ALASKA PERENNIAL FORAGE CROP PROFILE

Revised 2009

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PRODUCTION FACTS

Producing quality forage profitably in Alaska demands exceptional management skills, biological knowledge and practical experience. Growing conditions in the subarctic environment are challenging at best. The effects of the 100 – 118 day frost-free growing season and long photo period (18+ hours of daylight in June) is offset by the relatively low spring precipitation (0.9–1.7 inches for April and May), cool summer temperatures (July averages range from 51^0–61^0F for the different production regions), cool-damp autumns (average September temperatures of 44^0–47^0F with 1.3–3.3 inches of precipitation) and cold winter temperatures (average January temperatures of -2^0 to 14^0F). Average yields of perennial forages range from 0.9–1.3 tons/acre with the better-managed farms often exceeding 2 tons/acre/year. Alaska forage crop production has averaged over 26,625 tons/year for the previous 8 years, with an average total value of $6,208,125 from over 21,375 harvested acres (Benz and Bailey, 2008). In 2008, Alaskan hay sold for $225-720 per ton compared to $87 per ton in other states.

US RANKING[1] (2008): 48th of 49 in production value ($8,370,0000)
US RANKING[1] (2008): 47th of 49 in acres harvested (23,000 acres)
PRODUCTION AND STORAGE COSTS: $135-175/acre (estimated)[2]

PRODUCTION REGIONS

Perennial forages are produced in many areas of Alaska. The majority of the forage however, is produced in three regions: the Matanuska-Susitna Valley (2) of South Central Alaska (61N 149W), the Tanana Valley (1) of Interior Alaska (63N 145W), and the Kenai Peninsula (3) of Alaska (60N 151W). Both the South Central and Kenai Peninsula are near sea level in elevation and influenced by a maritime climate. The Interior region is 400–1300 feet in elevation with a continental climate regime.

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1 US Ranking: (Benz, 2009)

2 Production and Storage Costs: Personal communication from Delta Farm Service Agency, Phil Kaspari and Estimated from "Doane's Agricultural Reports – 2003 Machinery Custom Rate Guide."

The Crop Profile/PMSP database, including this document, is supported by USDA NIFA.

The maritime climate generates more precipitation, with a longer frost-free season, but cooler and moister growing conditions than occurs in the interior of Alaska. High winds that can scour insulating snow from the fields occur in parts of the Interior and South Central regions.

All-weather roads allow forage products to be marketed interchangeably among all three regions. The South Central and Kenai Peninsula regions contain some commercial dairies, beef, sheep and goat producers along with a large number of recreational livestock (horse, llama, alpaca, etc.) owners. The forage market in the Interior is comprised of more commercial dairies, beef production units, game ranches, and fewer recreational livestock owners.

Region	% Acreage[3]	% Production[3]	% Forage Value[3]
South Central	**44**	**40**	**41.0**
Interior	**45.5**	**51**	**49.1**
Kenai Peninsula	**8.9**	**8.3**	**9.2**
Southwest/Southeast	**0.8**	**0.6**	**0.67**

CROPPING PRACTICES

Soils and Fertility: The cultivated agricultural soils of these forage production regions are primarily loess (very fine sandy loam to silt loam) deposited over alluvial materials (sands and gravels). Both the Kenai Peninsula and South Central regions have higher proportions of volcanic ash additions to their soils than does the Interior region. This volcanic ash tends to render phosphorus less available to the crops. South Central and Kenai Peninsula soil pH's are often below 5.5, while those of the Interior often exceed 5.5 (Reiger, et al. 1979).

Many of the Interior agricultural soils were located in areas of discontinuous permafrost; thus little weathering and soil profile development occurred prior to conversion to agricultural use. Soils in South Central and the Kenai Peninsula are also considered new in geologic terms and as such are relatively infertile in the three major nutrients, (N-P-K).

