only survivor among the hundred started by the Resettlement Administration. More than any other single factor, this has been due to the series of events, beginning with World War II, which took place in Alaska. If any conclusions are to be drawn, they must include these: 1) That a profit incentive must exist at all levels of operation; 2) that economies of scale must be sufficient to meet competition; 3) that there must be a relative permanence of demand for whatever goods or services are produced; and 4) that institutional support cannot be less than that enjoyed elsewhere.

(d) Institutional Support

In the transition from a frontier to a modern economy, the U.S. Government delegated a number of functions to the Department of Agriculture and other branches. These apply to consumers as well as farmers. President Lincoln referred to USDA as "the people's department". In its policy of cheap food, government has granted the agricultural industry a considerable number of benefits as well as imposed the burdens of a number of mandatory regulations. To a great degree, the industry is what the nation decrees what it shall be. Whether this is good or bad, no part of the industry successfully operates outside this influence, which, with some modification, has been further extended by all state governments. In part, at least, these policies have contributed to the fact that U.S. citizens pay the lowest percentage of their disposable income for food of any nation in the

world, and that the nation remains the largest exporter of agricultural products. Collectively, these benefits are referred to as institutional supports. These have been extended to Alaska in the following order:

1898 Office of Experiment Stations (now Agricultural Research Service)

1903 Homestead Act

1922 Agricultural College (now University of Alaska)

1931 Extension Service

1935 Alaska Rural Rehabilitation Corporation

1936 Agricultural Conservation Program

1941 Farmers Home Administration

1945 State Division of Agriculture

1948 Soil Conservation Service

1949 Federal Credit Unions

Alaska Conservation District

State Veterinarian

1953 Agricultural Loan Fund

1960 Federal Crop Reporting Service

Federal Land Bank (one of four branches of the Farm Credit System)

1970 Federal Meat Inspection (by agency to State)

1972 State Plant Materials Laboratory

Homer Red Meat Research Center

Some Federal services and programs such as Rural Electric and Telephone, Food Stamps, Animal and Plant Health Inspection, etc. are not listed since they have little impact on agriculture as such. A number of agencies and programs are not present in the State. Some of those listed are oriented more to all consumers than to the agricultural industry.

Of the Federal programs, the Research Service has had the most impact. Experiment Stations have been maintained at various times at Sitka, Rampart, Copper Center, Fairbanks, Kodiak, Matanuska, Palmer, and Petersburg. Presently, the Fairbanks, Palmer, and Matanuska Stations are operated by the State through the University of Alaska.

(e) Farm Organizations

Alaska farmers have not been inactive in support of their industry. Three Chapters of the National Grange are represented, as well as the American Dairy Association. Farmers Union, Farm Bureau, and National Farmers Organization have been considered, but numbers are too small. State and local organizations are listed:

Soil Conservation Subdistricts; Salcha-Big Delta, Kodiak, Palmer, Wasilla, Montana Creek, Fairbanks, Kenny Lake, Homer and Kenai-Kasilof

Future Farmers of America: Palmer, Delta Junction, Homer, Fairbanks.

Alaska Crop Improvement Association

Matanuska Maid, Palmer

Alaska Farmers Co-op, Delta

Kodiak Livestock Growers

Kenai Peninsula Agricultural Association

Reindeer Herders Association

Mat-Su Farmers Association

Alaska Fur Growers Association

Alaska Bee Keepers

Matnauska Valley Breeders Association

Alaska Dairy Herd Improvement Association

At the present time, an Alaska Farmers and Stockgrowers Association is in the process of organizing. It may serve as an umbrella for all the existing organizations.

The Census of Alaska farms has shown some stability in numbers

in recent years:

1959	420
1970	320
1973	320
1974	290
1975	300
1981	390
1982	410

This is in contrast to the national census which showed a continual decrease from 6.8 million in 1936 to 2.3 million in 1981. In addition to increase from the Delta project, the Alaska figures are interpreted as reflecting recent population growth and some measure of increased investment resulting from increased construction and oil-related activity.

Cash receipts to farmers in recent years, as reported by the Crop Reporting Service, are:

1976	$10,150,000
1977	11,461,000
1978	11,508,000
1979	12,057,000
1980	11,729,000

At the time the Exploratory Soil Survey was 83% complete, and the prospect of exporting grain not yet considered, Burton (6) calculated the State's latent potential production capabilities to be of the following magnitudes:

Beef	1,700.0	million pounds
Pork	2,400.0	million pounds
Milk	450.0	million pounds
Lamb & Mutton	.8	million pounds
Wool	.4	million pounds
Reindeer	13.4	million pounds
Antlers	1.0	million pounds
Grain	8.0	million tons

In addition, significant quantities of ornamentals, eggs, forage, and other products could also be produced. In view of the final result of the Survey, perhaps these figures could be revised upward some twenty percent.