ALASKA LEGISLATURE COMMITTEE FILES 1987-1988 8672
4875 HRES ANWR: STATE AGENCY COMMENTS

447

Tuesday morning. Please keep my staff informed of your preliminary plans.

Transportation

The Fish and Wildlife Service will be providing the transportation from Deadhorse to Kaktovik to the calving grounds in a twin otter. You are responsible for travel to Deadhorse. Please contact my office for more information.

Lodging

The North Slope Borough has offered to accommodate legislators in its Deadhorse facility. Please bring personal items.

Follow-up

Please get in touch with Ned as soon as you can to indicate whether you plan to join the tour. Also please let him know your contact phone number for the first three weeks after session.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RD

MAY 8 1987

Representative Sam Cotten
Co-Chairman, House Resources Committee
Alaska State Legislature
P.O. Box V, Mail Stop 3100
Juneau, Alaska 99811

Dear Representative Cotten:

During Assistant Secretary Bill Horn's recent visit to Alaska, several members of the State and House Resources Committees expressed a keen interest in visiting the Arctic National Wildlife Refuge (ANWR) coastal plain area during the caribou calving season. Secretary Horn, in response, expressed willingness to both you and Senator Coghill to cooperate with the State in accommodating that desire.

We are pleased to invite you to participate in a one-day visit to the ANWR coastal plain, June 8, 1987.

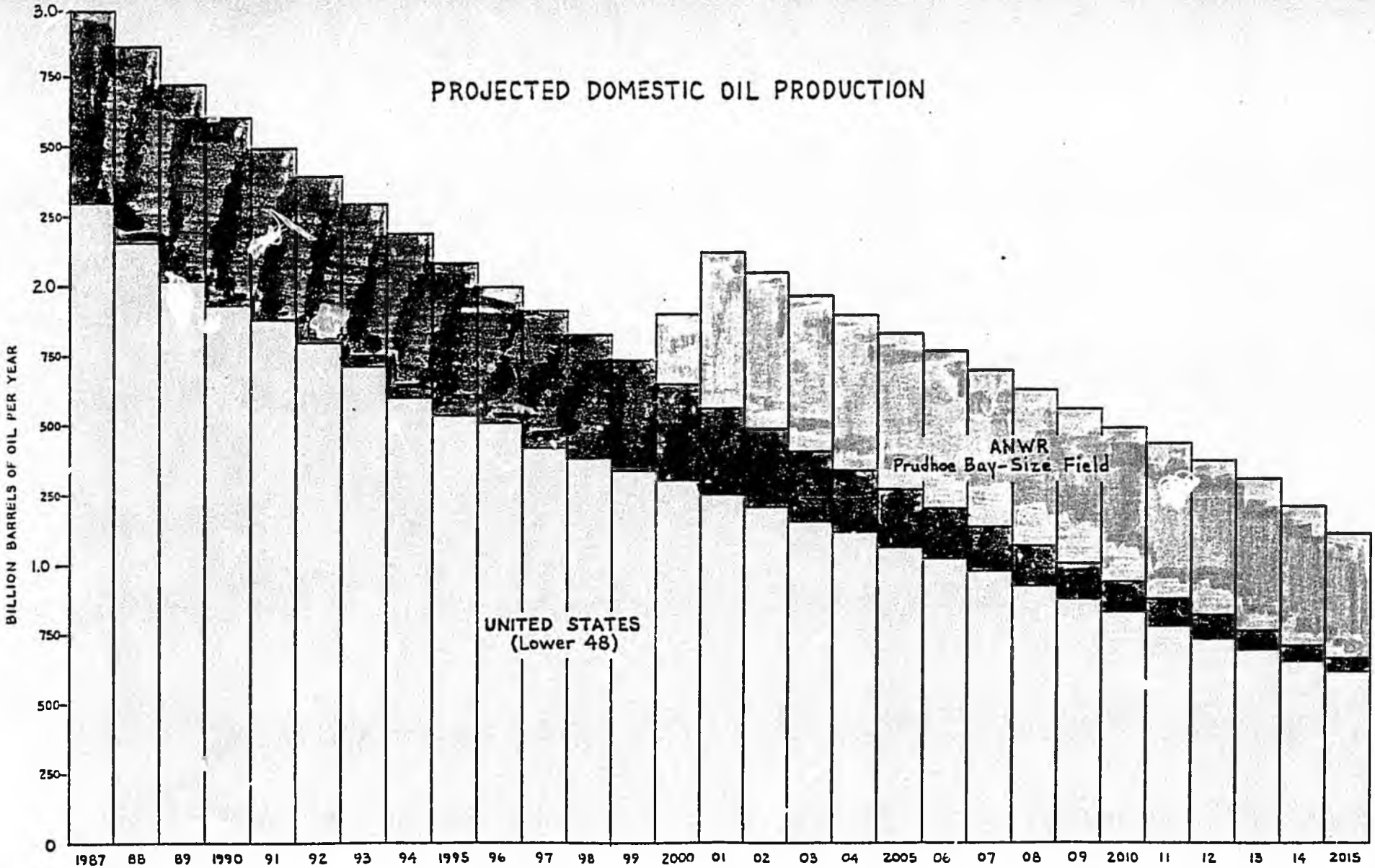
Our funds for this kind of effort are limited, as you can readily appreciate. Nonetheless, we are prepared to share the cost of this visit with you and the State of Alaska. It will be necessary, if you decide to participate, for you to provide your own transportation from your point of origin to Deadhorse and back to your point of origin or other subsequent destination. The same will be true in the event you decide, for any reason, to overnight in Deadhorse. We will provide air transportation from Deadhorse to Kaktovik and back to Deadhorse at the end of the day, as well as for the aerial tour of the coastal plain area. We will have the Refuge Manager, Mr. Glenn Elison, and one or two additional Fish and Wildlife Service personnel accompanying the party to answer questions, discuss issues as they arise, and assist you in gaining additional insight to the admittedly complex series of issues.

We hope this trip will afford you a better understanding, from an "on the ground" prospective, of the dynamics of the Porcupine caribou herd and the prospects of oil and gas development within the coastal plain. Logistics for this trip will require considerable advance planning. We therefore request your cooperation in giving us your decision as to whether you will participate at your earliest convenience. In any case, we request you confirm your attendance no later than May 20 with both your respective Committee Chairman and this office. We look forward to seeing you at Deadhorse Airport at approximately 9:00 a.m., Monday, June 8, 1987. If you have questions or need additional information, please contact Mr. Dave Olsen of my staff in Anchorage at 786-3542. He will be coordinating the trip.

Sincerely,

Walter O. Stieglitz

Walter O. Stieglitz
Regional Director




Alaska Department of Natural Resources

REPRESENTATIVE
BEN GRUSSENDORF

P O Box 928
SITKA, ALASKA 99835
(907) 747-8458

RULES COMMITTEE
LEGISLATIVE COUNCIL

DISTRICT 3
ELFIN COVE
PELICAN
PORT ALEXANDER
SITKA
TENAKEE

# Alaska State Legislature

WRITE IN JUNEAU
PO Box V
JUNEAU, ALASKA 99811

(907) 465-3824
(907) 465-3720

## House of Representatives

SPEAKER OF THE HOUSE

May 15, 1987

Walter Stieglitz
Regional Director
U.S. Department of the Interior
Fish and Wildlife Service
1011 E. Tudor Road
Anchorage, Alaska 99503

Dear Mr. Stieglitz:

I am pleased to accept your invitation, in my capacity as Speaker of the House of Representatives, to visit the ANWR coastal plain on June 8, 1987. I would like to have one of my special assistants, Mr. Doug Rickey, with me as he is involved with ANWR issue.

I understand that we are to provide transportation for the round-trip from our point of origin, Juneau, to Deadhorse and any expenses while we are in Deadhorse.

I look forward to the opportunity offered and will see you at the Deadhorse airport at 9:00 a.m., Monday, June 8.

Thank you for your time and effort involved in the coordination of our visit.

Respectively yours,

Rep. Ben Grussendorf
Speaker of the House

BG:fb

cc: Rep. Adelheid Herrmann, co-chair, House resources committee

Rep. Sam Cotten, co-chair, House resources committee

# United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RD

MAY 8 1987

Rep. Notify Cotten - I will participate

Representative John Sund
House Resources Committee
Alaska State Legislature
P.O. Box V, Mail Stop 3100
Juneau, Alaska 99811

Dear Representative Sund:

During Assistant Secretary Bill Horn's recent visit to Alaska, several members of the State and House Resources Committees expressed a keen interest in visiting the Arctic National Wildlife Refuge (ANWR) coastal plain area during the caribou calving season. Secretary Horn, in response, expressed willingness to both Committee Chairmen Coghill and Cotten to cooperate with the State in accommodating that desire.

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Sincerely,

Walter O. Stieglitz

Walter O. Stieglitz
Regional Director

# STATE OF ALASKA

LYMAN F. HOFFMAN
REPRESENTATIVE

HOUSE OF REPRESENTATIVES

DISTRICT 25

May 13, 1987

Walter O. Stieglitz
Regional Director
United States
Department of the Interior
Fish And Wildlife Service
1011 E. Tudor Road
Anchorage, AK 99503

RE: RD

Dear Mr. Stieglitz:

Thank you for invitiation to visit the Arctic National Wildlife Refuge (ANWR) coastal plain area during the caribou calving season.

At this time, I wish to confirm that I will attend this trip.

If additional information becomes available concerning this event, please contact my office here in Juneau until May 21st. After this date, please contact my staff aide, Bob Herron at 543-3543 or 543-4277, or after business hours, 543-4377.

Sincerely,

Lyman F. Hoffman
Alaska State Representative

cc: Representative Sam Cotten, Co-Chair
Representative Adelheid Herrmann, Co-Chair
House Resources Committee

LFH:BH

P.O. Box 763 Bethel, Alaska 99559 (907) 543-3543

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RD

MAY 0 1987

Representative Lyman Hoffman
House Resources Committee
Alaska State Legislature
P.O. Box V, Mail Stop 3100
Juneau, Alaska 99811

Dear Representative Hoffman:

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Sincerely,

Walter O. Stieglitz

Walter O. Stieglitz
Regional Director

Sprogen

After Ned.

REPRESENTATIVE
SAM COTTEN
DISTRICT 15

P.O. BOX 296, EAGLE RIVER, AK 99577
P.O. BOX V, JUNEAU, AK 99811

To
from Henry Springer
I will be overseas
5/30 - 6/20 so won't
be available. If anything
changes after that I would
be interested.
Home phone: 344-3821
@ Anchorage

RE

MAY 1, 1987

TO:
FROM:
SUBJECT:
DATE:

The Department of Interior will be inviting the House and Senate Resources Committees and the presiding members of each body to tour the caribou calving grounds in the Arctic National Wildlife Refuge. Please keep in touch with my staff in response to this memorandum.

Scheduling

The current itinerary is to leave Deadhorse (Prudhoe Bay) in the morning on Monday, June 8, for half- or full-day overflights of the area. This schedule is subject to change. My staff will need to know a contact phone number for you after session in case the schedule does change. The Interior Department projects that the calving will occur no earlier than June 8, but that the schedule could slip back a day or two, to the 9th or 10th of June. Likewise, if the weather prevents a tour on Monday, the Department will reschedule it for Tuesday.

This means that it will be best to schedule for arrival at Deadhorse on the evening of Sunday, June 7.

My staff is also trying to schedule some other oil-field and North Slope Borough tours for Tuesday and Wednesday after the calving grounds tour. If there is something that you are particularly interested in, please contact Ned Farquhar. I will let you know a more definite schedule for ancillary activities as soon as it shapes up.

Departure will depend on logistics and conditions on Monday and Tuesday; it should be safe to plan to leave Deadhorse on Tuesday evening or Wednesday morning as long as there are no disruptions. If you decide not to participate in the oil-field or Borough tours, you could depart Monday evening or

REPRESENTATIVE
SAM COTTEN
DISTRICT 15

P.O. BOX 296, EAGLE RIVER, AK 99577
P.O. BOX V, JUNEAU, AK 99811

# ALASKA STATE LEGISLATURE
## HOUSE OF REPRESENTATIVES

TO: Resources Committee members
Rep. Ben Grussendorf
Rep. Al Adams
FROM: Rep. Sam Cotten, co-Chair
SUBJECT: Caribou calving in ANWR
DATE: May 7, 1987

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Lodging

The North Slope Borough has offered to accommodate legislators in its Deadhorse facility. Please bring personal items.

Follow-up

Please get in touch with Ned as soon as you can to indicate whether you plan to join the tour. Also please let him know your contact phone number for the first three weeks after session.

# Alaska State Legislature
## House

Official Business

P.O. BOX V
State Capitol
Juneau, Alaska 99811


M E M O R A N D U M

TO: ANWR tour participants (list below)
FROM: Ned Farquhar Ned
SUBJECT: More details
DATE: May 16, 1987

Planning

If you haven't yet, please let me know within the next couple of days whether you intend to join the tour. There are several alternates lined up who wish to go but can't join until we get the primaries figured out.

Purchasing transportation

Please purchase your round-trip airfare from your home to Anchorage ~~and~~ Fairbanks at least two weeks ahead of time to take advantage of excursion fares; there are no excursion fares from Anchorage/Fairbanks to Deadhorse. You should plan to arrive in Deadhorse the evening of Sunday, June 7 or on the earliest plane the morning of Monday, June 8. If you expect to join the North Slope Borough oilfield tour (described briefly below), you will be leaving Deadhorse either late Tuesday night or early Wednesday morning. (These dates could change if the weather is bad, but we need to plan on them.)

You can get a TR from me for your travel. But I'll be leaving Juneau on Thursday, May 21, so get it while it's hot.

Please keep me informed about the travel expenses you bill to the Committee. I need to keep a current budget.

Lodging

The North Slope Borough will provide lodging for the entire group at Deadhorse and Kuparuk. Please pick a roommate and let me know so that I can tell the Borough. The accommodations are regular motel-type.

North Slope Borough activities

North Slope Borough activities

So far the Borough has indicated an interest in showing the group some of its facilities in Service Area 10. On Tuesday morning, if the tour of the calving grounds is complete, the Borough plans to take the group over to Kuparuk for a visit that could last overnight. I should have more details on this soon and will keep you informed.

Contacts

I need to know your contact phone numbers between the end of session and June 7. My schedule is like this: May 21 travelling; May 22 - June 2 at 804-491-1999; June 2 -June 6 at 202-234-6030; June 7 travelling. Please call me anytime. I will appreciate being posted of any changes in your plans.

I am attaching a copy of Rep. Cotten's original memo on the trip and of USFWS's invitation for your review and files in case you have not received this information.

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Rep. Springer
Rep. Hoffmann
Rep. Herrmann
Rep. Davidson
Rep. Sund
Rep. Navarre
Louann Cutler
Doug Rickey

Rep. Cotten
Rep. Shultz
Rep. Adams
Rep. Grussendorf
Rep. Davis
Rep. Boyer
Rep. Menard

REPRESENTATIVE
SAM COTTEN
DISTRICT 15

P.O. BOX 296, EAGLE RIVER, AK 99577
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# ALASKA STATE LEGISLATURE
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Rep. Al Adams
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# United States Department of the Interior

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1011 E. TUDOR RD.
ANCHORAGE, ALASKA 99503

IN REPLY REFER TO:
RD

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Alaska State Legislature
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# United States Department of the Interior

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# Alaska State Legislature
## House

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REPRESENTATIVE
SAM COTTEN
DISTRICT 15

P.O. BOX 296, EAGLE RIVER, AK 99577
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# ALASKA STATE LEGISLATURE
## HOUSE OF REPRESENTATIVES

TO: Resources Committee members
Rep. Ben Grussendorf
Rep. Al Adams
FROM: Rep. Sam Cotten, co-Chair
SUBJECT: Caribou calving in ANWR
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Standard Alaska
Production Company
900 East Benson Boulevard
P.O. Box 196612
Anchorage, Alaska 99519-6612
(907) 564-5111

STANDARD
ALASKA PRODUCTION

February 20, 1987
7006U

Mr. Ned Farquhar
Alaska State Legislature
P O Box V
Juneau, Alaska 99811

Dear Ned,

I was pleased to have the time to speak with you on the 19th about our analysis of the environmental issues related to ANWR, especially the caribou. SAPC has conducted a particularly thoughtful and thorough analysis of the USFWS draft EIS, and I believe that we have "dug deeply" enough to discover many significant points. As ANWR receives further consideration, please feel free to call upon me if I can help in any way.

Enclosed is a copy of Standard's comments on the USFWS draft EIS; this is the document that you and I spent sometime looking at last Thursday. I have also enclosed a copy of a paper by Dr. A.T. Bergerud et al. entitled "The buffalo of the North: Caribou (Rangifer tarandus) and human development".

This paper describes the experience with caribou and reindeer (=Eurasian caribou) and human development in both North America and Eruasia. There are two important conclusions of this paper: First, caribou/reindeer are coexisting very successfully with human developments in several parts of the world -- The Central Arctic Herd in the Prudhoe Bay area is not unique. Second, the factor that clearly can seriously affect caribou herds is mortality from high rates of predation and excessive hunting.

I have also enclosed a copy of an AOGA publication that outlines the basis for believing that ANWR may hold large reserves of oil. And finally, you may find interesting a publication that I wrote a couple of years ago on the bowhead whale -- a species that I have studied for more than a decade.

I look forward to seeing you again in the near future.

Yours very truly,

M. A. Fraker
Environmental Scientist

# AN ASSESSMENT OF PETROLEUM DEVELOPMENT ON THE STATUS OF THE PORCUPINE HERD

by

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The U.S. Federal government has proposed that the 1002 lands of the Arctic Coastal Plain and in the Arctic National Wildlife Refuge, Alaska, be opened for exploration and full leasing for petroleum supplies. Included within the 1002 proposed lease area are 242,000 acres of 311,000 acres (78%) of the core calving area of the Porcupine Herd (core defined as areas used in $\geq$ 5 of 14 years) and 934,000 acres of 2,117,000 acres (45%) of concentrated calving area of the herd (areas with $\geq$ 50 animals/ $mi^2$). Also included in the 1002 area is the habitat where nearly the entire herd, now estimated at 18,000 animals, masses in early July to seek relief from mosquitoes. The herd leaves the 1002 area in mid to late July and does not return until the following May. I have been asked as a caribou biologist, by AOGA, to evaluate the impact of full leasing and development on the viability of the herd and specifically to critique the environmental impact statement prepared by the Fish and Wildlife Service on the proposed full leasing and development.

## Background Theoretical Considerations

The environment of the caribou (Rangifer tarandus) can be segregated into: other animals, a place in which to live, food and weather (Fig. 1, Andrewartha and Birch 1954). The interactions of caribou with insects, open habitats, food and weather represent variable contingencies that result in facultative responses by caribou that can be modified relative to disturbance factors (Fig. 1). The interactions of caribou with other caribou and with wolves in open environments are consistent contingencies affecting reproductive fitness - these are obligatory responses that will respond to change very slowly, if at all, when habitats are modified.

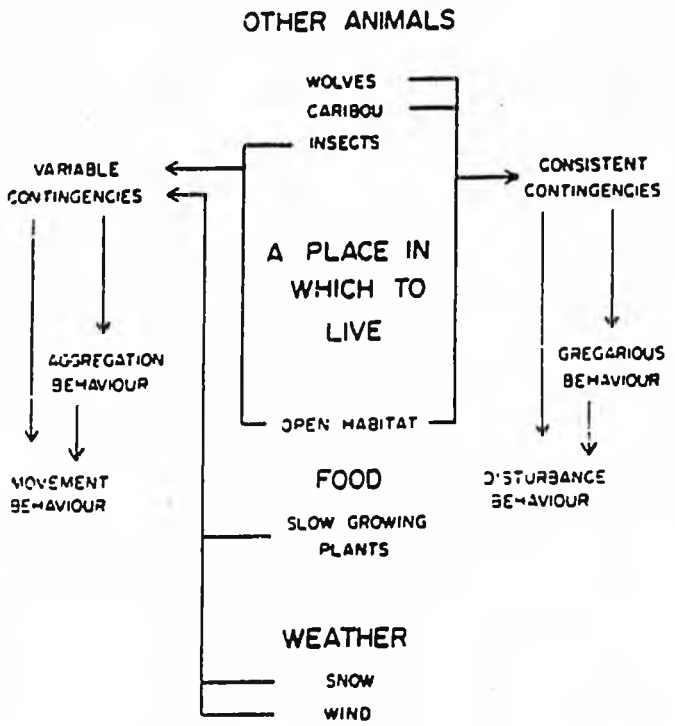


Figure 1. Diagram of the proposed manner in which the four components of the environment interact as variable and consistent contingencies in the development of movement, aggregation, gregarious and disturbance behaviour of caribou (Bergerud 1974b).

