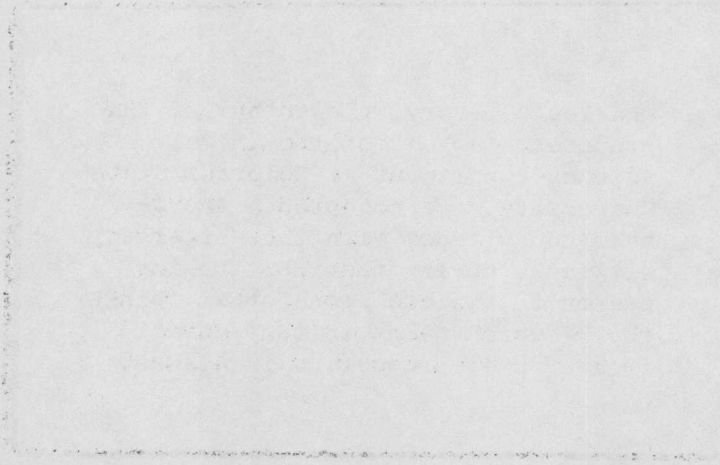


*a proposed*  
LIVESTOCK  
RESEARCH  
PROGRAM  
*for Alaska*



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Department of  
Wildlife  
Research  
Program  
for Alaska



This report presents, primarily, areas of research and research goals on range management and beef cattle production that 1) appear to be most urgent and 2) that appear attainable within the next few years without a great expansion of personnel, equipment and funds.

Other areas of research and development in the livestock industry (not including dairy) are discussed briefly. Present trends in agricultural research and recommendations for an expanded research program in animal husbandry are given. Some of these recommendations have appeared in other reports and are singled out here to emphasize their importance to a livestock research program for Alaska

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## RESEARCH ON ALASKA FEEDBASE .....

A recent report (Gazaway, 1960) on the agricultural potential in Alaska indicated that animal industry may be the best way of utilizing the state's total farming capacity. This is further indicated by the large acreage of grazing land for which there appears to be no other agricultural use. Some of these grazing lands are supporting beef cattle, sheep and reindeer already.

In 1962, Alaska's dairy industry provided a market for all locally produced grains and roughages. It was necessary to import additional grain to supply the total feed demand for dairying. Therefore, a developing red meat industry (beef cattle primarily) would impose additional demands on existing grain and roughage supplies especially for fattening cattle. **IF A BEEF CATTLE INDUSTRY IS TO DEVELOP IN ALASKA THERE MUST BE A SOURCE OF GRAIN WITH WHICH TO FATTEN CATTLE TO AN ACCEPTABLE MARKET GRADE AND QUALITY.** Thus it is clear that further development of an animal industry will require greater use of agricultural lands.

The major beef cattle producing areas in Alaska today are Kodiak, Sitkalidak, Chirikof, Trinity and Shumagin Islands. The Kenai Peninsula has a large acreage of grazing land near Homer and will probably be the first area on the mainland to produce cattle on any scale. There are a few scattered herds in the Matanuska and Tanana Valleys and Southeast Alaska.

Attempts by individual operators (Kodiak Island especially) to use large acreages of grazing land have met with many difficulties. Inadequate fencing has resulted in loss of cattle due to predators, poisonous plants and straying. Likewise, it has been difficult to manage the cattle for best utilization and conservation of the native forage. There is very little reliable information on carrying capacity or nutritional value of such native forages. Hence the need for range management and use studies.

**MANAGEMENT & USE OF NATURAL FEEDBASE.** A report of the recent Comprehensive Review Team (June 1962) on feedbase research recognized the large existing feed base resource in the range land of Alaska. However, no mention was made concerning the need for research on use and management of this resource for domestic livestock production. Research is needed not only to determine proper use of this feed resource but to help conserve it. Otherwise it may soon be depleted or exploitation and misuse. It is recommended, therefore, that research on grazing land management and use for beef cattle be initiated as soon as possible. The following problem areas may be considered initially:

- o Carrying capacity under different use intensities (light-moderate-heavy).

- o Plant succession for various grazing intensities (light-moderate-heavy).
- o Optimum dates and length of grazing season.
- o Beef production per acre.
- o Fertility studies and yield data on native grasses.
- o Studies with cultivated grasses.
- o Improved fencing for moose control.
- o Tree and brush removal and control.
- o Soil conservation on range lands.
- o Eradication and control of poisonous plants.