Commercial forage producers utilize soil tests and University fertilizer guides to determine crop nutritional requirements and their annual supplemental fertilizer application rates (Panciera and Gavlak, 1992). Forage producers targeting yields of 2 tons/acre or more typically apply 120-40-20-10 (lb./acre of actual nitrogen, phosphate, potash and sulfur) in the Interior region (Quarberg, unpublished data). Growers in South Central use rates of 140-60-120 and on the Kenai utilize rates of 80-40-40-32 (lb./acre of actual nitrogen, phosphate, potash and sulfur) (Gavlak and Jahns, unpublished data). All fertilizer materials are applied in the spring with the exception of

[3] % Acreage, % Production, % Forage Value: (Benz and Bailey, 2008)

nitrogen, which is sometimes split if more than one cutting per year, is taken. If applications are split, half of the nitrogen is applied in the spring and the second half is applied after the first harvest (Panciera and Gavlak, 1992).

Seeding and Cultivars: 'Manchar' "Polar" and 'Carlton' are the most prevalent cultivars of smooth bromegrass (*Bromus inermis*) raised for forage production in Alaska with the emphasis on "Carlton" and "Polar" as "Marchar" seed is harder to obtain (Kaspari 2009). 'Engmo' is the most common timothy (*Phleum pratense*) cultivar grown. Timothy is considered a single cut or harvest crop, while two cuttings of brome are common. Timothy is more resistant to spoilage and retains a green color better when subjected to rain, during the curing process, than does brome. Other forage grasses utilized include: 'Nugget', 'Merion' and 'Park' Kentucky bluegrass (*Poa pratensis*); 'Arctared' and 'Boreal' creeping red fescue (*Festuca rubra*); common meadow foxtail (*Alopecurus pratensis*), 'Garrison' creeping foxtail (*Alopecurus arundinaceus*) and reed canarygrass (*Phalaris arundinacea*) (Klebesadel, 1983). Forage legumes have met with very limited success in Alaska (Panciera and Sparrow, 1994; Klebesadel, 1994), although their use and potential continues to be evaluated.

A limited amount of dual-purpose forage is also produced in the Interior and South Central Alaska. Cultivars 'Tundra' Glaucus bluegrass (*Poa glaucus*) and 'Nugget' Kentucky bluegrass (*Poa pratensis*) are both raised for their seed as well as their forage potential. More commonly a mix of Bluegrass, Fescue, Garrison Creeping Foxtail, Wainwright Slender Wheatgrass and American Slough grass is utilized for pasture forage (Kaspari 2009). These grasses produce commercial yields of seed for 2–3 years while also producing forage crops. This gives producers the option of raising seed, forage or both. Forage quality following seed production is usually lower than if harvested strictly for forage.

Many of the seedings of perennial forage crops are made under a cost-share program with the United States Department of Agriculture. Certified seed is mandated in some districts and recommended in others. Seeding is usually done in the spring, during May and June, with a planting termination date of mid-July to mid-August, depending upon the region. Seeding implements include grain drills, drop seeders, specific grass seeders and no-till drills. Much of the interior's perennial grass is seeded with a companion crop of oats. The oats provide a number of benefits. Oats help the grass seed flow through the implement-metering device, plus they aid germination of the grass by reducing wind velocities at the soil surface, thereby reducing evaporation and soil erosion. Oats grow rapidly and serve to reduce weed growth. The oat stubble remaining after the season traps snow, which insulates the new grass from the cold winter temperatures and provides soil moisture the following spring. The oats also provide a forage crop in the planting season and thereby generate a return to the producer. Longevity of intensively managed perennial forage crops is 7 years or more. Some bromegrass and timothy stands have remained productive for 20 or more years.

Irrigation: Interest in irrigation of forage crops is increasing, especially in the Interior region where nearly 10% of the crop receives some additional water during the growing season. The need for supplemental irrigation is less in the South Central and Kenai Peninsula regions. Sprinkler systems including traveling guns, center pivots, wheel and hand lines are all used. Tensiometers, experience and capacities of the systems determine irrigation scheduling.

IPM PRACTICES

Even though perennial forages in Alaska are not plagued with many pest problems, the majority of the producers employ some IPM practices. The seeding of a companion oat crop is one example. Bluegrass producers utilize hand roguing in their seed crops as a form of weed control.

Diseases: There are few diseases which are of concern to Alaska forage producers. Rust (*Puccinia spp*.) and powdery mildew (*Erysiphe spp*.) are a potential threat for bluegrass producers.