I feel that the major behavioral responses of caribou in the 1002 area are the insect x weather facultative responses and the predator x habitat obligatory responses. Unlike many biologists, I do not feel that food is a major factor in the calving and massing of caribou in June and July in the 1002 area.

Are Caribou Wilderness Animals?

Much of the concern for the well-being of caribou arises from the view that caribou are wilderness animals that cannot adapt to coinhabiting ranges with man. This concept has arisen, in part, because caribou are found on ranges far removed from major developments. Also, caribou herds have declined on the southern edge of their range as settlement proceeded (Cringan 1956). Thirdly, caribou are unwary and easily over-exploited. And lastly, caribou utilize slow-growing lichens that are many years in recovering following forest fires.

However, a closer examination of these facts suggests that they are not sufficient to define caribou as wilderness animals nor to imply that loss of wilderness per se will bring about the demise of herds. Obviously, mule deer (Odocoileus hemionus) and antelope (Antilocapra americana) were once far removed from European man in the 1700's, but they are not called wilderness animals today; they have adapted. The decline of caribou along their southern boundary was due to increased predation from man and natural predators, as well as from disease contracted from white-tailed deer (Odocoileus virginianus) (Bergerud 1974a) and not from outright habitat alteration. There is no evidence that herds abandonned their annual ranges because of an intrinsic aversion to man or man-made

structures. The nomadic life style of caribou and its propensity for shifting habitats makes it as adaptable to short term habitat alterations as it is to the slow succession of lichen following natural fires and regeneration cycles. The unwary nature of caribou means that they can coinhabit range with man if not overhunted. In fact, reindeer (Rangifer tarandus) are an important domestic animal in Eurasia. Several caribou researchers have noted that caribou are both highly adapted and adaptable (Skoog 1968, Bergerud 1974b, Roby 1978, Skogland, pers. comm.).

Resource-Limited by Food?

Another basic philosophy that influences how some caribou biologists view the impacts of development on caribou is the closely held belief that the carrying capacity of the habitat for caribou is determined by food resources, the slow growing lichens in winter, and green plants in the summer. It follows from this belief that if caribou are displaced by development and lose part of their range, then the potential carrying capacity is reduced. Another concern is that, if the animals are at a carrying capacity limited by food, then additional disturbance may stress the animals, thereby reducing reproductive rates and increasing mortality rates. A further refinement is that caribou select their calving grounds to maximize the quantity and quality of the diet - to optimally forage (Kuropat and Bryant 1980). Hence displacement from the calving areas should adversely affect the herd.

As an example of this type of thinking, Whitten and Cameron (Arctic (1984:293) said, speaking of developmental impacts, "For example, a series of mild winters might compensate for the negative effects of harassment or

habitat loss." Bergerud, Jakimchuk and Carruthers replied (Arctic 1984:295) "The supposition advanced by Whitten and Cameron...assumes:

(1) that winter conditions limit caribou numbers (this has never been substantiated in mainland North America);

(2) that harassment results in caribou mortality - never substantiated and the extreme case (Pot Hill data) given in our paper represents the best available contrary evidence pertaining to this assumption;

(3) that habitat loss (unspecified) has governed caribou numbers (greater evidence for the opposite case is available in the literature);

(4) that ranges are at carrying capacity - which is not the case for any of the herds we discussed;

(5) finally, that the supposition has some basis in fact. However this supposition has never been researched."

Such a seemingly innocuous statement, as made by Whitten and Cameron, reveals a basic philosopy of food limitation, and is the cornerstone of many dire predictions of caribou demise with development.

But in fact, the carrying capacity of this herd is <u>not</u> limited by winter food supplies. The dynamics of the Porcupine Herd were modelled in a workshop at the University of British Columbia in 1978. The herd then numbered 110,000. The simulation model indicated that the herd was not limited by winter food supplies. Food would not be limiting until the herd reached about one million animals. The simulation even indicated that if no animals crossed the Dempster Highway and the entire range east of the road in the Ogilvie Mts was lost, the herd could still prosper if food resources were the only consideration. The same simulation, however,

indicated that the herd would be limited by wolf predation at densities far below those imposed by food resources (Walters et al. 1979).

Both reproductive and natural mortality rates of caribou are little affected by winter food supplies. Fecundity is relatively fixed at 1 calf/female/year for females $\geq$ 3 years-of-age regardless of densities (Bergerud 1971, Skogland 1986). Skogland provided an equation for recruitment for females $\geq$ 1 year in Norway, where there are few predators, where $R = 0.65 - 0.012\ Dw - 0.00013\ Dw^2$ where Dw = caribou/km$^2$. Even at a density of 10 caribou/km$^2$ of winter range, recruitment would equal 52 yearlings/100 females. At a density of 10 animals/km$^2$ the Porcupine herd would number 1,800,000 animals; and even this density would not hold since this many caribou would have greatly expanded their range.

In North America, in herds coexisting with wolves, recruitment is commonly less than 25 yearlings/100 females and yet densities seldom exceed 2 caribou/km$^2$ (Bergerud 1980). This disparity in densities and recruitment between Norway and North America is due to predation in North America. Predation limits populations far below that provided by food supplies (Bergerud et al. 1983).

Carrying capacity has been defined as that point where recruitment = natural mortality (Caughley 1977). For caribou on mainland North America the carrying capacity is determined by the abundance of predators (Bergerud and Elliot 1986). Recruitment equalled natural mortality for 22 herds at 6.5 wolves/1000 km$^2$ (Bergerud and Elliot 1986) regardless of the density of caribou on the winter range.

Long Term vs. Short Term, Individual vs. Herd

Bergerud, Jakimchuk and Carruthers (1984) reviewed the demography of 8 herds relative to disturbance by human activities. They concluded that the major impacts were (1) the building of transportation corridors that permitted increased human harvests of caribou and (2) the improvement in calf survival when wolves were reduced. Caribou herds continued to cross roads, and herds such as those in Newfoundland, still prospered when habitats were altered by logging and flooding. The Central Arctic Herd in Alaska increased from about 5,000 to 13,000 (early 1970's to 1984) despite the Prudhoe Bay oil field.

The conclusions of Bergerud et al. (1984) were debated in letters to the editor by Whitten and Cameron (Arctic 1984:293), Klein and White (Arctic 1984:293-294) and Miller and Gunn (Arctic 1985:154-155). Rebuttals to all letters were provided by Bergerud and Jakimchuk (Arctic 1984:294-295, Arctic 1985:155-156). Klein and White agreed that the herds were increasing but thought that disturbance must be viewed on a long term basis. But this is a nonsequitur - if there are no effects of disturbance for a short term, how are they significant on a long term? The long term is the addition of short term intervals. Miller and Gunn agreed that the herds were increasing but stated that disturbance must be viewed on the basis of the individual, not the herd. Again, this is a nonsequitur - since individuals comprise herds, if the herds are prospering, then the individuals are also faring well.

Now, there are new arguments that the prosperity of the Central Arctic Herd in the face of development cannot be used to gauge the success of the Porcupine Herd when faced with similar development and the question

is, why not? The Central Arctic Herd spends its entire annual cycle quite close to the development zone - the Porcupine Herd spends only two months. All the animals now alive in the Central Arctic Herd have been born since development commenced; they have adapted. The basic reason that some biologists cannot accept that caribou can cope with development is their ingrained views that caribou are "wilderness animals" and that food supplies are limiting. The new research work planned for the Porcupine by the Alaska Fish and Game is proceeding on this basis. Now caribou will be radio-tracked by satellites and energy budgets calculated daily, perhaps hourly. It all flows from the unsupported belief that nutrients and energy will ultimately limit total numbers of caribou in this herd.

## Biology of Calving and Aggregating Behavior

Before we can evaluate the potential impacts of development on the Porcupine Herd we must determine why the animals use the Coastal Plain in the 1002 area for calving and grouping after calving. Basically, what are the environmental factors that determine where caribou locate their calving grounds?

The calving grounds of the migratory herds in the Holarctic are usually located on the northern distribution of the herd's range in tundra habitats (Appendix I:Fig. 1). The cows leave the bulls and commence migration towards these areas generally in April before green plants appear. Some herds migrate northeast, others northwest, and two herds south of Hudson Bay even migrate east. The consistent factor in all these migrations is that cows cross the tree-line at right angles

(Appendix I:Fig. 1) Wolves in North America generally den near tree line (Appendix II). By migrating at right angles to the tree line the cows can maximize their distance from wolves, with the least effort. Caribou cows migrate and calve on the bleak inhospitable arctic tundra to reduce contact with wolves (Appendix II) and there are very few wolves on the calving grounds of the Porcupine Herd.

An alternative hypothesis is that caribou seek their northern tundra calving grounds to optimally forage, primarily on Eriophorum angustifolium (Kuropat and Bryant 1980). I was able to disprove this hypothesis in 1984 by comparing the nitrogen in fecal droppings and plants at the time of calving between cows on calving grounds and bulls still south of calving grounds. The bulls were feeding in more nutritious plant communities than the cows (Appendix I:Table 1). If the calving grounds were really unique in the quality of forage then the bulls should have been with the cows. If the cows were primarily "interested" in the quality of their forage, they should have stayed back with the bulls. The fact that cows commonly calve on Eriophorum tussock associations may be due to the particular microtopography of these habitats which results in little accumulation of snow and early snow melt (Benson 1969). That is not to say that caribou do not optimally forage within the constraints of selecting the best overall habitat to avoid predators. However, over all, the diet of the cows in late May and early June is not highly nutritious (Appendix I:Table 1) and this has resulted because of their own migratory behaviour.

The location of the calving grounds varies between years because of annual variations in snow cover. The caribou arrived on the calving

grounds of the Porcupine Herd on 5 May 1974 and 12 May 1975 when snow cover was light; they arrived 20 May 1976 and 24 May 1973 with medium snow cover and even later on 26 May and 30 May when winter snows had been heavy (Curatolo and Roseneau 1977). The calving ground of the Porcupine Herd is on the areas of reduced snow cover generally sandwiched between the foothills and the slightly colder coastal strip (Fig. 2). In an early spring, as in 1974, the animals will be farther west and north than in late years such as 1972 and 1973. In an early year, more caribou will calve in the 1002 area than in a late year. In 1982, the season was so retarded that the herd calved in the Yukon (ANWR Progress Rept FY 83-6). We can think of the annual variations as caused by snow induced limitations to the basic spacing antipredator tactic. But within this tactic, to maximize the distance from tree line, the animals also need to find brown substrates so that calves can be cryptic, especially to avoid predation from golden eagles (Aquila chrysaetos). Thus snow cover affects the distribution within the coastal plain but not the overall regional distribution.

We know less about the extrinsic and socialization factors in the massing of caribou in late June and July than we know about calving. In some years, such as 1976 and 1981, no large aggregations formed. But in all years, the animals concentrate on the 1002 lands. This occurred even in 1982 when the herd calved in the Yukon (ANWR Progress Rept. FY 83-6). We also know that the Porcupine Herd is unique that in some years the entire herd comes together for a few days in July. This represents the most spectacular aggregation of ungulates in North America and compares favorably with the aggregating of the wildebeeste (Connochaetes taurinus)

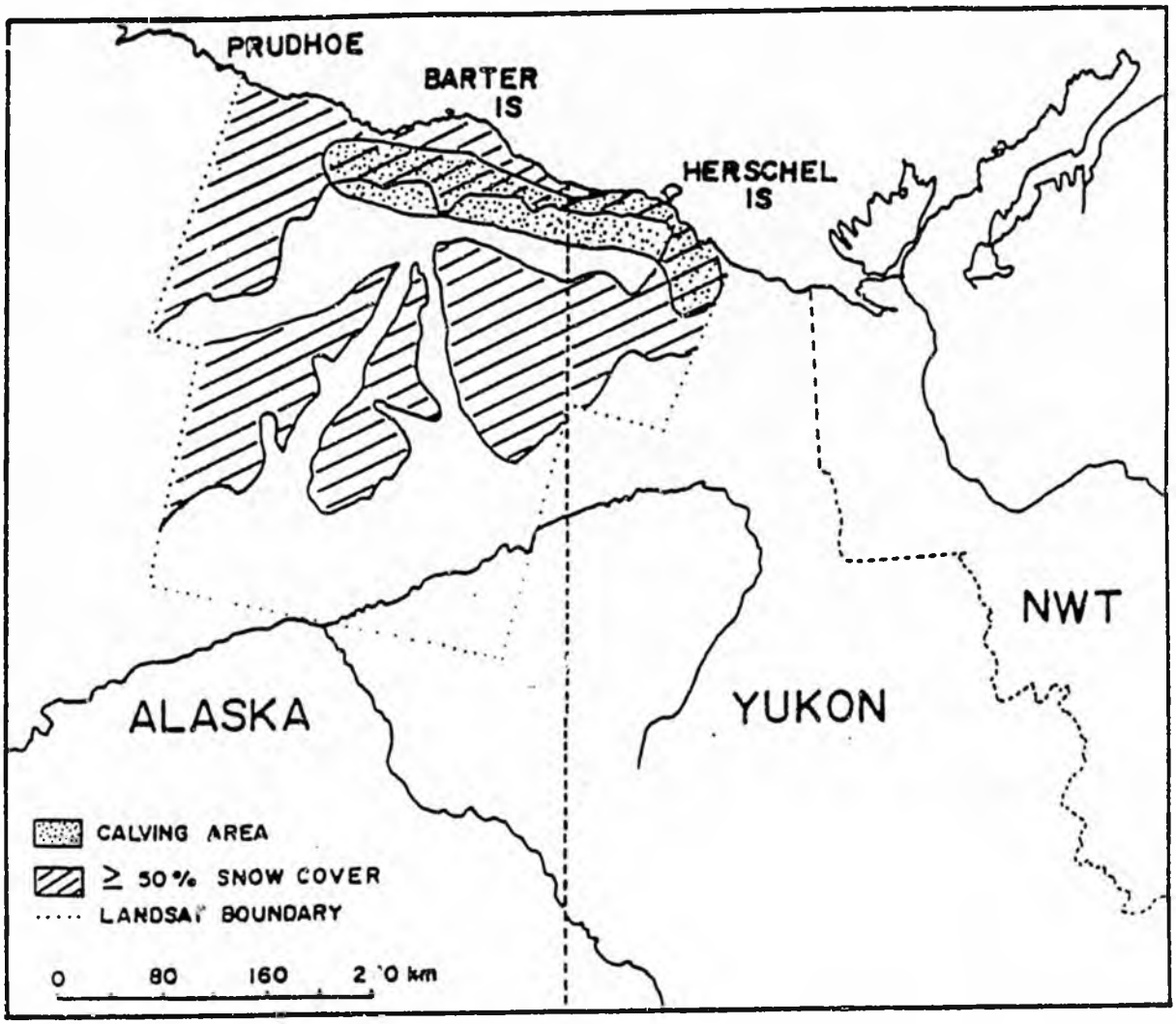


Figure 2. The snow profile of northeastern Alaska in late May 1978 (from Lent 1980).

on the Serengeti.

Initially, after calving, cows with their calves group together in the vicinity of where the calves were born (Lent 1966, Bergerud 1974b). This aggregating represents another antipredator tactic. A caribou calf will benefit if there is another animal between itself and a predator (the selfish herd concept) (Appendix II). Later, with the onset of the mosquitoes, the caribou in the Porcupine Herd move to the coast where cooler temperatures and fog provide some relief. The animals are usually concentrated in July south of Barter Island in the 1002 lands.

Why is this particular strip of coast selected? The animals may select the coast adjacent to Barter Island simply because the core calving area is near the Jago River, hence a direct route to the coast leads to Barter Island. In support of this view, in 1974, when the concentrated calving was along the Katakturuk River, the post calving grouping was at nearby Camden Bay. But to the contrary of this sequence, when the animals calved near Herschel Island in 1982, they still travelled up the coast after calving to the area adjacent to Barter Island (ANWR Progress Rept. FY 83-6). This fidelity to the coast opposite Barter Island could be due primarily to (1) tradition and socialization, or it might result because (2) the animals may, between the end of calving and the emergence of insects, follow the green phenology west, or, (3) the concentration at Barter Island may relate to some additional relief factor from mosquitoes. For example, a small herd of 2000 animals on the Hudson Bay Coast in Ontario aggregates in July on the tidal benches where there are large mud flats. In the absence of vegetation to hold insects, these caribou probably gain added relief from mosquitoes. This same situation

may hold for the tidal flats near Barter Island. Thus we don't know if the uniqueness of the gathering near Barter Island is because of its juxtaposition to calving locations or if the area, per se, has its own special attraction.

## Critique of the Arctic National Wildlife Refuge-Alaska Coastal Plain Resource Assessment

My comments are limited here to the full leasing option and are restricted to caribou. This is the worst case scenario and many of my comments will reflect my view that caribou can adapt to full leasing and developing if the proper mitigating actions are taken. I will only discuss my major criticisms, which does not mean that I necessarily agree with sections not discussed.

2 mile limit: On several pages it is suggested that maternal cows will avoid a strip 2-miles out from major roads and development. This implies a 4-mile displacement when both sides of the road are considered. The reference for this avoidance strip is Dau and Cameron (1986). Based on this 2-mile rule, the report calculates the acreage lost to caribou from development. Firstly, the concern should not be the lost acreage as it relates to carrying capacity. The cows have not selected the coastal plain for it forage resources but to avoid predators. If wolves travel the haul road, as they did the TAPS highway (Roby 1978) it will be advantageous for caribou to avoid the habitat adjacent to the road. Secondly, Dau and Cameron (1986) did not show caribou avoidance of a 2-mile strip on both sides of travel routes. Dau and Cameron documented

a 50% avoidance of adjacent habitats at 2 kilometers from the road and no avoidance at 3 kilometers (p. 100:Fig. 4). Thus there should be 50% avoidance at 1.2 miles and no avoidance at 1.9 miles. Actually, Murphy and Curatolo (in press) show that caribou, including cows and calves, resume normal foraging and daily activities when 600 meters from active roads in the Prudhoe oil field. Therefore, a maximum statement is that maternal cows avoid about a 1½ mile strip on each side of the road; thus the displacement statements in the report should be reduced substantially.

If development proceeds in area 3 as shown on page 7 of the assessment statement, there would be 47 miles of road in the core calving area. We could expect maternal cows to be displaced from an area of 141 $mi^2$ or about 90,000 acres. However, the area between the two parallel roads in the hypothetical development would also probably be lost. Parallel roads to reach different objectives should be avoided. However, parallel roads to reach the same objective might be a way to re-direct traffic to minimize disturbance, depending upon which route has the most caribou nearby.

P. 28, Para. 1. "The lower levels of earlier estimates may reflect a truly smaller population, less accurate or less complete survey techniques,...". Because the Porcupine herd gathers in one or a few major aggregations, the census results of the herd by aerial photography is highly accurate. The herd has definitely been increasing. This increase has resulted from greater calf survival (Fig. 3). The increased calf survival occurred because wolves were reduced by rabies in the late 1970's and early 1980's. Jakimchuk and associates saw considerably more wolves in 1971 and 1972 than have been seen in recent years.

