FORAGE PLANTS, SOILS, AND GENERAL GRAZING CONDITIONS ON UMNAK, KODIAK AND OTHER AREAS IN SOUTHERN ALASKA

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Preliminary study was made of both range and pasture conditions in the several areas devoted largely to livestock production in contrast to the Matanuska and Tanana Valley sections where livestock comprised a part of diversified farming. Beef cattle and sheep growing in Southern Alaska and adjacent islands have increased substantially in the past 20 years. The following figures represent the best information obtainable on the location and number of cattle, sheep and horses in the several areas.

<table>
<thead>
<tr>
<th>Location</th>
<th>Number of Cattle</th>
<th>Sheep</th>
<th>Horses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shore area of Cook Inlet</td>
<td>200</td>
<td>0</td>
<td>25</td>
</tr>
<tr>
<td>Kenai Peninsula</td>
<td>250</td>
<td>0</td>
<td>30</td>
</tr>
<tr>
<td>Kodiak Eastern and Southern coast</td>
<td>1,000</td>
<td>0</td>
<td>60</td>
</tr>
<tr>
<td>Chirikof Island</td>
<td>300</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Umnak Island</td>
<td>50</td>
<td>7,400</td>
<td>20</td>
</tr>
<tr>
<td>Unalaska Island</td>
<td>40</td>
<td>6,000</td>
<td>50</td>
</tr>
<tr>
<td>Eastern Coast Southern Alaska</td>
<td>250</td>
<td>50</td>
<td>25</td>
</tr>
</tbody>
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Most of this livestock is carried on native graze and some wild hay for critical periods during the winter. A limited amount of feed concentrates and hay are shipped into some of the areas. Recently a few ranchers have grown a small acreage of cultivated crops for silage especially in

Through the generosity of the Rockefeller Foundation, the University of Alaska obtained the services of Dr. James G. Dickson of Wisconsin during the 1956 growing season. Dr. Dickson, a world renowned agronomic pathologist, has studied extensively in other countries including Scandinavia, Russia, Siberia, Mexico and Canada. This is a brief report of his observations on Kodiak, Umnak and other areas in Southern Alaska. - Allan H. Mick, Director, Alaska Agricultural Experiment Station and Extension Service, University of Alaska and the U. S. Department of Agriculture cooperating.
sections with dairy herds. In general, however, this livestock production has been dependent upon the natural graze of the areas. Native forage plants of these areas are sufficiently abundant to carry a much larger population of livestock by developing other islands and in areas with suitable climate and terrain.

The preliminary survey of the plant species of grazing value found in the several areas is reported. Some comments on management and other problems are included. The information given is restricted to a few sections. Although the flora is similar for those studied, additional islands must be studied before general application to other specific areas is attempted.

FORAGE CROP SURVEY OF UMNAK ISLAND

An intensive forage survey was conducted on the northern half of Umnak Island or that portion extending Northeast of Inanudak Bay. The vegetation zones from the seashore to the altitude of permanent snow were sampled for forage plants, poisonous plants, and other characteristics pertaining to grazing. The areas grazed by sheep and reindeer were compared with similar ungrazed areas. An attempt was made to study the relative value of grasses, legumes and other herbals for both summer and winter grazing and the recovery of such plants after grazing or cutting for hay. The soils and natural vegetation on sections in all vegetative zones of the Island had been disturbed earlier by the activities of the Armed Forces; therefore, comparisons of vegetation on these sections disturbed or broken approximately 10 to 15 years ago and the undisturbed sections were possible. These comparisons have a direct bearing on the plant species reseeding the areas where native sod was disturbed, the comparative soil erosion on the respective areas, and the possible use of certain soil zones for cultivated crops to supplement the native crops for animal feed. The several vegetative zones and the soil, elevation and climatic factors associated with their development are described. The relative values of these zones for summer and winter grazing are discussed. The grazing management of the zones and the possible use of supplementary crops are suggested. The report is preliminary in nature and subject to modification with further study of the area.

