ALASKA LEGISLATURE COMMITTEE FILES 1991-1992 8672
7625 SENATE RESOURCES

SENATE COMMITTEE REPORT

FIRST COMMITTEE OF REFERRAL

DATE: 3/13/91 FURTHER: Finance

Date of 5-Day Notice: _____
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: _____

Resources Committee considered SB 198

Establishing the Delta Clearwater Public Use Area; efd.

and recommended:

[ ] replace with _____ CS _____ [ ] same title [ ] new title

[ ] attached amendment(s)

[ ] _____ letter of intent adopted

[ ] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

[ ] further referral to _____

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:

[ ] fiscal note(s) _____

_____

_____

_____

[ ] appropriation-no fiscal note

Department(s)/Date:

[ ] zero fiscal note(s)_____

_____

_____

_____

[ ] Governor's bill w/fiscal note

SIGNING DO PASS:

_____

_____

_____

_____

_____

_____

OTHER RECOMMENDATIONS:

_____

_____

_____

_____

_____

_____

_____
Chair: Signature and Recommendation

WALTER J. HICKEL, GOVERNOR

DEPARTMENT OF NATURAL RESOURCES

OFFICE OF THE COMMISSIONER

400 WILLOUGHBY AVENUE
JUNEAU, ALASKA 99801-1796
PHONE: (907) 465-2400
FACSIMILE: (907) 586-2754

April 10, 1991

The Honorable Lloyd Jones, Chair
Senate Resources Committee
P.O. Box V
Juneau, AK 99811

Dear Senator Jones:

Subject: SB 198, which establishes the Delta Clearwater Public Use Area.

Position: We have asked the Legislature to place an informal moratorium on the establishment of new legislative designations, including this one, until the state's final land selection project is completed. Some of the area recommended for designation as a public use area in this bill was recommended for a recreational river designation during the planning process. However, since the area is already being managed to maintain and enhance water quality, fish and wildlife habitat, and recreational resources, a legislative designation at this time is not necessary.

Background: The Tanana Basin Area Plan recommends that the Delta/Clearwater River corridor, its headwaters and surrounding wetlands be designated as a State Recreation River. The special designation is proposed to retain the area in state ownership and maintain the water quality, fish and wildlife habitat, and recreational resources of the river.

The plan states that until the Legislature takes action on the proposed legislative designation, the area will be managed according to the guidelines and recommendations attributed to the area in the planning document.

The legal description for land and water to be designated a public use area in this bill exceeds that recommended in the plan. This bill would include land offered in several former agricultural disposals as well as land proposed for future disposals within the designated area. It would also include portions of the bison range and the state forest in the new public use area.

Recommendation: Defer action on this bill until January, 1994. If action is taken in the future, work with the department to amend the legal description to more closely match the plan recommendations and adjust the language in certain sections of the bill.

10-J9LH

Please let me know if you need additional information about this matter.

Sincerely,

Harold C. Heinze

Harold C. Heinze
Commissioner

enclosure

cc: Senator Shultz
Bruce Kendall, Legislative Liaison, Office of the Governor
Carl Rosier, Commissioner, Department of Fish and Game

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SB 198

Revision Date:
Department Affected: Natural Resources
Title: Delta Clearwater Special Use Area
BRU: Land & Water Management
Components: Land & Water Management
Sponsor: Senator Shultz
Requestor: Senate Resources
COMPONENT SERIAL NO. 431

EXPENDITURES/REVENUES: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND&STRUCTURES						
GRANTS,CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0.0	0.0	0.0	0.0	0.0	0.0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0.0	0.0	0.0	0.0	0.0	0.0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of Current year impact:

ANALYSIS: (Attach a separate page if necessary)

See Attached

Prepared by: Gary Gustafson
Phone: 762-2692
Division: Land & Water Management
Date: 8-Apr-91

Approved by Commissioner: Harold Heinze
Date: 8-Apr-91
Agency: Department of Natural Resources

Distribution (by preparer) : Legislative Finance, legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