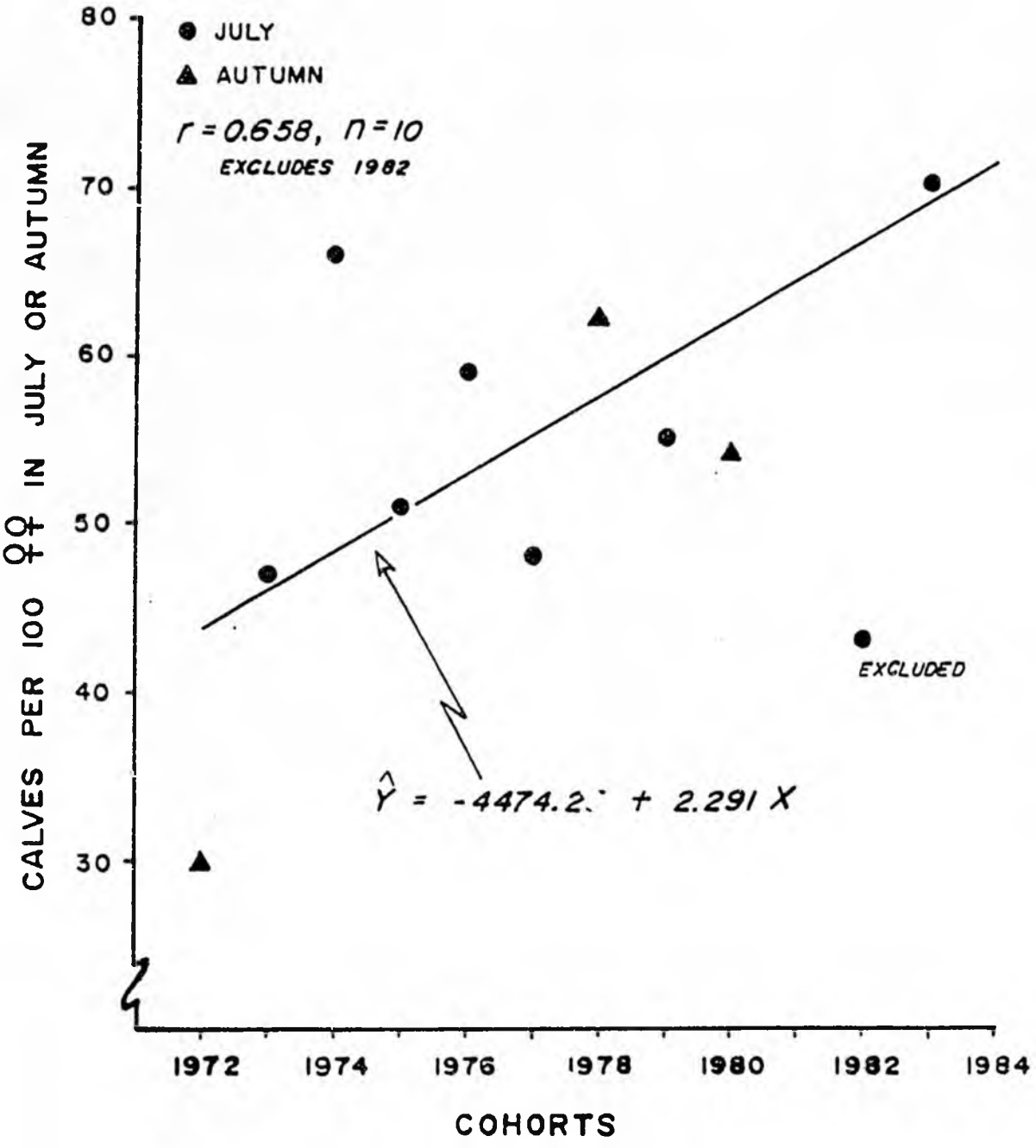


Figure 3. The regression of calf survival (calves/100 ♀♀) on year.

P. 29, Para. 4. "Access to insect-relief habitat and forage resources during this period may be critical to herd productivity." No one has documented that fecundity or calf survival have been affected by failure to reach mosquito relief habitat. There are no other large herds in North America that have access to a foggy coastal strip. Even if the animals could not use the coastal strip this would only put them on par with other herds. Note that there were an excellent 59 calves/100 cows in July 1976; in that year the animals did not mass on the shores of the coast. However, if caribou did seek the foothills for insect relief, reduced calf survival would be expected because of increased predation.

In this paragraph and throughout the report, the word "productivity" is used as a synonym for "recruitment". This is an unfortunate usage. To many ecologists, productivity brings to mind "to produce", the elements of reproduction, and for others it implies biomass as in the terms primary and secondary productivity. The use of the word "productivity" comes with the philosophy of a food carrying capacity. For many ungulates in the lower 48 states (where there are no wolves) the number of young born per 100 adult females does vary with nutritional conditions. In these southern ungulates, the final recruitment may indeed reflect the initial variations in pregnancy percentages. For caribou, we should use the terms "fecundity", "parous percentage", or "pregnancy rate" to describe the initial number of calves/100 cows at birth, prior to mortality. The emphasis thereafter should be on documenting the survival or mortality statistics; the final yearlings/100 females parameter at 12 months should be called "recruitment". "Productivity" is a catch-all and reveals a basic indoctrination that the resources of the land result

in cows being productive or not productive. Since fecundity is fixed in mature caribou the emphasis should always be on survival after the calves are born.

P. 29, Para. 10. "Riparian areas are used for travel corridors...". This does not sound feasible since wolves also use riparian areas for travel. Caribou in Spatsizi, B.C. avoid ambush cover in tall willows (Bergerud, Butler and Miller 1984). Also the streams are in flood in late May and early June and are not suitable for small calves. In Svalbard, T. Skogland (pers. comm.) indicated that bull caribou use the riparian communities and flood plains but cows avoid these dangerous areas. Curatolo (1985) also indicated that bulls used the riparian community but cows generally avoid them (see also Roby 1978).

P. 108, Para. 1. "Caribou select calving areas because of favorable... advanced new vegetation...proximity to insect relief habitat...". Caribou only select calving grounds to avoid predators (Appendix I,II). The report is too general in using the word "insect-relief". Generally, insect relief is meant to include both mosquitoes and oestrid flies, whereas the coastal habitats that the caribou seek are to escape only mosquitoes. Oestrids do not emerge until late in July, when the animals have left the 1002 lands.

P. 108, Para. 2. "Displacement of the PCH from a core calving area to a less desirable area would be expected to reduce productivity". Again, the word should not be productivity. If the development results in a

displacement of caribou farther south towards tree line it will result in increased predation (Fig. 4) and reduced survival. "Loss of important habitat has been shown to directly impact ungulate populations (Wolfe, 1978; Skovlin, 1982)". This is a general motherhood statement and these references are for ungulates living without wolves and are not appropriate for the Porcupine Herd. When caribou herds increase they expand their range and when they decline the range shrinks (Bergerud 1980). Calf survival drives numbers and hence range occupancy. "...Whitten and Cameron (1985) contend that the CAH has not experienced a reduction in productivity ... because (1) the CAH has been displaced from only a part of its calving grounds;...". The herd could be displaced from all of its calving area and still not decline if predator numbers were managed. The CAH herd increased 1972 to 1985 because of high calf survival since wolf numbers had declined with development. As their second point, Whitten and Cameron argued that the CAH did not decline with development because "...(2) suitable alternative high-quality habitat appears available...". The habitat at Prudhoe Bay is so poor that White et al. (1975) calculated some negative energy budgets and thought that the herd was energy-limited when it numbered a few thousand animals in the early 1970's. Again, the habitat was thought to be so poor from a forage standpoint that Skogland (1980) listed it as the area with the least plant biomass of 6 herds in the Holarctic. Yet today the CAH has grown to >15,000 animals. Point 2 of Whitten and Cameron (1985), referenced in the assessment statement, is an ad hoc hypothesis to explain away the herd's prosperity in the face of development. As their last point, Whitten and Cameron felt that the CAH

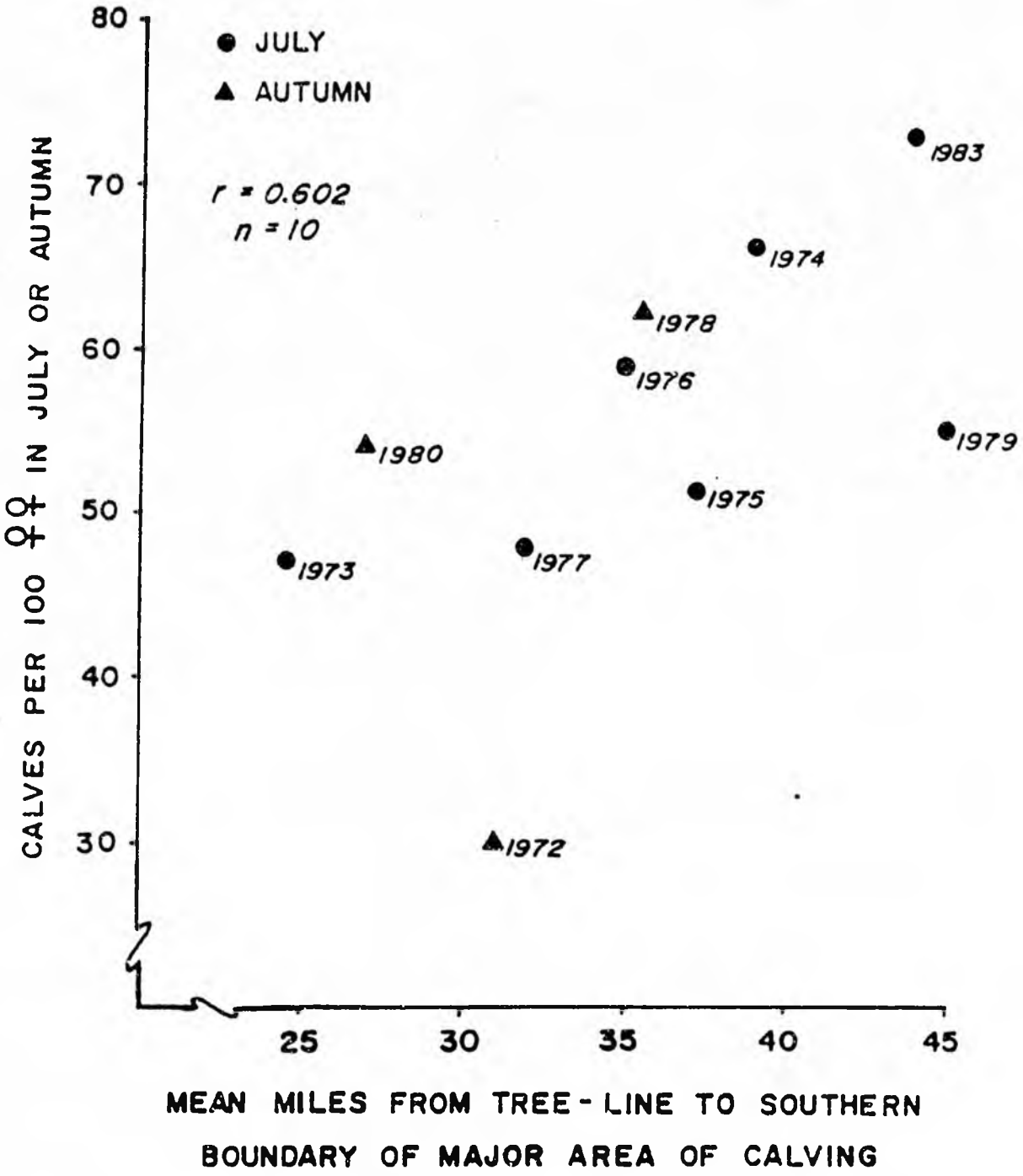


Figure 4. The regression of calf survival (calves/100 ♀♀) on distance of calving ground from tree line.

has not declined with development because the "...(3) overall density of CAH caribou on their calving grounds is much lower than that of arctic herds in Alaska". Again, this reflects Whitten and Cmeron's dogmatic opinion that forage determines numbers. The CAH calving ground is about 125 miles from tree line and the PCH, only 30-40 miles. Given the much larger "safe" space, the cows in the CAH are also able to disperse which is another antipredator tactic (Appendix II). The animals in the PCH herd, faced with less space, are more aggregated. Again this is expected, if the animals were dispersed, many would be nearer tree line and at greater predation risk. Since food supplies are not limiting for either herd, the greater densities for the PCH are not a problem. In fact the aggregating is a tactic to avoid predators; when animals face food problems such as in the high arctic or on Svalbard, the groups disperse and densities are low (T. Skogland and F. Miller, pers. comm.).

P. 108, Para. 3. "Both absolute..." This paragraph is irrelevant. One cannot use density figures (see above) to argue that the PCH will face greater consequences than the CAH from development. The CAH lives year round with development and has prospered; the PCH will only be near the development for 2-3 months. Densities are functions of aggregating behaviour and the lower densities for the CAH than the PCH mean greater forage as well as less space for the PCH, and in no way signify the density-dependent problems that Whitten and Cameron imply.

P. 108, Para. 4. "With the CAH calving density remaining low compared to other herds,... overcrowding and consequent habitat stress that might

result in reduced productivity have not yet occurred, ..." This statement is not correct; there is no habitat stress. The CAH cows have selected their calving range, with its low plant biomass, to avoid predators. Cows in other herds in North America are also prepared to sacrifice optimal foraging to avoid predators (Ferguson 1982, Bergerud et al. 1984).

P. 108, Para. 5. "The PCH is much more crowded..." They are not crowded - they aggregate to maintain maximum distance from tree line.

P. 109, Para. 2. This paragraph continues to discuss insect disturbance. But what is involved is primarily mosquitoes. Oestrid flies are not on the wing until the animals leave the 1002 lands. Helle in his publications was primarily concerned with oestrids and other flies and not mosquitoes. To quote their work in this context of causing mortality is stretching the argument.

P. 109, Para. 6. "Failure to obtain relief from insect harassment from either factor (barrier or displacement) could shorten foraging time, leading to poorer physical condition and subsequently to increased susceptibility to predation and reduced overwinter survival."
The 1976 and 1981 cohorts did not apparently use the coast line for insect relief and these cohorts did quite well. These animals are not on a fine edge in physical condition. No one has documented winter starvation in North America as a result of high insect years. When the insects abate in late August and September, the animals are able to recoop their losses

and fatten for winter. Remember that the Porcupine herd has a unique fog belt for insect relief that other herds do not have and even they (PCH) desert the mosquito relief habitat by mid-July. Murphy and Curatolo (in press) showed that caribou at Prudhoe Bay, away from the road, feed 53% of the day prior to mosquito emergence, 41% with mosquito harassment and 29% with oestrids on the wing. Oestrid flies harass caribou more than do mosquitoes and yet PCH animals contend with oestrid flies well inland in August.

P. 112, Para. 4. (and p. 132 as well) "These changes ... could result in a major population decline and change in distribution of 20-40 percent..." They have provided no data to show a 20-40% population decline. Neither was a concensus reached on the magnitude of any negative effects on the PCH population size or distribution by the 14 specialists at the Caribou Impact Analysis Workshop (ANWR) in November, 1985. I believe that the caribou will continue to use the 1002 lands with development, except near active roads. Even if there was some displacement, there is no need for the herd to decline if wolf populations are managed to provide positive recruitment or calf survival sufficient to balance natural and hunting mortality.

P. 112, Para. 5. "The population decline or distribution change would be 5 - 10 percent for the CAH throughout its range." There is no evidence to support such a decline. A change in distribution cannot cause a decline unless it changes the reproductive or mortality rates. Caribou, even in undisturbed populations, frequently exhibit range shifts,

including areas used for calving. Why can't the authors be objective? The empirical evidence is there for all to see; the CAH increased coincident with development because predator numbers were reduced. how can the field findings be twisted to fit preconceived ideas?

Impacts and Mitigation

The one guarenteed impact of the development of the 1002 lands will be that cows with young calves will avoid active roads for a distance of >1.2 miles. This is based both on theoretical considerations (Bergerud et al. 1984) and empirical observations (Dau and Cameron 1986). The loss of this habitat will not cause additional stress on the animals since they are not nutritionally limited. Nor will activity budgets be seriously altered by development activities (Murphy and Curatolo in press). It might be more serious if the animals remained near the road where predators may travel. We do not want these cows to habituate to traffic because this would suggest that they might become less wary to their natural predators.

An impact that might affect calf survival would be if the females in May failed to cross the east-west haul road because of the traffic and shifted their calving distribution closer to the foothills where there are greater numbers of wolves and bears. Such a barrier affect has not resulted from the TAPS corridor and haul road. The CAH animals have crossed the road and shifted their distributions between years, making use of habitats both east and west of the corridor. Presumably, these shifts relate to snow cover (Jakimchuk pers. comm.). The PCH herd, since it is both more migratory and larger than the CAH, should

cross a pipeline-road corridor more readily than the CAH. Also, the PCH caribou should cross rather than be funneled by the corridor because caribou should not be easily deflected when undertaking directional shifts to antipredator and mosquito-relief habitat.

Certainly, every effort must be made to allow the animals to continue to use all their potential space to avoid predators. Initially, until the impact of the corridor is understood, traffic will have to be prohibited in the period May 15-June 10 within several miles of cows moving west or north towards the road. Another effort to mitigate the effect of the corridor should be to reduce its visual impact as seen by animals entering the area (moving north and west). Once in the area, the animals will find their way out. If ramps are built they are more important on the south side of the road than on the north side. Murphy and Curatolo (in press) have shown that disturbance is greater when there is an active road combined with a pipeline. Theoretically, the vehicle appears as a predator - and the pipeline as the ambush cover. The pipeline and haul road should be separated by at least 1 km with the pipeline north of the road. Pipelines should be cryptic (painted green and brown), be motionless and scentless.

Another potential impact is that the road facilities will increase predator access to the herd. Wolves can be expected to move north down river valleys and then move laterally, using the road to cross rivers east and west. The cows, by calving between north-south river valleys, have in the past taken advantage of the rivers as potential barriers to east-west movements of predators, especially since the rivers are in flood in late May and early June. We do not want to increase the ease of

access to calving areas for predators by development (Bergerud 1985).

Even if the calving animals are displaced southwards by the corridor, the PCH can remain a viable herd if predator populations are managed. It is an incredible omission in this impact statement that predator management was not mentioned. The reduction of wolves is our major tool to improve calf survival. Wolves would not necessarily have to be reduced on the Coastal Plain. Control operations could take place on the winter range. The goal would be to have recruitment equal natural mortality + hunting mortality, which means, for the Porcupine herd, that about 12% of the herd should be yearlings in April-May (Bergerud and Elliot 1986). This oil development may provide advantages for predators. Once we disturb the status-quo, we must be prepared to manage the predators. This management is the fail-safe position.

I believe that the PCH will cross the haul road in seeking mosquito relief along the coast. The cow and calf that Curatolo (1986) radio-tracked in the CAH herd crossed the road 8 times in one mosquito season. Once a large herd starts across it will continue even if a vehicle approaches. Certainly large herds moving west and north will have to be monitored hourly as they approach the corridor and all traffic halted or rerouted. However, even if the animals did not cross and gain the coastal strip, I believe that the herd wuould be little affected in its vitality.

The one fact that we cannot escape is that the wilderness character of the coastal plain will be lost for decades. The post calving aggregation of the Porcupine Herd is the most spectacular large mammal display on the North American continent. We must do all that we can to

see that this massing does not become a memory as did the thundering buffalo herds of the plains. The animals should continue to mass in the undisturbed KIC lands, adjacent to the coast, in a wilderness setting.

Because I believe caribou can coexist in close proximity to an ethical man, I look forward to the day when I can go on a guided tour down the Haul road and view this massing of the mighty legions in July. The day will surely come when the old rigs will have been dismantled, the pipes disassembled, the scars left to heel, and the wind again sweeps unrestricted across the cotton grass plains. The caribou will still be there in uncounted numbers, coming as always down their ancestral tracks, and, we too will be there to see and marvel at the majestics of our fellow species.

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Mark A. Fraker

# Caribou, Wolves and Man

Abstract: The migratory tundra caribou/reindeer (Rangifer tarandus) in the Holarctic now number 3 million and are increasing, r = 0.11, and approaching estimated pristine numbers in North America. In contrast, the sedentary forest races living south of the tree-line number about 325 thousand animals in the world; their numbers are declining in some areas in both Eurasia and North America. The chief natural mortality factor determining the survival of neonates and adults is predation and the wolf (Canis lupus) is the major predator. Recruitment and natural adult mortality are approximately equal when wolf numbers are about 6.5/1000 $km^2$. Wolf numbers have been reduced (<6.5/1000 $km^2$) north of the tree-line in the Nearctic since the 1970's by hunting facilitated by snowmobile transportation. But south of the tree-line wolf numbers may be locally high (>8/1000 $km^2$) where moose (Alces alces) have expanded their range in this century. Caribou can adapt to economic development in the Arctic if their space for mobility to cope with their predators is kept inviolate. It should be possible through management of wolf numbers to further increase the abundance of caribou and wolves and provide supluses of both species for northern peoples yet maintain a viable large mammal ecosystem in the Arctic.