Insects: Occasionally an outbreak of grasshoppers occurs in the interior. The migratory (*Melanoplus sanguinipae*) and band-winged (*Camnula pellucida*) grasshoppers are the two most common. No insecticides have been applied on perennial forages to control grasshoppers in more than 7 years. Scouting and late fall or early spring tillage of grasshopper egg laying areas is occasionally used around the perimeter of the crops to destroy egg beds. Capsus bugs (*Capsus simulans*) can destroy many developing seedheads of bluegrass. This creates a condition known as "silvertop" in which the emerging seedheads die and turn silver in color. Black grass bugs *(Irbisia pacifica & Labops hesperius)* have increased in numbers over the past several years causing greater crop damage and concern. While there is currently no economic threshold established, growers are focusing on IPM tactics while waiting for research results. Insect damage appears to be on the rise especially in smooth bromegrass monocultures that are steadily increasing in Interior Alaska. This monoculture expansion may result in future insecticide usage, unless cropping diversification is adopted.

Weeds: Weed competition is most severe in the forage crop establishment year. Growers not seeding a companion crop will often clip the weeds or use an herbicide after the weeds have emerged but prior to emergence of the grass. Dry springs and droughty summer conditions allow dandelion (*Taraxacum officinale*) to invade the perennial forage crop. Field scouting, spot spraying and some field spraying for dandelions and hawksbeard (*Crepis spp*.) have been done. Infestations of foxtail barley (*Hordeum jubatum*) and perennial sowthistle (*Sonchus arvensis*) have occurred in the Interior. The incidence of hempnettle (*Galeopsis tetrahit*), Canada thistle (*Cirsium arvense*) and orange and yellow hawkweeds (*Hieracium aurantiacum & umbellatum*) is increasing on the Kenai Peninsula.

The following perennial weeds have been found in various growing regions across Alaska and have growers aware of potential crop loss from field introduction: buttercup (*Ranunculus spp*.), common tansy (*Tanacetum vulgare L*), cow parsnip (*Heracleum lanatum*), dock (*Rumex spp*.), fall dandelion (*Leontodon autumnalis*), fireweed (*Epilobium angustifolium*), horsetail (*Equisetum spp*.), tall larkspur (*Delphinium glaucum*), oxeye daisy (*Chrysanthemum leucanthemum L*.), plantain (*Plantago spp.)*, quackgrass (*Agropyton repens*), sheep sorrel (*Rumex acetosella*), toadflax (*Linaria vulgaris*), tufted hairgrass (*Deschampsia cespitosa*), yarrow (*Achillea millefolium*), wild iris (*Iris setosa*) and wild rose (*Rosa spp*.). These annual weeds have been found throughout Alaska and have caused some growers to adopt various control measures: annual bluegrass (*Poa annua L*.), chickweed (*Stellaria media*), common lambsquarter

(*Chenopodium album L.*), corn spurry (*Spergula arvensis L.*), cow cockle (*Silene vulgaris*), narrow leaf hawksbeard (*Crepis tectorum*), northern bedstraw (*Galium boreale L.*), mustard spp. (*Brassicaceae*), pineapple weed (*Matricaria matricarioides*), prostrate knotweed (*Polygonum arenastrum*), rattlebox (*Rhinanthus minor*), shepard's purse (*Capsella bursa-pastoris*), wild buckwheat (*Polygonum convolvulus L.*) and wild oats (*Avena fatua L.*).

Field scouting, hand clipping and/or spot spraying are used to control most of these weeds. The majority of the producers strive to control weeds by maintaining a healthy and vigorous stand of perennial forage.

Herbicide	**Use (Acres)**	**Users**	**Rate/Acre (product)**	**Rate/Acre (ai/ae)**	**REI** (hours)	**PHI (days)**	**Grazing Restrictions (days)**
2,4-D LV6[1]	30%	45% of growers	1.4-2.8 pts.	1-2 lbs.	12	7	none
Curtail (2,4-D + clopyralid)	<2%	5% of growers	2-4 qts.	1-2 lbs. (2,4-D); 0.19-0.38 lbs. (clopyralid)	48	30	14 dairy 7 meat
Cornerstone[2] ***(Glyphosate)***	15%	15% of growers	8 oz.-5qts	0.25-5.0 lbs.	4	56	14
MCPA ester	15%	15% of growers	1-3 pts.	0.49-1.3 lbs.	12	Pasture only	7
Banvel	1%	1%	1pt – 2qts.	0.50-2.0 lbs.	24	37-70	none meat; 7-40 dairy
Remedy [3]	1%	5%	1-2 qts.	1-2 lbs.	Till dried	14 days	3 meat; next season dairy