The first four items are problem areas of most immediate concern to beef cattle producers. Research work in these areas could be initiated most conveniently in the immediate vicinity of the Experiment Station headquarters near Palmer using personnel and equipment already available. In time, such grazing land research may be conducted in cooperation with individual ranchers on Kodiak Island or near Homer on the Kenai Peninsula. It would be well to include the Agronomy Section of the Experiment Station and range management personnel from the Bureau of Land Management in this research program.

The following suggested plan for a grazing and management study is offered with the assumption that range land on Wolverine Creek or its equivalent will be available for a minimum of 35 yearling beef steers.

Suggested plan for a grazing and management study-June to October - 4 months

		Intensity		
		Light	Moderate	Heavy
Acres . . . . .	number	20	20	20
Steers . . . . .	number	5	10	20
Steer performance . . . . .	--	lbs of beef produced per acre		
Pasture Performance . . . . .	--	carrying capacity, plant utilization by species, plant succession, etc.		
Total costs \$ . . . . .	--	per lb. of beef produced		

A budget of about \$10,000 would be required the first year for purchasing cattle, fencing materials (wire, post), fence construction costs and operating costs. Thereafter an annual budget of \$6000 to \$8000 per year for purchase of cattle and operating expenses would be adequate. After the first year, the net cost of this study should not exceed \$3000 to \$3500 as returns from sale of cattle after they have been fattened will be credited to the project.

## RESEARCH ON BEEF CATTLE PRODUCTION

Beef cattle production on the mainland should develop on a small scale, perhaps as a cow-calf operation in association with an existing farming or dairy enterprise where silage, hay and grain crops can contribute to the total feed supply. It is assumed that there will be adequate summer pasture available either from leased range land or improved, seeded pastures. Under such a small scale operation the beef enterprise will not supply the major family income. But it will offer the advantage of gradual expansion as better market channels and slaughtering facilities develop.

In proposing a new research program it is necessary to establish a priority of problems on which to work. The most urgent problems in producing beef as outlined above are 1) a lack of adequate marketing, slaughtering and processing facilities and 2) high cost of production--mainly in feed.

Problems of marketing, slaughtering and distribution of red meats are now being investigated. These problems, perhaps more than any others, are preventing further expansion in production of red meats in Alaska. The information and recommendations from this research are urgently needed as a basis in formulating a program of action toward developing the necessary facilities for handling red meats.

Research to determine feed requirements and total costs of commercial beef production should involve all phases of production starting with a cow-calf herd. However, in view of a present shortage of adequate facilities for taking care of additional cattle during the winter, yearling cattle (steers) purchased in early June for pasture grazing studies may be used for a fattening experiment following the pasture season in October. As more money and facilities become available this research work can be expanded to include all phases of beef production; that is, a cow-calf operation selling weaned calves; cow-calf operation selling long yearlings, or cow-calf and feedlot operation combined in the same enterprise.

**FEEDS & COSTS FOR FATTENING CATTLE.** At the present time Kodiak Island and the Kenai Peninsula constitute the only practical source of supply of feeder cattle. In the event that an island ferry system is developed Kodiak and the other nearby islands may be able to supply cattle to the mainland at a price which will encourage development of a beef feeding industry in the railbelt market areas. Ranching areas on the Kenai Peninsula can also produce feeder cattle, but at a greater cost than on Kodiak because of a longer and more costly winter feeding period.

With a dependable supply of favorably priced feeder cattle a beef feeding industry in Alaska must depend upon grain feeds for

profitable production of fat cattle. The initial feeding experiments should make use of oat-pea silage and barley which are the most suitable "home-grown" feeds for fattening cattle. If there is sufficient demand additional barley can be shipped in from Canada. The following suggested plan for a feeding and cost study assumes that feed costs can be controlled by varying the proportion of oat-pea silage to barley in the fattening ration. The specific objectives of this experiment are as follows:

- o To determine the ration that will give the most economical production of acceptable (good or choice) carcass beef.
- o To demonstrate that quality carcass beef can be produced from Alaska grown cattle with Alaska grown feeds.

Suggested plan for a feeding and cost study with fattening cattle (October to March - 5 months).