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A growing problem man faces in this century is the extinction of animal species with ever increasing economic development. We are losing species at an alarming rate (1). Some major mammal systems are threatened (2). Concerns for the future of caribou/reindeer (Rangifer tarandus) were voiced in the 1970's when the discovery of vast oil reserves in the Arctic accelerated commerical exploration and development. As recently as 1981 David Brower said "We face a choice. Caribou or ever more kilowatts?" (3). The view is widely held that caribou numbers in North America are vastly reduced and the species may even be threatened. Laycock in a recent book in 1983 stated: "In 1900 Canada might have held as many as 2 million barren-ground caribou. A fraction of that number wander the Canadian Arctic today and in Alaska too, caribou numbers have fallen for reasons not fully understood." (4).

However such pessimistic predictions have not materialized and we now know a great deal about the demography of the herds. At present there are in excess of 2 million barren-ground caribou in North America and $>730^3$ in the USSR (Fig. 1)(5). Biologists have counted more migratory barren-ground caribou (also called wild tundra reindeer in Eurasia) in the 1980's than at any time since systematic aerial surveys originated some 40 years ago (6) (Table 1). We are approaching pristine estimates. But in contrast to this population eruption of the tundra races, the more sedentary woodland caribou populations (called wild forest or mountain reindeer in Eurasia) living south of the tree-line, are only maintaining their numbers or else declining in many areas, in both North America and the USSR (Fig. 1). The contrast in the dynamics of these two different ecotypes provides insight into limiting factors and can help evaluate the potential impacts of the future.

Caribou populations in the past have seldom been stable in numbers (7). For a herd to increase, the recruitment of yearlings (R) must exceed the loss of adults from mortality; adult mortality includes both natural and hunting losses. The reproductive or birth rate of caribou is relatively constant between populations in North America; approximately 80% of the mature females annually give birth to single calves (8). But calf mortality in the first 12-months-of-life varies greatly; extreme values in the literature are 18 to 90% (9). Again, the annual natural deaths of adults can be as low as 5% or as high as 28% (10).

A generalization is that herds usually increase when recruitment of yearlings exceeds 12-15%, if the animals in the herd are not hunted (11). At the present time a majority of the herds that migrate to the arctic tundra in the spring to give birth to their young (the barren-ground/tundra herds) have yearling percentages in excess of 20%; whereas the caribou that calve south of the tree-line (the woodland/forest herds) have calf percentages of only 12-13% (Table 1).

In the past 10 years biologists have determined the causes of death of calves and adults by radio-tracking both neonates and adults. Close to 900 radios have been placed on adults in 41 herds in North America and 317 radios have been strapped on young calves. In a number of the studies the collars were equipped with sensors which modulated the radio signal when the animal was motionless which permitted the researchers to find the animals quickly after death and more accurately determine the mortality factors.

The survival of calves (recruitment) and the loss of adults in 17 herds in North America is negatively correlated (12) (Fig. 2) suggesting a

did the pattern
differ in the herds?

common mortality factor. The primary cause of death of both calves and adults in the recent radio monitoring studies was predation. Wolves (Canis lupus) and bears (Ursus arctos, U. americanus) killed 77 of 105 (73%) of the adults with radios that died in 12 herds (13). Wolves, bears and golden eagles(Aquila chrysaetos) were the most important predators of radio equipped calves, 89 of 111 natural deaths were caused by predation (14). These results are in agreement with earlier findings that showed 64% of 489 calves found dead on the calving grounds had died from predation (15). Other mortality factors beside predation such as starvation or disease have not been important for mainland populations free to disperse (16). However starvation is a common cause of death for insular populations where maritime weather has resulted in icing of vegetation (17).

The major limiting factor in the growth of mainland populations is predation (18). The rate-of-increase of caribou introduced to predator-free environments has averaged $r = 0.27 \pm 0.18$, $n = 6$, $CV = 16.6$. This is an extremely high rate and close to the theoretical maximum rate for the species, $r_m = 0.30$. In contrast, the mean rate-of-increase for 10 herds coexisitng with their natural predators and lightly hunted was only $r = -0.009$, some herds were increasing, others declining. Biologists have reduced wolves in the range of 5 herds in Alaska and Canada; prior to the reduction, the mean percentage of recruits was $5.2 \pm 1.16$ and after reduction the mean percentage increased to $23.4 \pm 2.38$ (19). Recruitment in 24 herds in the Nearctic was negatively correlated with the abundance of wolves and adult natural mortality was positively correlated with wolf numbers in 18 herds (20) (Fig. 3). Recruitment equaled mortality when wolf densities were 6.5 wolves/1000 $km^2$ (Fig. 3). Since both recruitment and mortality covary with the abundance of wolves and the slopes of both

regressions are steep (Fig. 3), fluctuations in caribou numbers should be expected with small changes in the abundance of wolves. At the present time wolf numbers are generally less than 6.5 wolves/1000 $km^2$ in the ranges of the tundra herds whereas woodland groups contend with numbers >6.5 wolves/1000 $km^2$ (Fig. 3). This difference in the abundance of wolves is currently a major factor in the divergent dynamics of the two ecotypes.

The low numbers of wolves in the arctic has been primarily caused by hunting by man. In the Soviet Union wolves are controlled by the government in the vicinity of the 4 largest migratory herds that are either increasing or providing large surpluses for harvest (Fig. 1). The density of wolves in the range of the largest herd in the USSR, the Taimyr Herd ($530^3$ animals), was only 2.6 wolves/1000 $km^2$ in 1976 (21). These 4 herds coexist with domestic reindeer, and wolves are controlled to reduce losses to domestic stock. In North America, where there are few domestic reindeer, wolves are sought for their fur. The pelt value steadily increased in the 1970's and averaged >$200 in the Northwest Territories in 1978-79 (22). Harvests accelerated in the 1970's when snowmobiles replaced the traditional dog teams and hunters could follow the wolves. As an example the Inuit at Coppermine, NWT harvested 914 wolves in the winter of 1978-79 and 234 in 1979-80. This harvest represented $\simeq$ 50% of the wolves associated with the migratory Bathurst Herd(23). Before the harvest the percentage of calves in this herd had averaged 10% and after the wolf reduction the recruitment rose to 20% and the herd has now shown a substantial increase in numbers (Table 1). Wolves have also been reduced on the range of the Western Arctic and Kaminuriak Herds (24). In Ungava, wolves have been scarce for at least the past 80 years and harvests may be preventing their increase (25). Wolves in the Arctic may also have disease

problems. Rabies has been found in several wolf packs on the range of the Porcupine Herd which is another herd that increased after 1977. The mortality factors for wolves may vary but at this time wolves are at low densities north of tree-line in the Holarctic; 16 of the largest herds in the world totalled 1402[3] in the late 1970's but by the mid-1980's, had increased to 2468[3] animals ($r$ = 0.113, $\lambda$ = 1.120, Table 1).

Wolf numbers are much higher south of tree-line in the boreal forest (Fig. 3). Hunting from snowmobiles is less effective in tree-cover. Also, the wolf is a religious symbol to some Indian groups living in the boreal forest. In the Soviet Union, wolf control in forested habitats is less than on the tundra because there are fewer domestic reindeer south of the tree-line. Wolf numbers are now probably higher in some sections of British Columbia, Alberta, and Ontario than in the 1800's. Since 1875 moose (Alces alces) have extended their range north 200-700 km (26). This increase in the prey biomass resulted in more wolves than the simpler caribou-wolf system. Wolves coexisting with moose commonly reach densities >8/1000 km$^2$, too high to maintain stable populations of caribou outside refuge habitats (Fig. 3) (27). Since caribou are easier to kill than moose, wolves can switch to caribou when caribou are common. When the caribou decline the moose prey base remains to support the predators, buffering predator-prey fluctuations (28). Another problem is that humans, by constructing roads and seismic lines in the boreal forest have provided access and travel routes for both wolves and illegal hunters. Logging has further compounded problems for southern caribou by reducing the size of their range which in turn facilitates the searching of the predators.

The proverbial question asks - if predation limits the numbers of caribou, why haven't caribou gone extinct, how have caribou and wolves

coexisted for so many thousands of years. The answer is space. The density-dependent respite for the caribou was the vastness of the north. The "miles beyond measure" (29). This space allowed caribou to mitigate predation by natural predators and pristine man. At calving time woodland caribou space-out in habitats mostly removed from wolves and alternate prey and they also seek island refuges (30). If caribou numbers are decreasing the space between these solitary calving females that show philopatry to their calving sites increases (31). When numbers are low the remaining females are sufficiently dispersed that it becomes unprofitable for predators to continue to search for young calves. The antipredator strategy of tundra caribou is to space-away; they migrate to calving grounds at the northern edge of the herd's distribution, whereas wolves mostly stay farther south denning near tree-line and relying on alternate prey (32). Before European man, the Indians also had their home sites south of tree-line far from the calving grounds. The Inuit, whose settlements were north of the calving grounds, turned to the sea in the summer for a living. Hence the caribou is pristine times had space to separate themselves from their major predators.

Prior to European settlement, when tundra races declined due to predation, the herds should have reduced the size of their annual ranges. This sequence has been documented in the declines in the 1950's-60's (33); when herds were low in numbers they stayed farther north in both summer and winter. These density-dependent range contractions increased their inaccessibility to their major predators. When these caribou herds increased they expanded their range and came farther south, especially in winter. Movement resumed along traditional and predictable migration arteries. In the past with such range extension, Indians and denning wolves would have fared

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35. C. Elton, Voles, Mice and Lemmings, Clarendon Press, Oxford (1942); A. E. Spiess, Reindeer and Caribou Hunters. Academic Press, N.Y. (1979). Inland Eskimos died from starvation as late as 1957 in Canada when caribou numbers were low in the NWT, F. Symington, Tuktu, a Question of Survival, Queen's Printer, Ottawa (1965). I found the Naskapi Indians in Ungava still living in tents and following the caribou by dog teams in the late 1950's. An entire way-of-life was transformed when snowmobiles came into general use in the early 1970's; then hunters could in a few hours travel great distances in search of

caribou while their families remained at settlements. Caribou could also be located by aircraft and radio messages relayed their locations.

36. R. O. Skoog, ibid. (1968), J. P. Kelsall, ibid. (1968).

37. A. W. F. Banfield, Can. Wildl. Serv. Wildl. Manage. Bull. Ser. 1, Nos. 10A, 10B (1954); J. P. Kelsall, ibid. (1968); J. L. Davis, ibid. (1978).

38. A. T. Bergerud et al. Arctic 37,7 (1984).

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40. Wolves can maintain their numbers with annual harvests of 25%, L. B. Keith, ibid. (1983).

Table 1. Status and recruitment of some reindeer/caribou herds since the late 1960's.

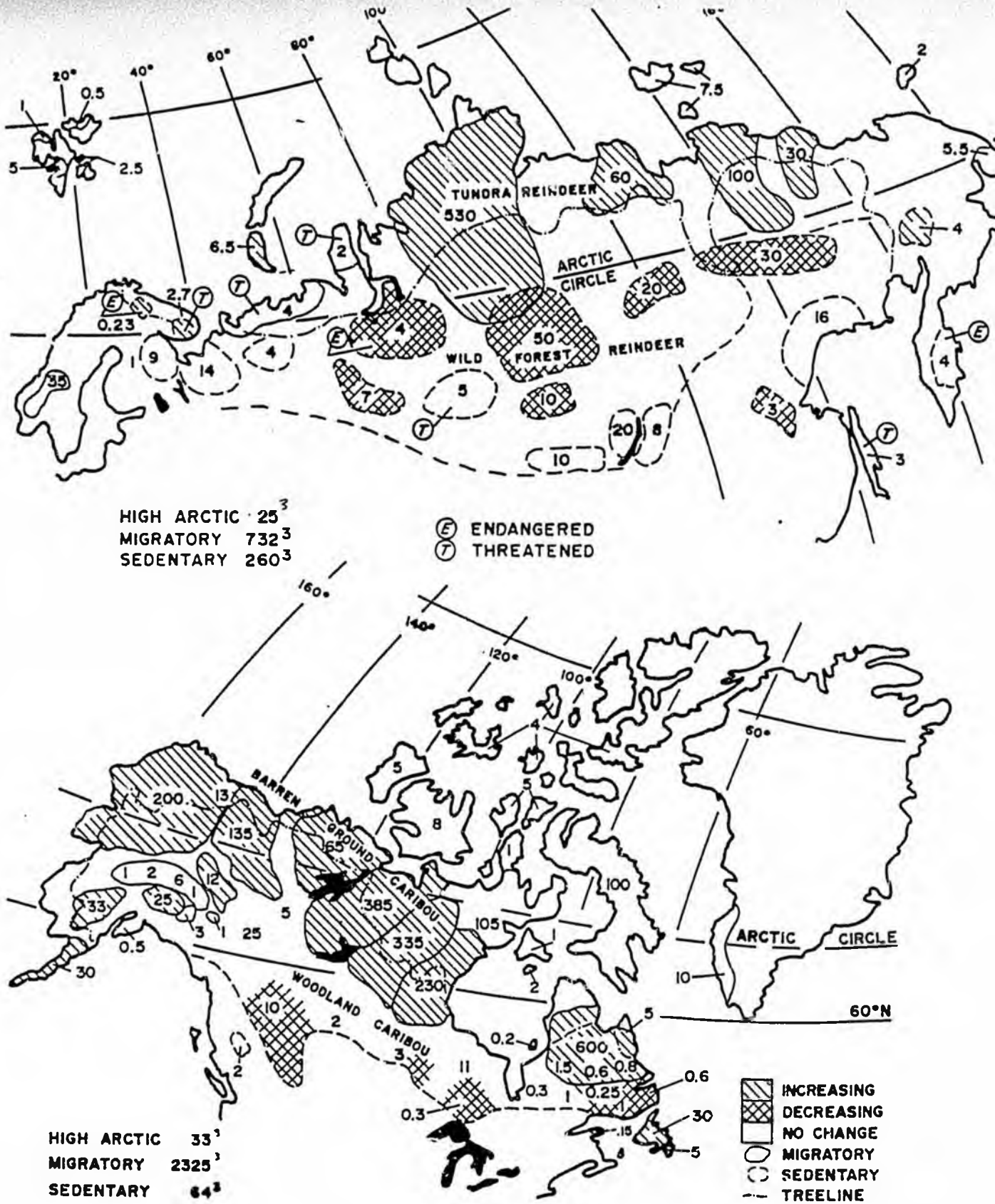
| Ecotype, Area & Herd Name | N. Latitude /Longitude | Thousands of Caribou 1963-70 | 1977-78 | 1983-85 | Recent Recruitment % calves ± S.E. (years) |
|---|---|---|---|---|---|
| Migratory, USSR[a] | | | | | |
| Taimyr | 73°/ 95°E | 333 | 460 | 530 | 26[b] |
| Lower Lena R. | 73°/125°E | 95 | 50 | 60 | ? |
| Yana-Indigir | 72°/145°E | | 109 | 100 | ? |
| Sundrun | 70°/156°E | | 21 | 30 | ? |
| Migratory, Canada | | | | | |
| George R. | 58°/ 65°W | >63 | 178 | 600 | 24 ± 1.0 (8) |
| Bathurst | 65°/110°W | 145 | 150[c] | 385[c] | 20 ± 0.9 (5) |
| Beverly | 63°/105°W | 159 | 124[c] | 335[c] | 19 ± 2.0 (6) |
| Bluenose | 67°/120°W | 19 | 40 | 65 | 21 ± 3.1 (2) |
| Kaminuriak | 60°/ 98°W | 63 | 44[c,d] | 230[c,d] | 25 ± 1.7 (5) |
| Migratory, Alaska | | | | | |
| Nelchina | 62°/147°W | 25 | 14 | 25 | 22 ± 1.9 (6) |
| Porcupine | 68°/144°W | 100 | 100 | 150 | 24 ± 3.4 (3) |
| Western Arctic | 69°/156°W | 242 | 75 | 200 | 23 ± 1.3 (7) |
| Mulchatna | 62°/156°W | 8 | 10 | 37 | 28 ± 0.8 (2) |
| Alaska Penn. | 57°/159°W | 14 | 18 | 30 | 25 ± 1.4 (3) |
| Fortymile | 65°/144°W | 10 | 4 | 13 | 18 ± 1.2 (6) |
| Central Arctic | 70°/149°W | 3 | >5 | 13 | 21 ± 1.7 (5) |
| Sedentary, Canada | | | | | |
| Spatsizi-Lawyers | 58°/128°W | more[e] | 2.4 | 1.1 | 12 ± 1.4 (8) |
| Level-Kawdy | 59°/131°W | more | 1.4 | 0.8 | 12 ± 2.7 (7) |
| Horseranch | 59°/129°W | more | <0.3 | <0.3 | 11 ± 2.1 (7) |
| W. C. Alberta | 54°/119°W | more | more | <0.3 | 15 ± 1.3 (3) |
| Finlayson | 64°/129°W | ? | ? | 2.1 | 12 ± 2.5 (2) |
| Burwash | 61°/139°W | ? | same | 0.3 | 12 ± 1.5 (3) |
| Red Wine | 54°/ 62°W | ? | more | 0.8 | 17 ± 2.0 (4) |

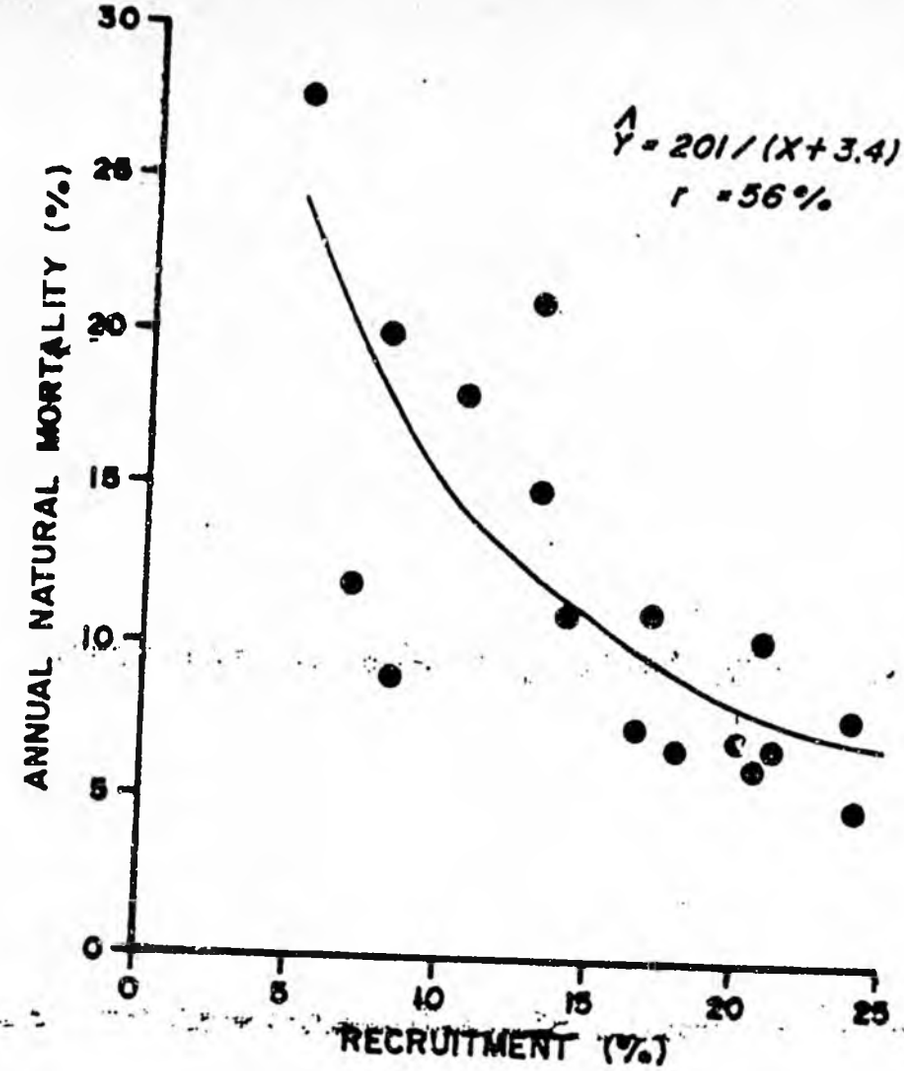
[a]Annual harvest of 4 USSR herds top to bottom are 13.8%, <11%, <15%, <15%. [b]Only for 1966 & 1977. [c]Census techniques have changed in Canada between periods and may account for some of the apparent increase. [d]There may have been ingress. [e]Authors listed herds as declining.