Vegetative Zones of Umnak Island and the More Important Forage Plants of Each

1. Seashore and Low Plateau - A rather continuous low bench land adjoining the shore line varies in width from a few feet of shore to several miles wide. Kelp is abundant, washed up on the shore sand; Ryegrass (Elymus), wild pea (Lathyrus), Purple top grass (Calamagrostis), Aleutian Brome grass (Bromus), and Lupine (Lupinus) are more abundant on the moist soils. The forage grasses and Lupine extend over the sandy areas and onto the
well drained, low ridges. The wild pea and Lupine with the above grasses occur on the valley floors extending back into the Island. The marshy areas, occurring frequently back of the sandy ridges, are covered with a dense growth of sedges and purple top grass. The better drained marshes could be developed into hay meadows and offer excellent winter grazing.

2. **Low Hills and Upland Plateaus** - The major spring and summer grazing area consists mainly of these typical grass prairie zones. The grasses mentioned in the first zone and the Fescue bunch grasses (Festuca) and the sod forming blue grasses (Poa) and red top (Agrostis) form a deep sod of fine grasses with high grazing capacity. The pumice rock ridges in this zone are covered with Geranium and some bunches of rye grass and bunch Poa with little sod development. These ridges are low in grazing capacity and cut badly when animals are driven over them.

3. **Alpine Zone of Ridges and Upland Meadows** - This zone is covered with snow during the spring and early summer, but supplies excellent young grass for grazing a few weeks after the snow melts during August and September. The sheep and reindeer were grazing this area during the period we visited the Island. The blue grasses (Poa), Fescues (Festuca), red top (Agrostis), alpine timothy (Phleum) and other fine mountain grasses form a good sod over this zone. The Lupine and Rye grass are not common in this zone.

**The Growth and Seeding Habits of Forage Grasses**

The grasses start spring growth as the soil warms up; earlier on the southern protected exposures than in the valleys and on the northern slopes exposed to the cold winds. All grasses found in zones 1 and 2 had ripe seed the last of August. New fall growth around the base of the plants and where the grasses had been cut for hay or grazed close was well started the last of August. This fall growth of the grasses is important in supplying fresh, tender grazing for the sheep during the late fall after the higher ranges are snowed in. Under this climate the spring grazing area can be regrazed again in the fall and winter or until snow cover is too deep for the sheep to reach the new grass. During the intervals of deep snow cover the livestock will have to depend upon the tall grass and seed heads of the grasses and sedges in the low meadows and near the shore line. Some of these areas especially where snow blows off should be held in reserve or not grazed heavily during the summer for this winter grazing. When not covered by snow, the growth habit of the grasses appears to be such that green, fine grass is abundant in supply for grazing during all seasons of the year.
Legumes for Grazing

The Lupine (Lupines) and wild pea (Lathyrus) are abundant and furnish an excellent supply of high nitrogen graze. The Lupine grows over a wider range of soils and plant zones than the pea. Both legumes shed seed as they ripen; therefore, the seed which contain the alkaloid are not a factor in grazing these plants. The sheep graze the leaves of these plants heavily and leave the blossoms and seed pods. Bloating on the leaves during wet weather and heavy feeding is common although not serious if the bloated animals remain quiet until the bloat subsides.

These legumes could be used with the associated grasses for the preparation of a high feed value silage. A pit silo for storing a reserve supply of feed both for supplemental feeding during heavy storm periods and before lambing would be a valuable asset to good management in all of the Alaska areas. Leveling off the areas selected for silage cutting with a heavy drag or railroad iron, and cutting such areas in alternate years would supply an economical reserve feed supply to use with some grain and feed concentrates during bucking, lambing, and periods of heavy snow fall for sheep and similar periods for cattle. Under the moist climate of most of these areas the silage is easier to store and it has higher feed value than hay.

Growing Cultivated Crops for Supplemental Feed

Some areas are adapted in slope and soil to the growing of cultivated crops to increase the carrying capacity of range sections. Locating holding corrals on areas suitable for breaking such season, and planting such areas to oats and field peas or vetch the following season, offers a means of increasing feed supply when necessary. The European, smooth stemmed, red clover is well established on Unalaska. Following oats and field peas with timothy and medium red clover such as the Alaskland variety from the Alaska Experiment Station offers another means of increasing feed supply.