Type of Ration		High silage	Medium silage	Low silage
Steers . . . . .	Number	10	10	10
Initial weight . . . . .	lbs	700	700	700
Average daily gain . . . . .	lbs	2.5	2.5	2.5
Final weight. . . . .	lbs	1075	1075	1075
Shrunk liveweight . . . . .	lbs	1040	1040	1040
Estimated carcass yield . . .	per cent	59	60	61
Estimated carcass weight. . . .	lbs	613	624	634
Estimated carcass grade . . . . .		Low good	High good	Average choice
Average daily ration				
Barley @ \$85/ton. . . . .	dollars	8	12	16
Oat-pea silage @ \$15/ton. . . . .	dollars	50	36	24
Mineral and salt \$3/cwt . . . . .	dollars	.05	.05	.05
Total feed required/steer . . . .	lbs	3457	3427	3487
Dollars				
Total feed cost/steer . . . . .		107.50	117.25	129.25
Overhead cost/steer (@8¢/lb gain)* .		30.00	30.00	30.00
Initial cost/steer (@ 25¢/lb) . . . .		175.00	175.00	175.00
Total cost/steer. . . . .		312.50	322.25	334.25
Total cost/cwt carcass. . . . .		50.98	51.64	52.72
Wholesale price/cwt fresh beef** . . .		54.00	54.00	55.00

\* Overhead costs include labor, veterinary fees, interest on investment, depreciation, and so forth.

\*\*August 12th, Seattle market + 8¢

This suggested experimental plan gives estimates of animal response and costs of production based upon results of feeding barley rations to

cattle in Montana. In determining the most economical ration for fattening cattle eventually other barley rations should be tested. For example--

- o Barley straw-barley-protein supplement.
- o Barley straw-barley-molasses-protein supplement.
- o Grass hay-barley-protein supplement.
- o Grass hay-barley-molasses-protein supplement.
- o Barley straw-barley-oats-protein supplement.
- o Barley straw-barley-oats-molasses-protein supplement.
- o Grass hay-barley-oats-protein supplement.
- o Grass hay-barley-oats-molasses-protein supplement.

#### OTHER LIVESTOCK RESEARCH

The relative importance of different red meats may be judged by their per capita consumption. In 1962, this per capita consumption in the United States was:

Beef	lbs	89.1
Pork	lbs	64.0
Veal	lbs	5.5
Lamb & mutton	lbs	5.1
TOTAL	lbs	163.7

It is likely that the relative consumer preference as indicated by these figures will also apply to Alaska even though wild game constitutes a part of the total meat supply. At present the beef cattle industry (along with dairy) has made a start in supplying meat to local markets with indications of a greater production potential in the future. Therefore the major research effort toward greater red meat production in Alaska should be in support of the beef cattle industry.



SWINE PRODUCTION. There is little reason to expect a swine industry to develop in Alaska soon, primarily because this class of livestock depends upon concentrate feeds which are expensive and in short supply. Pork lends itself to curing better than other meats and thus can be imported more economically. A research program in swine production (breeding, management and nutrition) does not appear to be justified at the present time.

SHEEP PRODUCTION. Although the present sheep industry is small and contributes very little to the economic welfare of Alaska it does offer a potential meat supply in lamb and mutton. Since choice lamb carcasses can be produced from grass with no grain the sheep industry would not compete with other classes of livestock (dairy and beef) for grains. Yearling wethers and old ewes can also be marketed as meat although the meat quality is not as good as young lamb. Thus, sheep are rather ideal animals for converting a natural resource (grass) into an acceptable food product. As in the case of beef, this potential will not develop until proper marketing and handling facilities for red meat are available.

DEFORMED CALF PROBLEM ON KODIAK ISLAND. For a number of years ranchers on Kodiak Island have been reporting a problem of deformed calves in their herds. These so called "crooked calves" have varied in the extent of deformity; from a slight crippling in the legs or a slight twisted neck to more serious malformations that have resulted in dead calves or calves that died soon after birth. Some calves have shown other malformations such as a cycloplan condition and in some cases imperforate anus (Atersi ani).

The incidence of this problem has varied from year to year and from ranch to ranch. For example, Tom Felton rarely has trouble with this problem in his herd while Joe Zentner rather consistently has 3 to 5 per cent of his calves affected. The history of deformed calves on Joe Beatty's ranch shows an increase from 2 calves (1%) in 1960 to 9 calves (4%) in 1963. Mr. Beatty began his breeding season on July 2, 1962 and seven of the nine deformed calves were born during a 2-week period from April 3 to 18, 1963. These calves were all from first calf heifers located in a new hill pasture separate from the rest of the breeding herd. Two of the affected calves born June 4 and 7, 1963, were from older cows on another pasture.