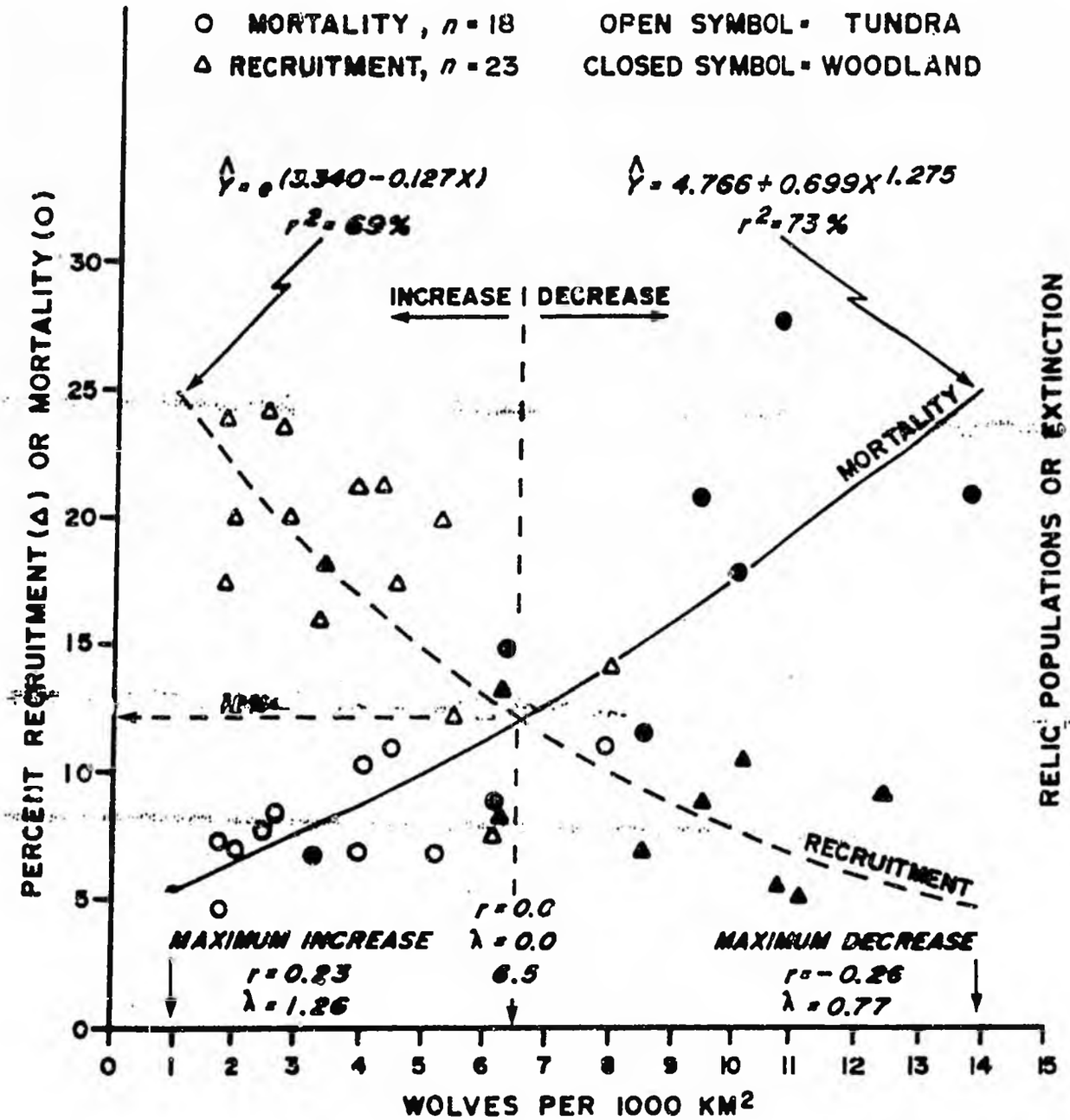
Figure 1. Status and population trends of the world's population of caribou/wild reindeer in the 1980's. Numbers represent 1000's of animals. Nearly all the largest herds have been counted or estimated since 1980. Migratory caribou/reindeer are those that travel to and aggregate at calving grounds north of tree-line and include barren-ground caribou in North America and wild tundra reindeer in Eurasia. Sedentary caribou/reindeer are those that scatter at calving time (space-out) in remote locations south of the arctic tree-line. However females in some of these herds do calve above the alpine tree-line in mountains. Included in this ecotype are the woodland caribou in North America (excluding the George River herd in Ungava and herds in Newfoundland that migrate to calving grounds) and wild forest or mountain rendeer in Eurasia. The high arctic caribou live on islands in the Arctic Ocean, excluding those animals on Baffin Island that migrate to calving grounds.

Figure 2. The natural annual mortality of adults regressed on recruitment (% calves at 5-6 months or short-yearlings at 10-11 months-of-age) for 17 herds totaling $\sim 1380^3$ caribou. Some herds are represented by two data points at different time periods. Natural mortality is based on the death of radio collared animals, estimated by the authors, or calculated by $M_n = 1 - [\lambda (1-R)] / 1 - M_h$, where: $M_n$ = natural mortality, $\lambda$ = finite rate of increase, R = recruitment, and $M_h$ = hunting mortality. N. Latitude and W. longitude locations of the herds are: 54°/119°, 57°/113°, 58°/65°, 58°/128°, 59°/129°, 59°/131°, 61°/139°, 62°/147°, 64°/126°, 64°/129°, 64°/147°, 65°/144°, 68°/144°, 69°/156°.

Figure 3. The regressions of annual natural mortality and recruitment on wolf densities for herds in North America where wolf numbers have been estimated. Recruitment is greater than mortality for many migratory-tundra herds at this time, that coinhabit ranges where wolf numbers are <6.5/1000 $km^2$. Recruitment is less than natural mortality for several sedentary-woodland herds who interact with wolf densities > 6.5/1000 $km^2$. In the past 100 years moose have extended their range north in both North America and USSR. This range extension has augmented the prey biomass permitting wolf densities in some regions south of the tree-line to exceed the levels at which recruitment and mortality parameters in woodland caribou are adequate to maintain numbers, especially when wolves are >14/1000 $km^2$.


TUNDRA REINDEER
530
ARCTIC CIRCLE
WILD FOREST REINDEER
50
HIGH ARCTIC 25³
MIGRATORY 732³
SEDENTARY 260³
E ENDANGERED
T THREATENED
BARREN GROUND CARIBOU
385
335
230
WOODLAND CARIBOU
ARCTIC CIRCLE
60°N
HIGH ARCTIC 33³
MIGRATORY 2325³
SEDENTARY 64³
INCREASING
DECREASING
NO CHANGE
MIGRATORY
SEDENTARY
TREELINE


$\hat{Y} = 201/(X+3.4)$
$r = 56\%$
ANNUAL NATURAL MORTALITY (%)
RECRUITMENT (%)
0
5
10
15
20
25
30


O MORTALITY, n = 18
Δ RECRUITMENT, n = 23
OPEN SYMBOL = TUNDRA
CLOSED SYMBOL = WOODLAND
ŷ = e(3.340−0.127X)
r² = 69%
ŷ = 4.766 + 0.699X^1.275
r² = 73%
INCREASE
DECREASE
MORTALITY
RECRUITMENT
r = 0.0
λ = 0.0
6.5
MAXIMUM INCREASE
r = 0.23
λ = 1.26
MAXIMUM DECREASE
r = −0.26
λ = 0.77
PERCENT RECRUITMENT (Δ) OR MORTALITY (O)
RELIC POPULATIONS OR EXTINCTION
WOLVES PER 1000 KM²
0
5
10
15
20
25
30
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15

"Behind is a forest that goes to the Arctic ...
And here we must draw our line."

-Gary Snyder

# THE NORTHERN LINE

The journal of the Northern Alaska Environmental Center

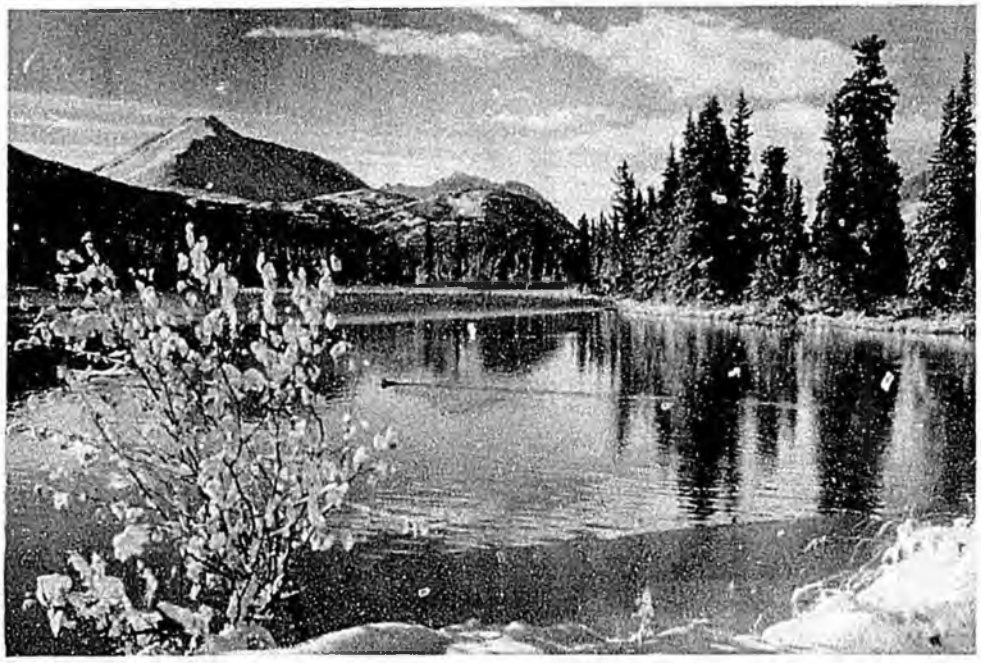
Volume VIII, No. 5, October - November, 1986

## National Parks:
# Management decision process review

by Randy R. Rogers

Decisions on the management of Alaska's National Parks are currently being made through several different processes. The General Management Plans will soon be finalized; Subsistence Hunting Plans are being proposed; wilderness recommendations are being formulated; Environmental Impact Statements on mining in three parks are underway; and final regulations on cabins within parks have been released. The outcome of each of these programs is vitally important to protection of the conservation values of Alaska's National Parks.

This article gives a brief rundown on the major activities currently taking place within the National Park Service (NPS) that will guide the management and protection of Alaska's National Parks. For more information on any of these topics, please call or write the Northern Center.



CHARLIE OTT

**General Management Plans**

The General management Plans (GMP) for Alaska's National Parks should be finalized and signed within the next few weeks.

According to a recent NPS memo from the Washington D.C. office to Alaska Regional Director Boyd Evison, the NPS does not have the authority to prohibit recreational use of snowmachines and motorboats in Alaska National Parks. The memo indicates that the NPS must pursue congressional legislation to protect wilderness values from the proliferation of such use. This position is contrary to Title XI of the Alaska National Interest Lands Conservation Act (ANILCA), and directly contradicts the final regulations implementing Title XI which have just recently been released.

The Gates of the Arctic National Park and Preserve GMP will be changed to allow recreational use of snowmachines and motorboats throughout the park. This plan revision runs counter to a large number of public comments on the plan, many of which were submitted by members of the Northern Center. On the positive side, language in all the GMPs will be revised to clarify that recreational use of off-road vehicles is prohibited off established roads or designated routes.

**Subsistence Hunting Plans**

In each of the parks where subsistence hunting is authorized by ANILCA, a subsistence resource commission is charged with the duty of preparing a subsistence hunting program for that park. The Secretary of the Interior is required to promptly implement the program unless he or she finds the program threatens conservation of healthy populations of wildlife or is contrary to the purposes for which the park was established.

The Northern Center has been actively involved in the discussions of the Subsistence Resource Commission for Gates of the Arctic National Park. We have encouraged the commission to steer away from advocating parkwide use of all-terrain vehicles for subsistence purposes. We have supported attempts to negotiate a land exchange

*Parks continued on page 3*

## No more wilderness:

# Policies defy Congress

**by Randy R. Rogers**

It has been several years now since James Watt left his post as Secretary of the Interior. During this time there has been little or no change in the policies he established. The Department of the Interior, under the guidance of Donald Hodel and his Alaska ax-man, Bill Horn, continue to subvert the intent of Congress in the implementation of the Alaska Lands Act.

One of the most outrageous examples of this abuse of power is the policy currently applied by Interior regarding wilderness review in Alaska. During Watt's reign a policy was issued, and still remains, forbidding the BLM to consider any further wilderness review not specifically required by ANILCA. In March 1985, the director of the Fish and Wildlife Service issued a memo instructing the Alaska region to only consider minimal wilderness recommendations in the refuge planning process. Most recently, Bill Horn wrote a memo to the director of the National Park Service instructing the Park Service to adopt essentially the same anti-wilderness policy for the wilderness review process that is being applied in the National Wildlife Refuge planning process.

The "no more" wilderness policy is based on the premise that since Congress conducted an exhaustive wilderness review during the Alaska Lands Act debates, only minor boundary adjustments or small additions with unique characteristics should be made.

This directly contradicts Section 1317 (a) of ANILCA, which states: "the Secretary shall...review, as to their suitability or nonsuitability for preservation as wilderness, all lands within units of the National Park System and units of the National Wildlife Refuge System in Alaska not designated as wilderness by this Act..." It is ludicrous to suggest that Congress could have accomplished a thorough wilderness review during the ANILCA debates, given the number of devisive issues which had to be dealt with in order to pass the legislation.

Conservationists who fought to see portions of Alaska protected through the Alaska Lands Act must wonder how long Congress will tolerate disregard of the law by Interior. We must hope that this abuse of power will be accompanied by a major backlash to rectify the situation.

The Northern Alaska Environmental Center would like to suggest wilderness designation of the Arctic Refuge coastal plain as the 2x4 to hit the mule between the eyes. Affirmative action by Congress on this issue will surely gain the attention of Interior, industry, and all those opposed to conservation of Alaska's wilderness. In this manner Congress can convey the message that when ANILCA was passed, there indeed was a serious intent to protect the Alaska wilderness legacy for future generations.

**CORRECTION**

Apologies to Liz Peltola and Malcolm Rogers, whose names were incorrectly rendered by the editor in the last issue of *Northern Line*.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Environmental News
of
Arctic and Interior Alaska

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*Alaska bull moose in winter.* CHARLIE OTT

**PARKS**

*continued from page 1*

to resolve subsistence access questions in the Anaktuvuk Pass area, while at the same time, insisting on protection of park values.

Recommendations of the subsistence resource commissions have varied widely, from encouraging the NPS to establish permit programs to limit eligibility of new residents, to advocating aerial wolf control and aircraft access for subsistence purposes. According to NPS officials, any recommendations accepted by the secretary which are not allowed under existing regulations must undergo a formal rule-making process, including public hearings, before they can be implemented. We will inform Northern Center members when public comment opportunities are scheduled for proposals which threaten the integrity of the parks.

**Wilderness Recommendations**

The NPS has recently initiated preparation of recommendations for wilderness designations for nonwilderness portions of Alaska's National parks. The GMPs just being completed include an assessment of which lands within the parks are suitable for wilderness designation. The wilderness review process now underway will determine which lands declared "suitable" for wilderness will actually be recommended by the Secretary of Interior for congressional wilderness designation.

Until recently the NPS wilderness review was looked upon as the most promising opportunity for major wilderness additions since passage of ANILCA. The NPS considers 17.9 million acres of nonwilderness lands suitable for designation. A September memo issued by Assistant Secretary for Fish and Wildlife and Parks, Bill Horn, instructs the NPS to focus on unique resources or characteristics that may have been overlooked by Congress. Horn states: "In view of the thorough review conducted by Congress, I would not anticipate there to be a significant amount of land proposed for wilderness designation."

Notwithstanding the biased policy direction given the NPS by the Department of Interior, the Northern Center supports major wilderness additions in Alaska's National Parks. Wilderness designation provides the greatest possible protection to the outstanding natural characteristics for which the parks were established. Maps outlining different NPS wilderness alternatives in each park are available at the Northern Center office. Public hearings on the NPS preferred alternative will be scheduled sometime in 1987. It will be important to establish a strong record of public support for wilderness so that Congress may make significant wilderness designations, despite the recommendations of the Secretary of the Interior.

**Mining in the Parks**

As a result of the lawsuit filed by Sierra Club Legal Defense Fund on behalf of the Northern Alaska Environmental Center and other environmental organizations, the NPS is required to prepare Environmental Impact Statements on the cumulative effects of mining in Denali, Yukon-Charley, and Wrangell-St. Elias National Parks and Preserves. Through this process the NPS intends to prepare comprehensive mineral management plans for mining in each park. Scoping meetings took place this fall and pubic hearings on the NPS preferred alternatives will occur in 1987. This October, the 9th Circuit Court of Appeals upheld the decision of the Alaska District Court, once again ruling in favor of the environmental organizations.

**NPS Cabin Regulations**

Final regulations concerning the use of cabins in Alaska National Parks have recently been released. While these regulations include some improvements over previous drafts, significant deficiencies still exist. The final regulations continue to provide for legitimizing trespass that occured between 1973 and 1978 when the areas were withdrawn from entry. The regulations are still being reviewed by the Northern Center and other environmental groups.

**What You Can Do**

We cannot afford to be intimidated by the onslaught of plans and regulations which have deluged the Alaska conservation community since the passage of ANILCA. Proposed regulations become so complicated in some instances that dealing with them may be better left to professional environmentalists and attorneys. But in the majority of situations, the input of individual citizens is more important than that of professionals, and has a greater effect on the outcome.

If each person concerned with the future of Alaska's wildlands can choose one conservation unit or one particular issue to concentrate on, the tasks before us can be broken into more manageable, less overwhelming portions. It is relatively easy for the average citizen to become involved in issues such as the NPS Wilderness Review. In this case, an opinion expressing support for wilderness is just as valuable as an analytical comment.

The Northern Center encourages its members to adopt an issue or area on which to focus. The staff will be happy to provide information or assistance in any way we can.

# Where to recycle in Fairbanks

by Betsy Chronic

The old newspapers are taking over the arctic entry and the aluminum cans have rattled around the back of your truck for over a month. What are you going to do with them? Here are some answers. No doubt our list is incomplete. Please let us know of other locations and options.

**Newspapers**
At present these are collected by the Boy Scout Varsity Team 4. The only drop site is the Box Boy on Chena Pump Road. If you have a large amount, call them at 479-0037 and they will pick it up. Please bag or bundle the papers and keep them free of trash.

**Computer Paper and Waste Paper**
The Boy Scouts will also take non-glossy, non-waxed computer paper and used paper, like stationary and cereal boxes, at the Box Boy collection point, or you may call them for a large pick up. Please bundle or bag and keep free of trash.

**Aluminum**
K & K Recycling, 8.5 mile Old Richardson Highway (488-1409) currently pays $.14/pound for aluminum. Several local non-profits are collecting aluminum to help raise money for their organizations. Drop sites are located at 726 17th Ave., outside the Market Basket store at Gavora Mall, and on the side of Fred Meyers. In addition, the Arctic Audubon Society collects aluminum at their monthly meetings and the first grade class at Weller Elementary School is in the business. Aluminum should be free of thrash and bagged in plastic bags.

**Batteries**
Alaska Battery Enterprises Inc., at 157 Old Richardson Highway, (452-2202) will pay $.25 for your used car battery. If it leaks, please wrap it up.

**Used Oil**
Dumping of waste oil (such as on the ground, into rivers and ponds or into the sewer system) is unsafe and illegal. The Fairbanks North Star Borough landfill on the South Cushman Extension (452-7290) will accept waste oil. It is kept in a storage tank and hauled to Anchorage, where it is used for heating. Less than five gallons is free, amounts above that cost 35 cents a gallon. K & K Recycling will take used oil for 40 cents a gallon.