Poisonous Plants of the Area

Only one genus of poisonous plants was found on the Island, namely Aconitum or Aconite. Two species, the fine-leafed and large coarse-leafed occur in zones 1 and 2. No larkspur (Delphinium) was found and this plant has not been reported from these islands although it was present on Kodiak. Water hemlock (Cicuta) also appears absent from this area. Livestock will not graze Aconite unless other feed is poor and of low quality. Sheep were not feeding on this plant even where it occurred in fair abundance mixed with the Lupine. In selecting meadows for silage cutting care should be used in getting locations relatively free from Aconite.
SURVEY OF KODIAK AND SOUTHCENTRAL COASTAL AREAS

Only limited sections of the Southern Coastal areas of Alaska were sampled in the present survey. In general, the grasses, legumes, and other forage plants of these sections appeared similar. These areas differed from the Western Islands, chiefly by the competition of forests for the better soils. The natural forest growth as in Alaska and the Western Pacific Coast in general, does not support an undergrowth of forage plants. Therefore, the natural grazing areas are the marshes generally too wet for tree growth, the more recent soils originating from glacial till or river-bed deposits, and the grass land above timber line. The coastal marshes and valley floors provide good pasture of sedges, seashore rye grass (Elymus), and blue top (Calamagrostis) with Lupine (Lupinus), and the bunch grasses Poa, Agrostis and some others on the sandy bars and better drained soils. The alpine meadows of these areas always above the timber line are characteristically productive for summer grazing, but less abundant and usually some distance from the ranch or winter grazing areas. The best meadows found in these areas were on land cleared from forest and seeded to grass-legume mixtures or such areas that had reseeded naturally to grasses and legumes.

The areas described above were used chiefly for beef or dairy cattle. More specifically, the sections studied were located on the Knik Branch of Cook Inlet, the Southeast side of Kodiak and the sections near Valdez, Cordova, and Juneau. Parts of some of the open range and fenced pastures on Kodiak and in the Juneau section were overgrazed and offered some opportunity to study the effect of overgrazing on grass and legume survival. Where overgrazing was heavy the low, annual blue grass (Poa annua) was the predominant grass with wild barley (Hordeum jubatum) abundant. Where grazing was less heavy, the rye grass Elymus and coarse bunch grasses (Poa and Agrostis) were growing with the annual blue grass supplying the main ground cover. On the wet ground the coarse sedges were present. Low willow, poplar, elder, and coarse weeds were present on the overgrazed areas. The native legumes and the better forage grasses were killed out by overgrazing and the carrying capacity of the range or pasture was reduced greatly. In the Juneau area overgrazing resulted in destruction of the natural sod and the surface soil was cut up badly by the animals. The same damage from hoof-cutting was evident on the seeded or cultivated meadows where overgrazing occurred.

Grasses and Legumes Adapted to the Area

The behavior of the cultivated forage grasses and legumes in these southern areas were compared. In the wet meadows the grasses best adapted to survival in both grazed and mowed meadows were meadow foxtail (Alopecurus pratensis), Reed canary grass (Phalaris arundinacea), meadow fescue (Festuca elatior), orchard grass (Dactylis glomerata),
and timothy (Phleum pratense), with the native seashore rye grass (Elymus mollis) persisting in sandy areas and the blue joints (Calamagrostis spp.) where grazing was not so heavy. Alsike clover was the only legume surviving on the wet soils although white clover was growing on the better drained areas. Smooth brome grass was not adapted to these wet soils or most of this general area of high rainfall. These same grasses were best adapted to the upland meadows. In short rotations, medium red clover produced good forage the first and second years on the upland soils, but did not persist. Good surface drainage of the fields was important in relation to growth and survival of plants on both the low and upland soils.

Poisonous Plants of the Area

Three genera of poisonous plants occurred in this area; Aconite (Aconitum), Larkspur (Delphinium), and Water Hemlock (Cicuta). As on Umnak, the livestock were not grazing these plants under the conditions studied. In some few instances on overgrazed range on Kodiak and near Juneau these poisonous plants were developing and seeding. With continued overgrazing some damage to livestock may occur with increased stands of these plants.

FORAGE CROP MANAGEMENT IMPORTANT

Management of the natural range and meadows of this area appeared very important and was being practiced on some ranches. Fences were used on the best developed ranches to control the grazing on areas of both natural range and cultivated meadows. Holding the cattle off of the lower winter range during the summer was practiced generally where sufficient land was available. Most fenced pastures used for summer grazing were overgrazed. On Kodiak, the better upland summer range was utilized inadequately due to insufficient fencing to hold the cattle on the upper areas. In some instances the cattle were pastured during the summer only on fenced bottom land and abundant upland graze was available almost adjacent to the pastures. Part of this apparent inadequate use of summer range was due to the danger from predators.