The vegetation cover on these ranches is similar. All have varying amounts of poisonous plants which so far have not accounted for an appreciable loss in stock. The principal poisonous plants are water hemlock (cicuta occidentalis), arrow grass (Triglochin maritima), monkshood (Aconitum spp.), lupine (Lupinus spp.) and false hellebore (Veratrum spp.). These particular plants seem to be fairly common in most all areas of Alaska where livestock are found.

Reports in the literature show that the problem of deformity in calves and lambs exists in the states of Washington and Utah. Dr. Wayne Binns of Utah State University has been able to produce a cyclopic malformation in lambs by feeding false hellebore to pregnant ewes. He reported that the critical period of ingestion of this plant was during the second and third weeks of pregnancy and that exposure to the plant need not be longer than 9 days.

Dr. I. A. Dyer of Washington State University is conducting research on the cause of "deformed calves". Dr. Dyer is familiar with the Kodiak problem and has indicated a desire to cooperate with the ranchers to determine if manganese deficiency in the cows might be involved in causing the crippled calves. In a recent letter, Dr. Dyer pointed out that: "until recently, the deformed calf problem was considerable in Washington. However, for the last 2 years it has been difficult to find cases of deformed calves in this state because ranchers are using a better mineral supplementation." He also stated that; "it has been our experience that the use of a mineral mixture bringing the calcium and phosphorus to approximately 1:1 ratio along with 20 mg. of supplemental manganese per pound of ration prevents deformed calves."

Two soil samples and a water sample from Mr. Zentner's ranch have been found low to very low in manganese and according to Dr. Dyer, who performed the analysis, strongly suggests manganese deficiency in cow diets may well be causing the crippling of their calves. Additional analysis on soil, water, feed and tissue samples from crippled calves on Kodiak will soon be available from Dr. Dyer's laboratory. Ed Liebenthal, district agent for the Cooperative Extension Service, is serving as coordinator of much of this work.

J. A. King, DVM. of Anchorage is studying skeletal and other deformities of the Kodiak calves. It should not be assumed that the problem which other workers have observed in Washington or Utah is identical to the problem or problems (Cyclopic vs skeletal malformations) noted in the calves on Kodiak Island.

At one time it was postulated that deformed calves on Kodiak resulted from certain genetic factors in the breeding stock much the same as the problem of "dwarf calves" due to a recessive gene in specific breeding beef animals. Although this idea has not been disproven, there seems to be no repeatable association of deformed calves with specific blood lines or with specific breeding animals.

In view of the above observations the following recommendations may offer the ranchers a practical solution to this problem.

- o Feed a manganese supplement to the breeding cows. Ordinarily, salt containing trace minerals (includes manganese) is used as a practical method of supplying trace mineral supplementation to cattle on pasture. However under the conditions on Kodiak salt consumption by cattle is

limited often times because of their proximity to the ocean which apparently supplies adequate levels of salt in the stock water and forage. Thus, it is difficult to be assured of trace mineral intake by feeding salt.

Another alternative is to feed the trace mineral mixture in a small amount of grain to the cattle each day. This method also has limitations in that cattle may refuse to eat the grain in preference to lush green pasture.

Therefore, it might be advisable to enlist the support of some chemical company to devise and prepare manganese pellets, similar to cobalt pellets which were manufactured for dietary supplement in cattle and sheep. The manganese pellets administered orally to the cows as they go to pasture in the spring should be such that it would provide the release of about 400 mg of manganese daily for a period of 3 or 4 months.

- o Keep bred cows and heifers on pastures that are free of poisonous plants. This may require spraying some pastures to eliminate these plants.
- o Attempt to manage pasture use and or breeding dates of the cow herd so that they are not exposed to poisonous plants during the apparent critical stage of gestation--perhaps the first 2 or 3 weeks.

In the meantime, a formal research project first should accurately describe the problem or problems of concern. It would be well to:

- o Get complete and accurate case history and incidence of deformed calves and herd management on as many ranches as possible.
- o Obtain detailed description of the deformities and cyclopic conditions in calves.
- o Have soils, water and feeds normally used analyzed for calcium, phosphorus and the trace minerals manganese, iron copper, cobalt, zinc and iodine.
- o Determine species of poisonous plants that are found in the cattle pastures. Also determine to what extent and at what stage of plant maturity these plants are being consumed by cattle.

When the above information is available further research can be logically planned.

#### RECOMMENDATIONS

The question of support for expanded agricultural research must be considered in projecting a livestock research program for Alaska.