**Brass, Copper, Steel, Iron**
K & K Recycling will pay for these materials. Call for current prices.

**Junk Cars**
The Fairbanks North Star Borough no longer hauls away junk cars. The landfill will accept them.

**Hazardous Waste**
Currently the state of Alaska does not have a permanent hazardous waste management facility. The Alaska Department of Environmental Conservation is working on identifying potential sites and technologies for handling hazardous waste. Borough residents can take advantage of Spring Clean-up Day for disposing of household hazardous wastes (Borough Environmental Services, 452-4761). For more information on what is hazardous and how to handle these materials, contact the Alaska Department of Environmental Conservation (452-1714).

Each of us generates waste on a daily basis. Recycling is one way of reducing the amount of waste that we need to handle. Basic separation of waste materials in our homes is the first step, proper disposal comes next. Alaska is having to deal with increasing amounts and types of waste and each of us has a role in making sure that it is done in a safe and sound manner.

# Power from the people: least-cost energy

According to alternative energy producers, Alaska's utilities have used only a few supply-side resources such as gas, hydro, diesel, and coal to provide electric service, although there are many other resources available.

Power From the People (PFP) is a group whose goal is to catalyze a shift in Alaska's energy policy toward a least-cost planning strategy. The Northern Center is one of five organizations involved in this project.

Under the least-cost planning strategy, all types of supply- and *demand*-side resources are considered. Demand-side resources include techniques to decrease current and future electrical consumption.

In terms of delivered services, a lighting efficiency program that saves forty megawatts of electricity is equivalent to building a forty-megawatt power plant, according to John Hines, PFP coordinator. The criteria for judging which resources provide the best electrical service is least cost.

To illustrate the savings potential of energy efficiency, PFP has completed what is known as an avoided cost study. The study compares the cost-per-kilowatt of reducing energy demand by using more efficient commercial and industrial lighting techniques with the cost-per-kilowatt of satisfying energy demand by building and operating an electrical generator powered by natural gas.

To compare energy efficient lighting and a gas-fired generator, the PFP study looked at energy costs and capacity costs Energy costs include fuel (about 90 percent) and variable operating and maintenance costs. The energy efficient lighting techniques have an advantage over a generator in the area of energy costs because lighting techniques have no fuel cost.

Capacity costs are the costs paid by the utility to produce a kilowatt over the useful life of the gas-fired generator, or efficient lighting techni-

*continued on page 4*

## Power

*continued from page 4*

ques. The study found that in the area of capacity costs, lighting techniques are again less costly than those of the generator.

The cost of each kilowatt produced by the generator over its useful life is $56.81, while the cost of a kilowatt produced by lighting techniques is $52.66. The $4.15 difference in the cost of a kilowatt produced by each method becomes a $3.3 million difference for the production of forty megawatts.

The PFP study also illustrated how a lighting efficiency program benefits both consumers and utilities. The study reports that consumers who participate in a lighting efficiency program will enjoy lower electricity bills with no loss of comfort or welfare. As an example, Hines pointed to the energy audits performed on the Anchorage school district. Savings of over one million dollars a year were found. This type of savings can be extrapolated to every city or village in the state.

According to Hines, lighting efficiency benefits to a utility are best perceived when the utility needs new energy. The avoided costs of implementing a lighting efficiency program as opposed to other resources can be substantial. A lighting program has been shown to be a low-cost, if not the lowest-cost, available resource. Also, an efficient lighting program can be implemented in incremental amounts, allowing the increase in electrical demand to be precisely correlated with energy savings. Utilities will not have unused or idle power plants.

The PFP group believes that lower capital costs and incremental installation gives utilities a lower risk factor This in turn is reflected back to the consumer through lower electrical rates. This enhances a utilitiy's economic stability. After all, utilities exist to provide reliable energy services at the lowest possible cost. Least-cost energy planning helps them to attain this goal.

For more information contact John Hines at 278-3661.

*This article first appeared in "ACAP Update," the newsletter of the Alaska Consumer Advocacy Program, a project of the Alaska Public Interest Research Group, 513 W. 7th, Anchorage, AK 99510.*

# Yes you can . . .

## renew your own commitment to the north,

Enclosed is my tax-deductible check to:
the Northern Alaska Environmental Center.

| | |
|---|---|
| Student/Senior | $20 ☐ |
| Individual | $25 ☐ |
| Family | $35 ☐ |
| Donor | $100 ☐ |
| Friend of the Center | $250 ☐ |
| | $500 ☐ |
| Friend's Pledge | $20/month ☐ |
| Other | $_____ ☐ |
| Volunteer. I would like to give some of my time. | ☐ |

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Address _____

City _____ State _____ Zip _____

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## encourage a friend to join,

## and remember someone this year with NAEC membership.

I would like to give a gift membership in NAEC to:

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Address _____

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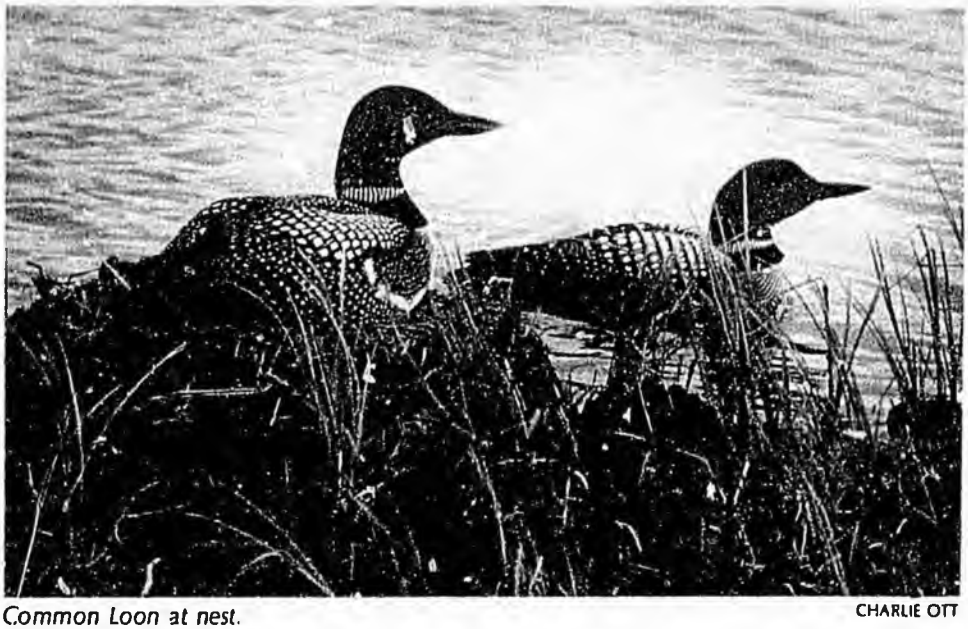
| Family | $35 ☐ |
| Donor | $100 ☐ |
| Friend of the Center | $250 ☐ |
| | $500 ☐ |
| Friend's Pledge | $20/month ☐ |
| Other | $_____ ☐ |

## Refuge update:

# Comments due on management policies

by Larry Sutton



*Common Loon at nest.* CHARLIE OTT

If the draft Comprehensive Conservation Plans that have recently been issued for several National Wildlife Refuges (NWR) are any indication, Alaska already has all the refuge wilderness acreage it's ever going to get.

Public comment periods end for the Nowitna and Selawik National Wildlife Refuges December 24, 1986, and for the Koyukuk National Wildlife Refuge January 20, 1987. All are administered by the U.S. Fish and Wildlife Service (FWS) in western Alaska. The Nowitna refuge lies south of the Yukon River, east of the village of Ruby, and has more than 2 million acres of land within its boundaries. The Selawik refuge is east of Kotzebue, south of the Kobuk River, and contains over 3.2 million acres of land, athough only 65 percent of that acreage is in undisputed Federal ownership.

The namesake rivers of both refuges were designated as National Wild Rivers by Congress when it passed the Alaska National Interest Lands Conservation Act (ANILCA) in 1980. The Koyukuk NWR consists of nearly 4.5 million acres north of Galena, but the plan also covers 750,800 acres of the Kaiyuh Flats area east of Galena, currently part of Innoko NWR.

These refuges have all the characteristics of true wilderness: vast tracts of undeveloped land where the laws of nature prevail, where people may visit to enjoy primitive recreation and solitude or provide for their own subsistence. Wildlife is varied and abundant on these refuges. The Selawik Refuge is an important migration and wintering area for the Western Arctic Caribou Herd, with many of its 200,000-plus animals moving through the area each fall and spring. The refuges are breeding grounds for hundreds of thousands of waterfowl, from Trumpeter Swans to Arctic Loons. Salmon, sheefish, and whitefish spawn in the rivers. Moose, black bears, and brown bears thrive in their as yet unspoiled habitats. Until now, the remoteness and inaccessibility of these areas has ensured their preservation as de facto wilderness.

There are many potential threats to these refuges. The Selawik plan contains scenarios for oil and gas production and construction of a transportation corridor across the refuge. Although the Selawik plan finds gas production and pipeline construction to be incompatible with the purposes for which the refuge was established, FWS could not decide about a possible 125-mile road through the refuge. They can't make a compatibility determination yet about a road that would take 350 people two years to build, and require up to 600 million cubic yards of material. Perhaps a name change would help: Selawik National Gravel Pit (and Wildlife Refuge).

The Nowitna plan explores the possibility of commercial timber production on islands in the Yukon River; off-refuge mining threatens water quality. The Nowitna refuge contains excellent moose and black bear habitat, while furbearers such as marten, beaver, wolf, mink, otter and wolverine provide the basis for a healthy subsistence trapping economy. People from the villages of Galena, Ruby, and Tanana all use the refuge for various subsistence purposes.

The Koyukuk refuge probably receives the heaviest subsistence use of any of these three refuges, with people from the villages of Huslia, Galena, Koyukuk, Nulato, and Kaltag using the refuge extensively for subsistence. Here Fish and Wildlife faces the problem of balancing increasing subsistence demands (as village populations rise) with increasing non-local use, while at the same time conserving fish and wildlife populations and habitats in their natural diversity. Water quality on this refuge is also threatened by placer mining.

ANILCA allows for oil and gas exploration on wildlife refuges in Alaska. Such exploration, particularly seismic testing, will adversely affect the wilderness values that the Fish and Wildlife Service claims to be protecting under their "no more wilderness" policy. The environmental consequences of explosions, habitat alteration, garbage dumps, accidental fuel spills, and other impacts associated with exploration seem a high price to pay for assessing the oil and gas potential of areas that are not expected to contain much in the way of commercially viable deposits. One benefit of wilderness designation is that it prohibits surface-disturbing activities such as seismic testing and oil and gas development.

When ANILCA established these three refuges in 1980, some portions were also designated as components

of the National Wilderness Preservation System (NWPS). In the Koyukuk NWR, 400,000 acres were set aside as wilderness, while 240,000 acres of wilderness were designated in the Waring Mountains of Selawik NWR. This 640,000 acres of wilderness constitutes a paltry 6 percent of the acreage of these three refuges.

The contention that Alaska already has enough wilderness is made laughable by such statistics. Obviously, Congress realized in 1980 that other lands in Alaska were deserving of preservation as units of the NWPS, or it would not have included a provision of ANILCA requiring the Fish and Wildlife Service to conduct a wilderness review of all refuge lands in Alaska. Wilderness designation of refuge land would, in the words of FWS itself, "maximize the protection of natural values and fish and wildlife populations and habitats."

Draft plans such as the ones now out for Selawik, Nowitna, and Koyukuk refuges contain outlines of several management alternatives, with one of these designated as the Fish and Wildlife Service Preferred Alternative. All of the plans are supposed to incorporate a wilderness review and subsequent recommendations for congressional wilderness designation. Not a single one of the 10,519,300 acres reviewed by these plans is proposed for wilderness designation under the Fish and Wildlife Service Preferred Alternatives (also known, accurately, as the "no action alternative").

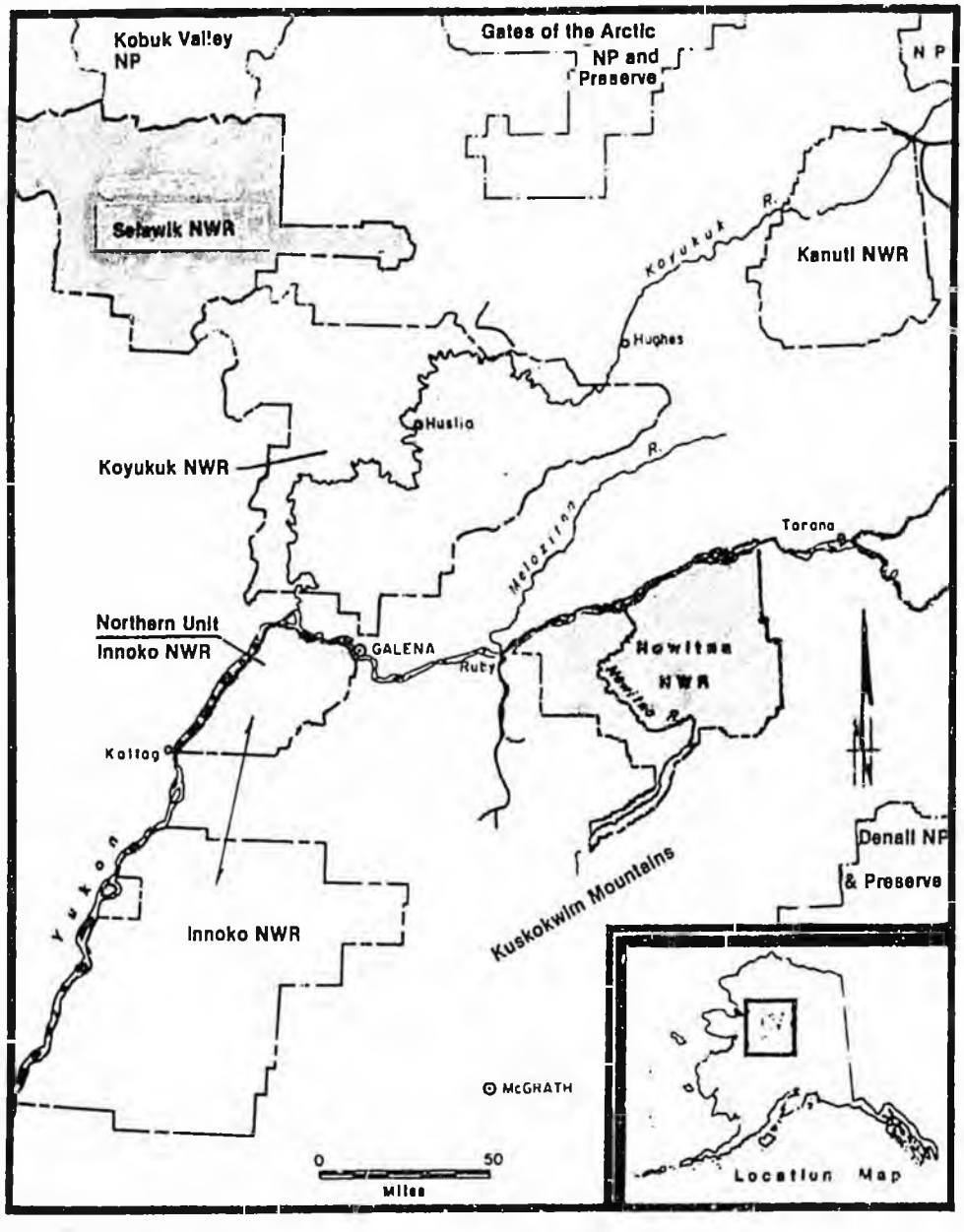
The lack of acreage to be proposed for wilderness designation is quite remarkable, in view of the many millions of acres considered "suitable," even by Fish and Wildlife's restrictive definitions. Only a bureaucratic directive from the rarefied top could so stymie the intent of Congress in ANILCA. The Fish and Wildlife Service claims it can protect the wilderness values of its refuges without congressional designation by placing lands in a Minimal Management category. This claim lacks credibility in view of the current situation on the Arctic National Wildlife Refuge.

While the Northern Center would like to see all the acreage of these refuges designated as wilderness, we also have our own minimum acceptable wilderness proposal. For the Selawik and Koyukuk refuges, wilderness designation of approximately the eastern third of Selawik, along with designation of the Purcell Mountain unit of Koyukuk, would create a continguous wilderness area stretching from the Nogahabara sand dunes east of Huslia to the Kobuk River. The minimum acceptable wilderness recommendation for the Nowitna refuge is the Nowitna River unit. Wilderness designation of this area would ensure protection of the wilderness values of the Nowitna Wild River. The Nowitna meanders radically, altering its bed on an annual basis. Wilderness designation would protect Nowitna's Wild River values even if it meanders out of its present Wild River Corridor.

Another effect of ANILCA was to ensure the continuation of subsistence uses of public lands. Machinery such as snowmobiles and motorboats may be used for the purposes of subsistence hunting, trapping, woodgathering, and so on. Other means of surface transportation may be employed, provided they were traditionally used for subsistence prior to 1980.

NAEC director Randy Rogers and other conservationists recently met with Robert Gilmore, Fish and Wildlife regional director for Alaska. In that meeting, Gilmore acknowledged that while subsistence use of ATVs is limited by ANILCA to areas where the

*Refuge continued on page 8*




*Location of Koyukuk Refuge and the northern unit of Innoko Refuge.*

# ANWR—the "unimproved" experience

**by Roger Kaye**

"An experience in the Arctic National Wildlife Refuge is one you must search out yourself," states the form letter the U.S. Fish and Wildlife Service sends potential visitors to the refuge. "You will find no packaged trip plans nor trail maps pointing the way....perhaps more than anywhere in America, the Arctic National Wildlife Refuge is a place where the sense of unknown, of horizons unexplored, of nameless valleys remains alive."

Opportunities for self-reliance, independence, challenge, discovery and adventure—finding one's own way in a setting unsurpassed in beauty and vastness—make the Arctic Refuge a unique recreational experience. Refuge visitors can enjoy climbing a nameless peak and looking upon a pristine and undisturbed portion of the world from a perspective perhaps no one else has shared. The mystique owes its existence to the absence of recreational "improvements"—no campgrounds, signs, trails, visitor cabins or facilities; no brochures featuring attractions or handouts pointing the way.

At the extreme end of the paved-to-pristine spectrum of the nation's conservation areas, the Arctic Refuge is not a convenient place to visit. As the letter reminds potential visitors, the rare qualities of the Arctic Refuge place the symbolism of real wilderness before the visitor, not as an abstract image, but as decisions with consequences.

"Be aware that where the wild has not been taken out of the wilderness, there are risks. Where freedom, discovery and exploration prevail, experience and self reliance are required."

For those who seek this most authentic condition of wilderness, and who are willing to make the necessary mental, physical, and material preparation, the refuge offers a variety of trip options.

Numerous rivers on both the north and south slopes of the Brooks Range can be traveled by canoe, kayak or raft. Trips can be made in as little as eight days, but most take two weeks. Journeys from the Yukon River across the range to the Arctic Ocean can take an entire summer. There is an infinite variety of backpacking routes available. Short day hikes can be made from a fly-in base camp. More arduous two- or three-week treks can be made along rivers or across the divide, either by foot or on cross-country skiis in spring. Mountains and glaciers offer both technical and non-technical opportunities.

The Arctic Refuge does not and should not provide for every type of recrational use. Those who desire a more casual and convenient experience would be better served by one of the many other conservation units in the state. For those who seek what the visionary Olaus Murie described as "the use of wilderness as wilderness, not as make believe," there can be no finer opportunity than the Arctic National Wildlife Refuge.