Supplemental feed was harvested from wild meadows and cultivated forage crops. The cutting of hay and silage from the natural hay meadows was practiced generally. The reserve feed was used during periods of heavy snow cover and during calving. The natural meadows were not productive when cut every year unless commercial fertilizer was used. Many of the natural meadows were not sufficiently productive to warrant the use of fertilizers. Under such conditions cutting every other year appeared to be better management. The use of oats and field peas and vetch on the better soils as a source of silage appeared more economical than natural hay, and the cultivated crop was being used on some ranches. Well
selected areas of good soil and the preparation of the field to insure
good surface drainage were important factors, but frequently not
practiced. The investment of additional capital in landgrading machinery
to prepare larger fields for economical silage crop production appeared
warranted, based on the prices being paid for feed shipped into these areas.

General Discussion

The control of predators especially in the Kodiak area appeared
to be essential to economical cattle production. Losses during the pre­
sent season from bears have been high. Such losses are likely to increase
unless the several agencies cooperate in solving the problem, not only on
Kodiak, but also throughout Alaska. Bear hunting on Kodiak has been a pro­
fitable venture, both from the standpoint of income to local guides, and
to the Territorial Fish and Wildlife Department. Hunting and fishing in
general, have been good tourist attractions, but these will always comprise
a very small fraction of the real, intrinsic tourist value of the Territory.
The potential tourist income of Alaska depends upon the development of
good roads and road connections with the states combined with adequate
accommodations and reasonable prices for food and shelter to bring the
traveling American public to Alaska's natural beauty. Such tourist trade
will net a million dollars to every thousand now being obtained from the
big game hunters. The first preparation for this tourist income, as in­
dicated earlier, is the completion of the present road system. At the pre­
sent rate of road development this phase of the program will be completed
long before the citizens of Alaska have developed the second basic require­
ment; namely, food production and processing facilities to be mainly self
sufficient in foods and thereby keep the tourist dollars in Alaska for
Alaskan development. The foresighted citizen and especially the Territorial
government personnel must realize not only the potential income
from this tourist trade, but also the economic principle that unless
Alaskan agriculture is developed to produce the major food for this tourist
population most of their tourist dollars will end up back in the States.

Agricultural development, therefore, is basic to Alaskan develop­
ment and stability. Agricultural development in Alaska at this stage
requires the support and cooperation of all agencies; Federal, Territorial,
and private. While the apparent lack of cooperation with the Kodiak cattle
growers on the part of Fish and Wildlife in poisoning the bear crowded
out of the major bear reserve by bear population pressure within this re­
serve appears unimportant and debatable, basically, such cooperation is
essential to the future of Alaska.

The same principle applies to the development of facilities for
slaughtering, processing, storage and distribution of Alaskan-grown
meat. The pioneers in livestock production in Alaska have demonstrated
Alaska can be economically self sufficient in both dairy and meat production. These producers still have some real problems in economical feed production; such as suitable legumes adapted to Alaska and enough feed grains, but these are being solved slowly. In the processing and marketing of dairy products the private companies and farmer's cooperatives have been generally successful. However, little progress has been made in the development of facilities for slaughtering and processing meat animals. Local slaughtering and peddling the meat in local markets has not been profitable or economical.

The development of a centrally located packing and processing plant or plants is an essential part of the meat production program for Alaska. The location of such a plant initially on Kodiak, for example, with adequate barge transportation for moving the livestock to the plant and refrigerated cargo space for distributing the meat are essential to further development of meat production. At present, the volume of livestock is too low to make the operation of such a packing plant economical. On the other hand, the present growers of livestock in Southern Alaska must have such marketing facilities to continue production. As in the dairy industry, private capital and territorial assistance must be combined to build and operate such processing plants. Another possibility is the adaptation of some of the numerous fish canneries into year round operation to include the meat processing. This at least would supply some of the large volume of canned meat used in Alaska and furnish a market for locally grown livestock.