1. Do not to exceed 2 applications per year
2. Do not exceed 8 qts. per season
3. Maximum 2 lb. ae per season

Other Pests: Migratory waterfowl (primarily geese) feed heavily on the newly established grass in the autumn. Noise-makers and other forms of hazing have very limited effect. Legal hunting is much more successful. Another more formidable pest in the Interior region is a wild, free-ranging herd of bison numbering over 500 animals. They too, detrimentally graze the newly established fields of grass. In addition to grazing they also tend to wallow in the fields and destroy small areas of the grass. These areas are then open to weed infestation. Finally, bison dropping may contain viable weed seeds, which serve as a source of contamination. Hazing techniques for bison control are generally ineffective as they simply return after dark.

HARVEST

In a two cutting per year system, the first harvest of forage occurs between mid-June and early July. Second harvest is in mid-August through September. Cool, moist weather and shortening day lengths challenge the second harvest of field-cured forage. Some growers are experimenting with hay preservatives. Other techniques include plastic bale wrapping (haylage) which allows harvesting at higher forage moisture levels. On rare occasions hay has been baled under snow and successfully fed to animals while still frozen. In a single cutting per year system, harvest of forage occurs between early July and late August (weather and forage maturity dependent).

STORAGE

Recreational horse owners interpret “green” colored forage as a symbol of quality. To preserve this green color producers are storing more of their product under shelters. These shelters vary from tarps to fully enclosed buildings. Many dairy and beef producers are utilizing round bales, either wrapped in plastic and stored outside or stored unwrapped in structures. In the drier parts of the Interior, some unwrapped storage occurs outside. Statewide there remains excessive hay spoilage, the result of improper storage.

GRADING AND MARKETING

Until 2004 no hay-grading standard had been implemented in Alaska. With the combined efforts of Alaska's Soil & Water Conservation Districts, the Cooperative Extension Service and Alaska Committee for Noxious and Invasive Plant Management, a Weed Free Forage Certification Program has begun to address the growing concern for weed free forage, bedding and mulch on certain public lands. This program was initiated in 2004, and five districts have actively participated in inspector training workshops. This program has helped to produce quality "noxious and invasive weed free" straw and forage and continues to slowly gain recognition and participation. Most producers must market their products themselves and inspected fields will now be able to have the added benefit of "Alaska Grown Certified Weed Free" tags to assist in broadening the market.

CROP ACTIVITY CHART

Month	Activity
May	Fertilizing, ground preparation, planting, pre-emergence herbicides
June	Post emergence herbicide applications, spot spraying
July	First Cutting, bale wrapping
August	Second Cutting, bale wrapping
September	Bale wrapping, storage
October	Storage

SUMMARY

Perennial forage production is a very significant component of Alaskan agriculture. Quality forage has and will remain a challenge to produce economically within the unique climatic conditions of Alaska. With limited University research support, many producers conduct their own research, as well as evaluate and adopt new technology into their production system (mower-conditioners, tedders, windrow-inverters, irrigation systems, bale wrappers, high moisture production and improved marketing and quality control). The Alaskan agricultural industry strives to improve production and marketing efficiencies while also protecting the environmental quality of the land.

ACKNOWLEDGEMENTS

This crop profile is written as an overview of the Alaska forage crop industry. Much of the information presented was obtained from unpublished surveys, plus personal and electronic communications. We would like to thank the following current and past contributors for their assistance in developing this forage crop profile: Suzan Benz (USDA Agricultural Statistician – Palmer), Dr. Raymond G. Gavlak (Extension Agronomy Specialist – Palmer), Steve DuBois (Area Game Biologist – Delta Junction), Phil Kaspari (Producer and Ag Extension Agent – Delta Junction) and Christy Roden (Administrative Secretary – Delta Junction). In addition, appreciation is also extended to the following Delta Junction producers: Bob Green, Scott Miller, Mike and Scott Schultz and Bryce Wrigley for their production information. We also wish to thank Christy Roden, Donald Quarberg and Phil Kaspari for supplying the Delta Junction pictures; Pam Compton for supplying the Palmer pictures and Tom Jahns for supplying the Kenai Peninsula pictures used in this publication.

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