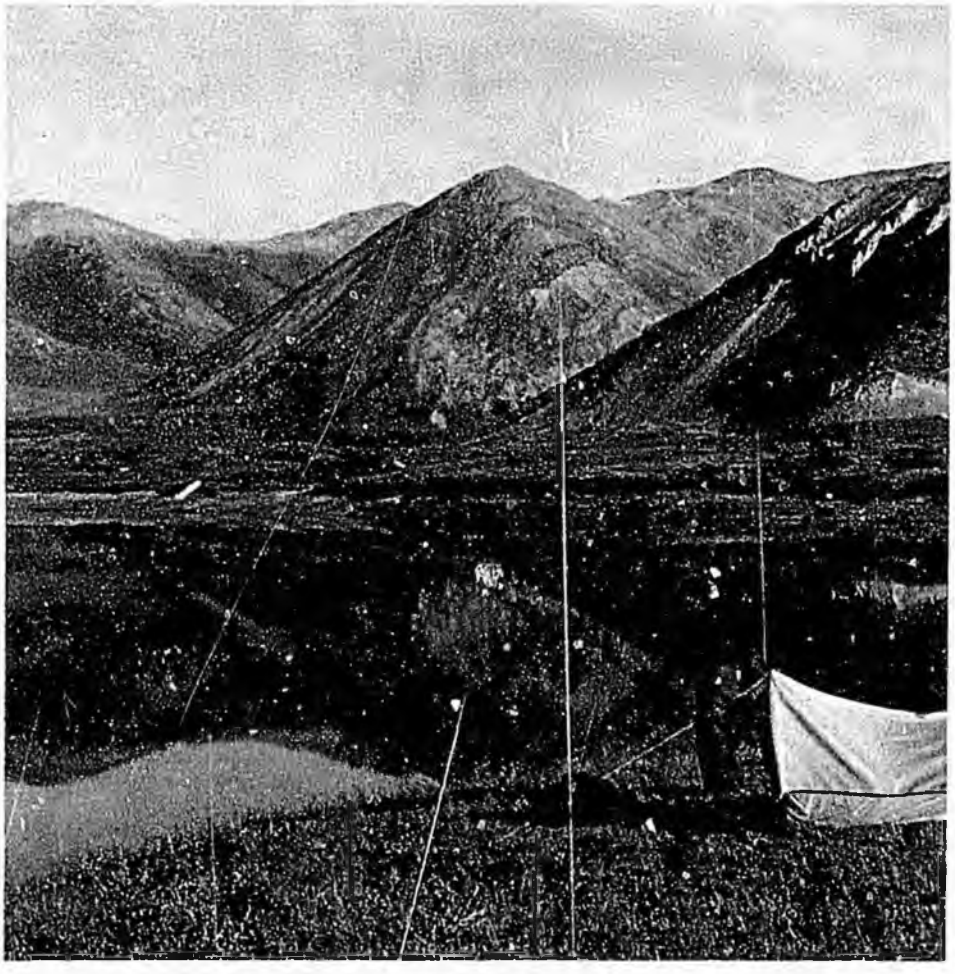
**REFUGE**

*continued from page 7*

use is traditional, the FWS has no criteria to define traditional use, and currently *assumes* all ATV use in refuges is traditional.

This is another blatant example of FWS ignoring ANILCA mandates to the detriment of refuge lands. The common misconception that wilderness designation would prohibit or restrict hunting and traditional access has been responsible for much opposition to wilderness in the past—the opposition coming, ironically, from those people who have the most to gain from added legal protection of natural resources.

The public comment periods now open for these draft comprehensive conservation plans are your opportunity to provide input to the Fish and Widlife Service about how you would like to see Alaskan refuges managed. To obtain copies of the draft plans, or to submit written comments, write to the U.S. Department of the Interior, U.S. Fish and Wildlife Service, 1011 E. Tudor Road, Anchorage, AK 99503, Attention: William Knauer. For more information, stop by the Northern Center at 218 Driveway in Fairbanks. Your involvement will make a difference!



*The wilderness features of the Arctic are its most important resource to man.*

# From the woodpile

## by Ginny Hill Wood

*I guess the following ramblings could be titled "In Defense of Bleeding Hearts."*

*The other day I got to musing on the news stories about the surging Hubbard Glacier in southeastern Alaska, and attempts of members of the Whale Museum on San Juan Island in Washington state to rescue the sea mammals trapped in the newly formed land-locked lake. Until the glacier dammed it, the lake was a saltwater inlet. This sudden transport of glacier ice and till created a barrier across Russell fjord behind which meltwater was rapidly changing the seawater to fresh water—a condition that would eventually mean certain extinction for the eighty seals and twenty-five porpoises impounded there.*

*Like the publicity given the efforts to get Humphrey the Whale headed back downstream to San Francisco Bay after he took a wrong turn up the Sacramento River, the attempts to help the seals and porpoises get back to the ocean tugged at the heart strings of many readers. But not all.*

*Most biologists considered the project futile and a waste of time and money (albeit, entirely financed by private donations). They felt nature should be left to take its course (a reversal of Department of Fish and Game guidelines that wildlife is a crop to be harvested for man's benefit, to be managed and manipulated for the maximum yield of the "good" animals at the expense of the "bad" ones—i.e., moose versus wolves).*

*Fishermen in the area derided the whole endeavor. Seals and porpoises ate fish and were therefore varmits to be exterminated anyway. The residents of nearby Yakatat were more concerned over what would happen to their fishery if the rising waters behind the dam drained off down the Situk River. They were also amazed and amused by the sudden influx of journalists from news syndicates all over the country who jammed the small town's meager hostelry facilities vying to cover the story. Local bush pilots reaped unexpected profits providing aerial views of the situation. Larry Mayo, a Fairbanks glacier geologist with the US Geological Survey, sat gleefully perched in his camp overlooking the scene, waiting to witness and record for science whatever the denoument of this drama of Nature might be.*

*Meanwhile, back at the dam, a few seals rescued themselves by flopping over the ice and rubble barricade to the saltwater below. Poor weather, lack of funds, and a shortage of aircraft to provide the airlift, coupled with lack of expertise in just how to go about snaring the porpoises stalled the rescuers.*

*Nature solved the matter in favor of the sea mammals (and the Situk River fishery) when the rising waters breached the dam, spewing icebergs, debris, and the seals and porpoises out to sea. Russell lake is now a saltwater fjord again, at least for the time being. If the Hubbard Glacier continues to surge, the whole geological process could be repeated again, perhaps with a different ending. For now, the headlines are back to the usual—politics, international atrocities, and the economy. And Larry could come back to Fairbanks to help wife, Gail, with the fall chores.*

*I guess I have to applaud the efforts of the "do-gooders" in their attempts to save the critters, futile and unnecessary as their efforts may have been. I know one must never anthropomorphize if you want any credibility in wildlife matters. But in this troubled world where so much money, effort, intrigue, and propaganda goes toward perpetuating man's inhumanity to man, to say nothing of his fellow creatures—be it with bullets, time bombs, ballistic missiles, or pesticides—I cannot deride or censure those who try to save a few beasts as well as beings.*

*We could do with more "bleeding hearts" in these unstable times of self-proclaimed "practical realists." And who is to say which of us is misguided.*

# the kitchen sink

We are working diligently to find **new NAEC members**. One way to do this is for you to organize a gathering of people, perhaps a potluck dinner, and invite the NAEC staff to talk about the Northern Center and issues. We can't grow without your help.

Wondering when your membership **expires**? Check the month and date on the mailing label on your newsletter.

Membership Drive continues—we're working on our goal of a **15 percent increase** and we need your help. Please renew your membership and encourage a friend to join. A gift membership will make a great present this holiday season, forms are in this issue.

The Alaska Environmental Lobby welcomes **Gail Gatton** as the new Executive Director. We look forward to working with her this next session.

Notable quotables: At the conclusion of Stuart Udall's recent lecture, after several questions by local placer miners, Bob Weeden closed the evening by saying, "I hope you will join me in applauding the placer miners who created Alaska, we used to give God credit for that."

In the 1986 voter information pamphlet, Senator Frank Murkowski notes that he is a member of the Alaska Conservation Society. So that's how Frank keeps in touch with the environmental concerns in the state. Guess he doesn't realize ACS disbanded in 1980.

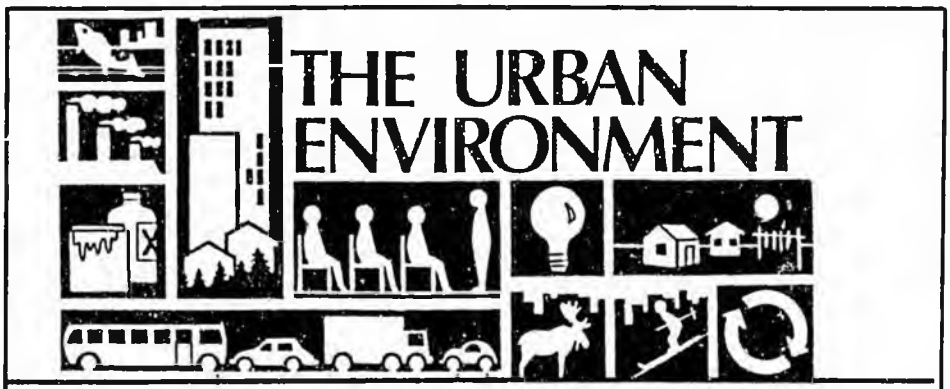
A big **Thank You** to our loyal volunteers: Marilyn Kosiick, who was our membership coordinator for over a year, Larry Sutton, Bob Lance, Laura Jacobs, Tamiko Gross, and Betsy Chronic.

Refuge Plans: written comments on the **Selawik and Nowitna** refuge plans are due by Dec. 24, 1986. There will be a public hearing on the Koyukuk refuge plan Dec. 10, 7 p.m. at the Noel Wien Library. The deadline for comments on this plan is January 20, 1987.

Arctic National Wildlife Refuge **comprehensive conservation plan** is back in the works. There will be a consultation committee meeting on November 25, 9 a.m. in the Federal Building.

Trustees for Alaska has published 67-page guide to **wetlands protection** in Alaska. This guide is designed to provided a basic introduction to the complex array of laws and regulations that govern activities in wetlands. The guide also provides practical advice on how citizens can participate effectively in government decisions on projects that affect wetlands, and suggests other strategies for wetlands protection as well.

"A Guide to Wetlands Protection in Alaska" is available free of charge by calling or writing Trustees for Alaska, 725 Christensen Dr., Suite 4, Anchorage, AK 99501 (276-4244). Trustees for Alaska is a nonprofit, public interest environmental law firm.




## SURVIVING AND THRIVING IN ALASKA'S CITIES, TOWNS AND VILLAGES

A Conference by the
**ALASKA ENVIRONMENTAL ASSEMBLY**
December 6 and 7
Anchorage Community College
Lucy Cuddy Center

***Volunteer Help needed***

Registration is $10 for the weekend and travel funds are available. Call Kate for more information.

For information contact Natalie Hill at 274-3621

# Gifts from NAEC!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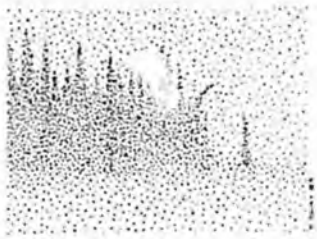

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Thank you for your order. Your support will help us in our effort to protect the Arctic National Wildlife Refuge.

# conservation abstracts

by Florence Collins

**U.S. BIRDWATCHERS** totalled 83 million in 1980, and they spent at least $6.6 billion on related transportation, lodging, food, and equipment. In the same year, 42 million anglers spent $10.2 billion, and hunters spent $8.5 billion. More than twice as high a proportion of Alaskans are "birders" than people in the Lower 48, and an even higher proportion of tourists to Alaska are birders. Most of the larger Alaskan communities are not aware of the increasing numbers of birders among their visitors. *Alaska Fish and Game*, July-August 1986, p. 24-25.

**CORRECTION:** The Alaska Conservation Foundation has given away more than $1 million, not "more than $1," as stated in the June 1986 *Abstracts*.

**WOLVES** in the Lower 48 total 12-15 lone wolves in Idaho, none in Yellowstone or the rest of Wyoming, possibly 25 in Montana, of which a pack of 12 recently migrated into Glacier National Park from Canada. Northern Minnesota has perhaps 1,200. A Wolf Recovery Plan is complete, but not yet "approved and implemented' for the northern Rockies. *Idaho Conservation League News*, August 1986, p. 1.

**A SUBMERGED LANDS BILL** submitted by senators Stevens and Murkowski would make land under non-navigable lakes and rivers not counted in calculating the acreage granted to the state and to Natives as settlement of the Statehood and ANCSA Acts. Under ANILCA these areas were added to the total, but Secretary Watt gave some (out of a possible total of 1-2 million acres to Natives and 4-6 million acres to the state) without counting it. This allowed them to claim that many more acres of unsubmerged land. Watt's decision was challenged in a lawsuit, but this bill would change ANILCA to "incorporate the Watt formula and preempt any court action." Lands under dispute include protected acreage in refuges, wild rivers, and other conservation units. *Alaska Report*, September 1986, p. 1.

**FISHING IN THE NORTH PACIFIC** causes what is probably the "most devastating effect" of plastic trash in the open sea. Fishermen from the Orient set out nets that are 28 miles long and 26 feet deep, with a total 20,000 miles of invisible nylon net set each night. An average of 10 miles of net is lost each day, and thousands of miles of deteriorated nets are abandoned or dumped overboard each year. The "ghost nets" collect fish until they sink from the load or are washed ashore. Alaskans have objected to this practice because it catches salmon which then cannot return to spawn. A recent agreement with Japan "will have little effect beyond moving the fishery to inshore waters" and postponing phase-out for five years. The nets plus those from bottom-fish trawling in the Bering Sea are also a major threat to fur seals. Present laws are both inadequate and poorly enforced, and most do not address plastic pollution specifically. Some eight states require biodegradable six-pack holders, others are proposing similar laws, and some firms make biodegradable plastic products; but durability is a major selling point for plastic, inhibiting the use of biodegradable types. *Audubon*, September 1986, p. 18-23.

**THE FOREST SERVICE** has withdrawn decision notices for roading and logging at Berner's Bay, north of Juneau, and will prepare an EIS for the area. It will take one to two years to complete, and will include a "No Action" option. The service, however, wants the court's injunction against future development lifted; the injunction was requested by conservationists and others to stop construction of a "pre-roading" project and proposed timber sale. *Ravencall*, July-Setember 1986, p. 3.

**GATES OF THE ARCTIC** National Park Superintendent Roger J. Siglin, formerly of Canyon de Chelly National Monument, Arizona, has recently replaced Richard Ring, who has gone to Delaware Water Gap National Recreation Area. *Alaska Report*, September 1986, p. 6.

**THE U.S. FOREST SERVICE** builds and maintains more roads than any other agency in the world. It has built, or permitted building, 350,000 miles of roads in National Forests—nearly 10 times as many miles as there are in the Interstate Highway System. *In Brief*, Summer 1986, p. 1. The U.S. House of Representatives cut road building funds by $44 million recently, but the Senate Appropriations Committee increased their budget, adding $75 million to the $178 million asked for by the administration. The service proposes building 580,000 more miles of roads by the year 2030, and road building has exceeded their own goals for each of the past five years. Conservationists hope to reduce the appropriation by $142 million before final passage. *National News Report*, August 26, 1986, p. 2-3.

***A much more complete set of Conservation Abstracts is available each month from the Northern Alaska Environmental Center, upon request. Contact us if you would like to be added to the mailing list.***

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Ned –

Here is some information on the Arctic National Wildlife Refuge from our perspective.

Please do not hesitate to call for more information or clarification of these materials.

We would greatly appreciate a copy of your proposed resolution when you are finished.

Thanks.

Kate Pendleton

"Behind is a forest that goes to the Arctic ...
And here we must draw our line."

-Gary Snyder

# THE NORTHERN LINE

The journal of the Northern Alaska Evironmental Center

Volume VIII, No. 6, December 1986

# Action Alert: Oil lease proposal threatens Arctic National Wildlife Refuge

*Director's note: This special edition of the* Northern Line *is designed to encourage public comment on the fate of the Arctic National Wildlife Refuge coastal plain. The issue includes an overview of the refuge, facts about the coastal plain, and detailed information on the contents of the draft 1002 Report. Please take a moment to read through this information and voice your concerns.*
**YOUR INPUT WILL MAKE A DIFFERENCE.**

The Arctic National Wildlife Refuge is our nation's most northern unit of the National Wildlife Refuge System. No other refuge or park encompasses such a continuum of undisturbed, biologically intact, Arctic and Subarctic habitats–from the interior boreal forest and the central Brooks Range, to the coastal plain bordering the Arctic Ocean. No other area protects habitat for so many healthy populations of national interest species, including grizzly and polar bear, caribou, muskox, Dall sheep, wolf, wolverine, peregrine falcon and gyrfalcon. The annual migration of the 180,000 member Porcupine Caribou Herd between the Arctic Refuge and adjacent areas of Canada is considered by many to be the most spectacular wildlife phenomenon on American and Canadian soil.

When the Arctic National Wildlife Range was established in 1960, the action was seen as the culmination of extensive preservation efforts begun more than a decade earlier. In 1980, Congress passed the Alaska National Interest Lands Conservation Act (ANILCA) which increased the size of the range to 19 million acres and renamed it the Arctic National Wildlife Refuge. Eight million acres of the original wildlife range was designated as wilderness. Twice the House of Representatives voted overwhelmingly to designate the coastal plain, the 1.5 million acres wedged between the Brooks Range and the Beaufort Sea, as wilderness. In the Senate version of the Alaska Lands Act, which finally became law, the coastal plain wilderness was deleted.

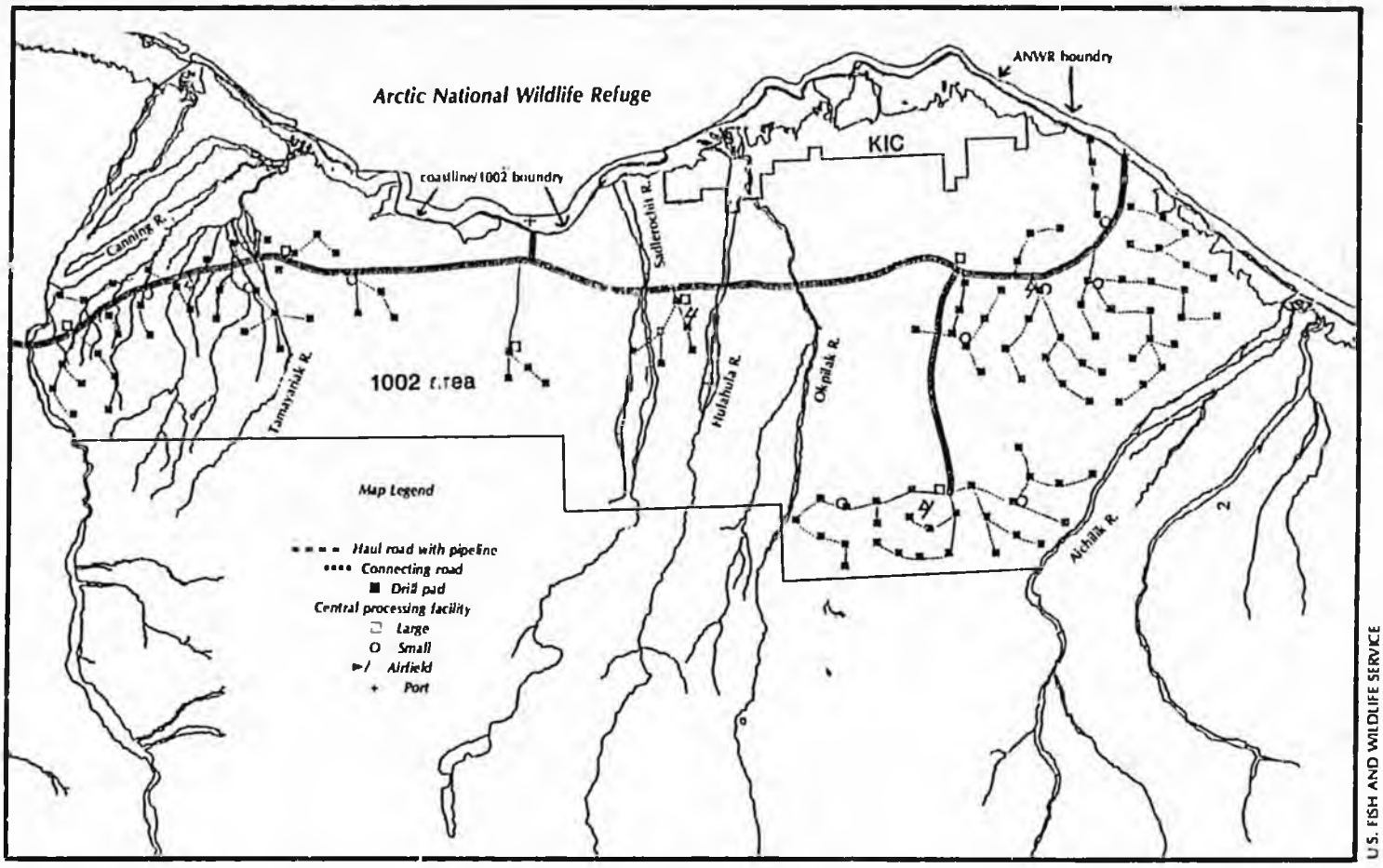
In its place, ANILCA called for an assessment of the fish and wildlife resources, and the oil and gas potential of the coastal plain. This provision of the law also required the Secretary of the Interior to assess the likely impact of oil and gas development on refuge values and submit a report and recommendation to Congress. This report, required by Section 1002(h) of ANILCA,(hence the name ten-o-two), is now out for public comment before being finalized and submitted to Congress. It is important to keep in mind that Section 1003 of ANICLA prohibits further oil exploration and development in the coastal plain unless Congress passes specific legislation to open the area for such use.