Historically, most of the research in animal science throughout the United States has been conducted by state agricultural experiment stations with financial support from both state and federal funds. In recent years other agencies have entered the field of livestock research. Private foundations now conduct research on a contract bases. Industrial firms (feed manufacturers, pharmaceutical firms, etc.) are conducting research on development and testing of drugs, feed additives and other products. A larger number of individual livestock breeders, ranchers and commercial cattle feeders are actively conducting production research with technical assistance from extension service specialists or state experiment station personnel.

Another recent development is the increased financial support of experiment station research from National Science Foundation and National Institute of Health grants. These federal agencies require that their funds be expended for basic or health related research only.

The present urban reaction toward agriculture is not favorable. In many states this anti-agricultural attitude has been reflected in decreased state appropriation of funds for agricultural services and research. Generally, these are the funds that support "commodity" oriented (sheep producers, cattle feeders, potato growers, wheat producers, etc.) production studies which are of immediate concern to farm and livestock producers.

With other agencies participating more in applied research activities and with greater dependency upon federal and grant funds, there is a trend for state experiment stations to concentrate less on applied and more on basic research in their over-all program. Much of the applied or production research is being relegated to one or more substations in various agricultural areas of the state. This allows for better use of space and specialized equipment at the main station for graduate student training and basic research. Also the commodity oriented production research is located where it can function best--that is, in the agricultural community that will benefit most from the results. Thus it is through the people who receive direct benefit that such research can be most effectively explained to state officials and perhaps to the general public.

RESEARCH PROGRAM IN ANIMAL SCIENCE. Much that needs to be done in developing a livestock industry in Alaska can be accomplished by competent livestock specialists either under the cooperative extension service or preferably with a joint extension service--experiment station appointment. Many of the problems facing the livestock producer in Alaska can be solved by judicious application of present knowledge and recommendations developed in other states. Scarcity of research funds is critical and "show-me-how" experiments demonstrating principles and practices already known cannot be justified.

In making recommendations on livestock research for Alaska it is necessary to involve Experiment Station organization and facilities.

It is important to maintain the closest possible affiliation of Experiment Station and University functions. The difficulties imposed by geographic separation of the University and most agricultural areas in Alaska are fully recognized. However, it is my opinion that the very existence of the Experiment Station depends upon integration of research, teaching and graduate student training. It is much easier to justify a research staff and research program that can show such a dual function.

Expand the present livestock research program to include:

- Production research on beef cattle and sheep.
- Range and forage utilization research.
- Studies on chemical composition and nutritional value of livestock feeds.
- Studies on preservation of winter feeds for livestock.
- Animal adaptation and reaction to subarctic environments.

Add one professional staff member to the department of animal husbandry. Another staff man is needed to assume responsibility for livestock and research operations at the College Farm in Fairbanks. He should be trained in animal physiology and furnish leadership in acquiring grant funds and conducting basic research in livestock adaptation to subarctic environments.

Add one professional staff member to the department of animal husbandry under a joint Cooperative Extension Service-Experiment Station appointment. An Extension Livestock Specialist under such an appointment can serve the Experiment Station by conducting field experiments in cooperation with livestock producers.

Develop branch experiment stations in specialized or isolated agricultural areas.

LAND USE AND MANAGEMENT RESEARCH

Animals, 35 head of yearling steers, each 500 pounds @ \$28 per cwt plus freight from Anchorage . . . . .	\$5,100
Feed, pasture base @ 6¢ per AUM, salt . . . . .	150
Labor, building fences, caring for cattle . . . . .	3,000
Supplies, posts, fencing wire for three 20-acre pastures . . . . .	1,000
Miscellaneous expenditures . . . . .	1,000
Total estimated annual expenditures . . . . .	\$ 10,250

FATTENING CATTLE

Animals, 30 head of long yearling steers carried over from above studies . . . . .	\$ None
Feed   Barley grain @\$85 ton, 27 tons . . . . .	2,295
Oat-pea silage @15 ton, 82.5 tons . . . . .	1,237
Mineral & salt @\$3 cwt, 225 pounds . . . . .	7
Labor . . . . .	1,500
Supplies . . . . .	1,000
Miscellaneous expenditures . . . . .	500
Total estimated annual expenditures . . . . .	\$ 6,539

POSSIBLE INCOME FROM CATTLE SALES .....

30 head of fat cattle @ ca \$324 . . . . .	\$9,730
5 head of other cattle @ \$150 . . . . .	750
Total possible annual sales income . . . . .	\$10,480