When the draft 1002 Report was finally released in November 1986, it recommended that the entire coastal plain be opened up for full oil and gas leasing. **The nation is being given a clear choice: preserve intact the unique ecosystem that is the Arctic Refuge, or hack off a crucial chunk of it for environmentally destructive resource development.**

Full oil and gas leasing of the Arctic Refuge coastal plain will completely subvert the purposes for which the refuge was established, which include: a) to conserve fish and wildlife populations and habitats in their natural diversity; b) to fulfill the international treaty obligations of the United States with respect to fish and wildlife and their habitats; c) to provide the opportunity for continued subsistence uses by local residents, and; d) to ensure, to the maximum extent practicable, water quality and necessary water quantity within the refuge. This basic mandate for management of the refuge should be kept in mind when reviewing the recommendations of the draft 1002 Report.

U.S. FISH AND WILDLIFE SERVICE

*The foothills of the Brooks Range at the edge of the Arctic Refuge coastal plain.*




**Map of the 1002 area and hypothetical development scenario**

*The 125 mile stretch of coastline along the Arctic Refuge, most of which is in the 1002 area, is the only section of Alaska's 1100 miles of Arctic Ocean coastline that is currently protected from the environmentally damaging effects of oil development.*

# Impact of alternatives

The draft 1002 report presents and analyzes five management alternatives for the coastal plain. The five options are: 1) full leasing of the entire 1002 study area; 2) partial leasing within the 1002 area; 3) additional oil and gas exploration including exploratory wells (currently prohibited by ANILCA); 4) no action which would include the 1002 area in the refuge comprehensive planning process currently underway; and, 5) federal wilderness designation for the entire coastal plain. Signed by Assistant Secretary of the Interior Bill Horn, ***the draft 1002 Report recommends full leasing of the coastal plain for oil and gas production.***

### Resources and the Price of Extraction

On the North Slope of Alaska, there are over 23.6 million acres of federal land in the National Petroleum Reserve-Alaska already committed to oil development. This figure does not include the vast oilfields around Prudhoe Bay or state and federal Outer Continental Shelf (OCS) oil leases.

No one knows conclusively how much, if any, oil actually lies beneath the coastal plain. The draft 1002 Report predicts that ***there is only a 19% chance that any economically recoverable oil deposits lie beneath the coastal plain.*** This 19% chance is called the marginal probability, and makes recoverable oil estimates "conditional"; that is, based on the rather important condition that there is any oil there at all. It is against this one in five chance for economically recoverable oil that the American public is being asked to sacrifice internationally significant wildlife and wilderness resources.

The rationale provided in the draft report to justify the full leasing recommendation includes the national need for domestic sources of oil and gas and the need to provide for national security. Information included in the draft 1002 Report does not provide sufficient evidence to demonstrate that development of the Arctic Refuge coastal plain would provide enough oil to significantly alter the nation's dependence on foreign oil.

Two kinds of oil resource estimates are frequently made: estimates for oil "in place" (how much oil is down there), and estimates for "economically recoverable oil." Not all the oil in the ground can be extracted, given current technology.

The report presents a range of conditional probabilities of how much oil might be recoverable. Many of the wildly optimistic figures cited by the Department of the Interior in the press are for estimates of oil in place with low probabilites of occurance. The mean estimate of oil cited in the draft is 3.2 billion barrels with a 40% probability of occurance. This figure is used in the report as the basis for economic predictions.Using this mean figure, production from the Arctic Refuge under full leasing would equal only

4.17% of projected U.S. oil demand by the year 2005, 2.57% by 2010.

The report bases its economic predictions on optimistically high oil prices of $33 and $40 per barrel, while recent oil prices have been in the neighborhood of $14 to $18 per barrel. These calculations produce correspondingly high figures with which to bolster arguments relating to the national interest.

**Environmental Damage**

One reason cited by Assistant Secretary Horn for proposing full leasing is "the ability of industry to minimize damage as learned from oil and gas activities elsewhere in the Alaskan Arctic." From the same report: "Accidental spills of crude oil and refined petroleum products are an inevitable consequence of oil field development."

Since 1972, there have been 23,000 oil spills ***that were reported*** to the Alaska Department of Enviromental Conservation. The largest spill was 658,000 gallons. This does not indicate a good industry track record and represents a serious threat to the fragile life forms of the arctic tundra.

Hazardous waste disposal is another serious problem that remains unsolved: there is currently no permitted hazardous waste disposal site on the North Slope. Studies of reserve pit fluid discharges (which occur at every drill pad) at Prudhoe Bay indicate increases in the levels of heavy metals such as zinc, arsenic, and aluminum. The studies note that "along with deteriorations in water quality, the quality and quantity of organisms used as food by North Slope bird species may be decreasing."

**Caribou**

The Porcupine Caribou Herd stands as a symbol for this threatened ecosystem. Two extremely critical phases of caribou life history take place in the 1002 area: the calving and post-calving periods. Caribou cows with new-born calves are particularly sensitive to disturbance. During the post-calving period caribou store energy for winter survival; disturbances from human activity can cause stress and energy loss at this crucial time . Also at this time, hordes of insects, mainly mosquitoes, emerge to plague the caribou. To avoid the insects, caribou seek out the windy and cool Beaufort Sea coast. The 1002 area provides the most important calving, post-calving and insect relief habitat for the Porcupine Caribou Herd.

**Other Species**

The 1002 area also provides essential habitat for a variety of other wildlife species. Muskoxen were exterminated from the North Slope by the late 1800's. Today's healthy population in the 1002 area is a result of a reintroduction in 1969 and 1970. The area provides important habitat as well for wolves, arctic foxes, wolverines, brown bears, and polar bears. One hundred and eight species of birds have been recorded on the Arctic Refuge coastal plain, including the threatened arctic peregrine falcon. Most of these birds nest on the coastal plain, others feed, nest, molt, or prepare for the fall migration on the rich tundra vegetation. As many as 300,000 snow geese, or approximately 50% of the Pacific Flyway population, stage on the coastal plain to prepare for their long migratory flight south. Twelve species of fish frequent the rivers and streams of the 1002 area, while many more species inhabit the waters offshore. In summary, the coastal plain is the most biologically important part of the Arctic Refuge because it provides critical habitat for so many resident and migratory species.

**It is against this one in five chance for economically recoverable oil that the American public is being asked to sacrifice internationally significant wildlife and wilderness resources.**

**Direct Impacts to Fish and Wildlife**

The report projects a "population decline or distribution change for 20-40 percent of the Porcupine Caribou Herd." The report also indicates that caribou may be forced to avoid 72,000 acres of insect relief habitat under full leasing. "Depending upon design, pipelines may create a barrier. Those adjacent to or close to active roadways would probably most impede free movement...This is of particular concern in the 1002 area because the probable pipeline/haul road route would bisect the area." said the report.

" Increased noise and disturbance level displacing wildlife throughout the 1002 area..." is one of the unavoidable impacts listed in the report. Another is direct loss of habitat due to ground being physically covered by structures, roads, and other facilities. Displacement and increased harvest of wolverines, direct loss of moose habitat, direct mortality of birds, a decline or change in distribution of golden eagles, a decline in the wolf population: the list goes on and on. "A major reduction or change in distribution of snow geese using the 1002 could occur through the cumulative effects of . habitat loss, indirect habitat loss due to disturbance, and direct mortality," is also indicated by the report.

**The coastal plain is vital to the ecological integrity of the Arctic Refuge. It is not a spearate entity which can be conveniently sliced off without major adverse effects to the whole system.**

**Mitigation**

Measures proposed for mitigation of impacts associated with oil production represent wishful thinking at best. For example, the report says that "...negative effects to muskoxen could be mitigated by standard stipulations prohibiting disturbance, implementing necessary time and area closures, and requiring on-site monitoring." Yet in the next paragraph, the report admits that "...major negative effects upon the muskoxen population from oil and gas development could occur, considering the present management objectives for continued population growth of the herd under natural regulation and the displacement from habitat likely to occur."

**Subsistence Values**

Native people in both Alaska and Canada depend on Arctic Refuge resources for both cultural and nutritional sustenance. This includes the Inupiat people of the village of Kaktovik and the Athabascan people of Arctic Village,

# Environmental organizations working for the Arctic Refuge

The following groups are working together to save the Arctic National Wildlife Refuge:

Alaska Center for the Environment
Defenders of Wildlife
National Audubon Society
National Parks and Conservation Association
Northern Alaska Environmental Center
Sierra Club
Southeast Alaska Conservation Council
The Wilderness Society
Trustees for Alaska

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***THE NORTHERN LINE***
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U.S. FISH AND WILDLIFE SERVICE

*Porcupine Caribou Herd crossing a coastal plain river.*

Venetie, Chalkyitsik and Fort Yukon in Alaska and the village of Old Crow in Canada. The most important subsistance resource of all is the Porcupine Caribou Herd. "Caribou is the most important food source for the people of Arctic Village..." according to the 1002 Report. Other refuge species used by the people of Kaktovik include Dall Sheep, Arctic Char, Arctic Cisco, ptarmigan, polar bear, numerous species of waterfowl, bearded seal, spotted seal, ringed seal, wolf, wolverine, brown bear, and Arctic-ground squirrel.

**Recreational Values Would be Compromised**

"An experience in the Arctic National Wildlife Refuge is one you must search out yourself", states the form letter the U.S. Fish and Wildlife Service sends to potential visitors to the refuge. "You will find no packaged trip plans nor trail maps pointing the way...perhaps more than anywhere in America, the Arctic National Wildlife Refuge is a place where the sense of the unknown, of horizons unexplored, of opportunities for self relience, independence, challenge, discovery and adventure...finding one's own way in a setting unsurpassed in beauty and vastness...make the Arctic Refuge a unique recreational experience." If the 1002 area is developed, the sights and sounds of oil drilling and transportation will dominate the visitor's sensual experiences anywhere from the coast to the Arctic Divide. Aesthetic impacts will extend beyond the 1002 area itself.

**Other Problems the Report Fails to Address**

Two major problems immediately meet the eye. One is the lack of sufficient water quantity in the 1002 area. The other is the enormous requirement for gravel necessary for building drilling pads and roads on permafrost. The report says " Specific locations and sources of water and gravel for exploration and development activities have not been identified; and it is understood that these resources, especially water, are not readily available on the 1002 area." The report states that "...as much as 15 million gallons of water may be needed to drill one exploratory well." As for gravel, "Each mile of road occupies about 5 acres and requires approximately 40,000 cubic yards of gravel." In all, 40 to 50 million cubic yards of gravel would be required for construction, operation, and maintenance. "Gravel might have to be mined from upland sites, river terraces, streambeds, lagoons, or other potential sites." How this is to be accomplished without causing severe adverse impacts to fish and wildlife populations and their habitats is not addressed.

**The Managing Agency's Biased Record**

Throughout the decision making process on the 1002 area, the Department of the Interior and the U.S. Fish and Wildlife Service have demonstrated tremendous disregard for the intent of Congress and have done everything possible to minimize public involvement.

Contrary to the intent of Congress as expressed in ANILCA and appropriation bills, the Department of the-Interior has spent over $300,000 appraising land values in order to develop land exchange agreements with private Native corporations. These proposed exchanges would remove subsurface mineral rights from the public domain in the 1002 area. These secret negotiations, known within the Department as "Project M or Megatrade", have compromised the objectivity of the 1002 report and created additional vested interest pressures to open up the area.

Originally, the agency had no intention of allowing a public review of the draft 1002 report. A successful lawsuit undertaken by Trustees for Alaska with the support of many other local and national conservation groups, required the Department of the Interior to hold public hearings and take public testimony before submitting the

final report to Congress. The public involvement opportunities currently established are the Department's attempts to minimally comply with the mandate set forth by the courts as a result of litigation.

## Comments desperately needed

### Key points to include in your comments:

★ Support Alternative E which recommends wilderness designation for the entire Arctic Refuge coastal plain.

★ The report finds that there is only a one in five chance of finding ecomically recoverable oil beneath the coastal plain. Moreover, these estimates assume that oil would be priced at ***more than double*** what it is now.

★ Despoiling Alaska's premier wilderness refuge and jeopardizing its internationally significant wildlife and wilderness resources is ***not in the national interest.***

★ Full oil and gas leasing of the coastal plain could be disastrous for the more than 180,000 caribou that use the area for calving and post-calving insect avoidence. This is the nation's only opportunity to protect virtually the entire range of one of the largest and only internationally migratory caribou herd in the world.

★Caribou are vital to the subsistance way of life of Native people in both Canada and Alaska: adverse impacts on the caribou population will result in adverse impacts on subsistence.

★The report looks at the 1002 area in isolation, rather than examining in detail the cumulative effects of oil and gas development on adjacent state and federal leases and offshore on the outer continental shelf.

★The disposal of hazardous wastes associated with oil development presents a serious long term problem that has not yet been adequately addressed.

★Further efforts towards energy conservation and creating viable alternative energy sources can better provide for our future energy needs than sacrificing the Arctic Refuge for a few days supply of oil.

## The 60-day comment period for the draft 1002 report ends January 23, 1987.

Three public hearings, where people can voice their concerns, are scheduled for Kaktovik, Anchorage, and Washington, D.C. on January 6, 5, and 9 respectively. The public hearing in Anchorage will be located in spaces 1 and 2 of the Egan Convention Center. The hearing will begin at 9:00 a.m. and continue until all testimony is received. Please arrive early to be sure you can testify!!

U.S. FISH AND WILDLIFE SERVICE

*The glacial headwaters of a coastal plain river.*

For more information contact the Northern Alaska Environmental Center.

Legislation was introduced in the House of Representatives by Morris Udall during the 1986 Congressional session to protect the coastal plain as wilderness. The bill is expected to be reintroduced early in 1987, and we hope a similar bill will be introduced in the Senate. If you can, please send a copy of your letter to Senator Bennett Johnston, Chairman of the Senate Energy and Natural Resources Committee, with a note asking him to sponsor legislation to include the area in the National Wilderness Preservation System. Also, a copy to Governor Cowper will help show him there is support inside the state for preservation of these wildlands.

**Mail Your Comments To:**

U.S. Fish and Wildlife Service
Attn: Division of Refuge Management Resources
2343 Main Interior Building
18th and C Streets, N.W.
Washington, D.C. 20240

Senator Bennett J. Johnston
Senate Energy and Natural Resources Committee
Senate Office Building
Washington, D.C. 20510

Honorable Steve Cowper
Governor, State of Alaska
Pouch A
Juneau, Alaska 99801

# Interior report takes a cut at refuge pitch for oil



**Fred Pratt**

I call them "seams." When you're reading a government analysis and you see a difference between what the staff wrote and what their bosses concluded, that's a seam.

Lately I've been reading the Arctic National Wildlife Refuge (ANWR) Coastal Plain Resource Assessment, and it's full of seams.

The Interior Department recommended to Congress that the ANWR be opened to oil development. The common pitch is that ANWR contains another Prudhoe Bay, and it represents the economic salvation for Alaska's troubled oil industry.

But the body of the report gives a very different story. Let's look at what's behind it.

The executive summary of the document says there is 13.8 billion barrels of oil in ANWR, and we should want to sell the oil companies leases for the rights to that oil. That figure is what has been most widely reported.

Then the report says the most optimistic figure is 4.8 billion barrels, but that doesn't take into account the fact that more than half the oil will be left in the ground after it's developed.

The report's most likely estimate of what might be discovered and drawn from the ground is 3.2 billion barrels, and that estimate is based on a price of $33 per barrel of oil. That's more than twice the current price of North Slope oil and, it's considerably higher than any price projection for the next decade.

But let's look even deeper into the question.

The Interior analysis, which can be obtained from the local U.S. Fish and Wildlife Service office, breaks the geologic data from ANWR into "26 petoential petroleum "prospects." In turn, these are grouped into seven "plays" showing similar geologic characteristics.

The first thing I noticed in this analysis is the bald statement, "If recoverable oil resources are present in the prospects there is a five percent chance that the two largest prospects contain economically recoverable resources equivalent to those found at Prudhoe Bay."

The next thing I noticed is that in the geologic area considered the most likely source for ANWR oil, "None of the sampled oils are similar to Prudhoe Bay oil."

The charts in the report show this clearly. The zone that contains the oil we produce at Prudhoe Bay dis-

*(See REFUGE, Page B-2)*

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12/21/86

## REFUGE

*(Continued from Page B-1)*

appears as one moves east, apparently because it was eroded before it could be buried by later deposits all those millions of years ago. It's also lost from well records as one moves from south to north along the ANWR boundary.

"Seismic and surface data indicate that all but the northwestern quadrant of the area is complexly folded and faulted," the report states. "This complexity is vastly different from the relatively simply sturcture that underlies the coastal plain west of the Arctic Refuge, such as the Prudhoe Bay area."

According to the report, this small northwest quadrant contains the same oil-bearing structures as the shallow West Sak and Ugnu oil deposits at Prudhoe Bay.

In the Prudhoe Bay area these zones contain more oil than the Prudhoe Bay reservoir itself, although the oil is thicker and harder to develop. The Interior report says this region in ANWR has half the potential oil reserves of the entire ANWR coastal plain .

Now from a strictly narrow Alaskan point of view, why should be want to open up federal land with oil deposits identical to those the oil companies have already discovered on state land? The oil companies at the Kuparuk Field are already installing special casings to keep West Sak oil from flowing into their wells, and they want to go look for the same structures 60 miles away?

Then, let's look at the rest of ANWR.

The Interior report says potential oil reservoirs could be found at depths of up to 26,000 feet, more than three times the depth of the Prudhoe Bay reservoir. Since wells of more than 12,000 feet can require more than one winter drilling season to drill, the ANWR exploration could stretch out for many years and many tens of millions of dollars.

Add to that the more complex geology, and we have a situation that will require more exploratory wells to find smaller oil reservoirs that are harder to get into production.

The report says its estimates of recoverable oil reserves are "conditional upon the occurrence of at least one economic size oil accumulation in the are, the probability of which is about 19 percent."

Even then, ANWR does not have anywhere near the water or gravel resources that are found on the parts of the North Slope that are already being developed.

". . . the water needed for drilling, and more particularly the ancillary needs such as ice roads and airstrip construction, poses the major engineering problem," the report states. "Water in the area is confined to surface resources, and there are few lakes of appreciable size within the area."

It can take as much as 15 million gallons of water to drill one exploratory well, in an area with few lakes and where all but two rivers are dry during the winter.

"The availablilty of adequate gravel supplies in the area is uncertain," the report adds.

The less said about the greater water and gravel supplies for development, the better. When we look at ANWR, we discover how lucky we were that the first oil discovery on the North Slope was so near the Sagavanirktok River Delta on Prudhoe Bay.

I won't go into the environmental or wildlife aspects of the ANWR question at this time, except to note that there is a great misconception about that topic. We often hear it said that the experience at Prudhoe Bay proves that oil development and caribou can coexist peacefully, but the wildlife studies in print show that's not the case.

You can't equate the survival of the tiny caribou bands around Prudhoe Bay with the giant Porcupine caribou herd in ANWR, and what we do know from the Prudhoe Bay experience that development of ANWR would have a major effect on wildlife. That is speiled out more fully in the Interior report.

It's puzzling why Alaskans would support ANWR development when it would draw industry attention from oil reservoirs already discovered on state land nearer to the trans-Alaska pipeline. The more I read the Interior report, the more puzzling this question became.

*Fred Pratt is free-lance journalist who covers Alaska business and politics.*