REV 10/90

DIVISION OF LEGAL SERVICES

LEGISLATIVE AFFAIRS AGENCY
STATE OF ALASKA

P.O. Box Y, Juneau, Alaska 99811
(907) 465-3867 or 465-2450
FAX (907) 465-2029

Deliveries to: 240 Main Street
Court Plaza, Room 500
Mail Stop 3101

MEMORANDUM April 12, 1991

SUBJECT: Senate Bill 108, establishing the Delta Clearwater Public Use Area -- sectional analysis

TO: Senator Lloyd Jones, Chair
Senate Resources Committee

FROM: Jack Chenoweth
Legislative Counsel

The measure sets aside state land located "within the Delta Clearwater watershed" encompassed in the townships set out in proposed AS 41.23.198 as the Delta Clearwater Public Use Area. The material is codified as AS 41.23.180 - 41.23.199. If enacted, the measure would establish the state's fifth land reservation that is statutorily designated as a "public use" area.

Bill section 1 adds eight codified sections to establish the Delta Clearwater Public Use Area --

Proposed AS 41.23.180 enumerates reasons that the area is set aside as a public use area.

Proposed AS 41.23.183 assigns management of the resources of the new public use area to the Department of Natural Resources. It directs the commissioner to prepare and propose a management plan, sets out the intended content of that management plan, provides opportunity for public comment to the proposed plan, and directs submittal of the plan for legislative review. The plan takes effect unless rejected by act of the legislature. Revisions of the plan are to be handled in the same manner. The section directs that, as to the preparation of the initial plan and to any revisions, public hearings must be held in Delta Junction. The section also authorizes the commissioner of natural resources to adopt implementing regulations.

The topic of managing the public use area is addressed in proposed AS 41.23.186. The section authorizes the commissioner to enter into an agreement with the local management board to manage the area. It also specifies that the Department of Fish and Game has responsibility for management of the area's wildlife and fisheries

resources, the management to be consistent with the statement of the area's purpose. Traditional access is guaranteed, consistent with the statement of the area's purpose.

Proposed AS 41.23.189 enumerates three specific prohibitions relating to the area: (1) Acquisition of land by eminent domain is not authorized. (2) The unit may not be managed as a state park. (3) The commissioner may not limit sport and subsistence activities in the area if those activities are allowed by a regulation of the Board of Fisheries or Board of Game.

Proposed AS 41.23.192 permits the commissioner of natural resources to prohibit or restrict uses within the area that are incompatible with the area's management plan, and spells out specific steps to be taken in the event the commissioner determines that a use is incompatible.

Proposed AS 41.23.195 establishes a ten-member (seven voting members; three non-voting members) Delta Clearwater Management Board, specifies the board's composition, outlines its organization, and sets the members' terms. It explicitly prohibits payment of salary or reimbursement of travel and per diem for voting members, but makes an exception for certain activities of the person who chairs the board. The section authorizes the board to make its own rules and regulations. It relieves the voting members of liability for their decisions. Significantly, the measure spells out the relationship between the management board and the commissioner of natural resources with respect to decisions made by the commissioner in the management of the resources of the Delta Clearwater Public Use Area: a unanimous decision of the voting members may require the commissioner to reconsider the decision.

Proposed AS 41.23.198 identifies the geographic area within which the Delta Clearwater Public Use Area is to be established.

Proposed AS 41.23.199 sets out a necessary definition.

Bill section 2 serves to set the terms of office of the members of the Delta Clearwater Management Board who are first appointed.

Bill section 3 gives the measure an immediate effective date.

JBC:lmb
91-110.lmb

Alaska State Legislature

SENATOR DICK SHULTZ

P.O. Box V
Juneau, Alaska 99811
(907) 465-4940
Home: P.O. Box 487
Tok, Alaska 99780

Member
Finance Committee
Transportation Committee
Special Committee on Oil & Gas

Senate
District J

MEMORANDUM

District 17

ALCAN BORDER
ANDERSON
BIG DELTA
BOUNDARY
CANTWELL
CHICKEN
CHISTOCHINA
CLEAR
COPPER CENTER
DELTA JUNCTION
DENALI PARK
DOT LAKE
DRY CREEK
EAGLE
EAGLE VILLAGE
GAKONA
GLENNALLEN
GULKANA
HEALY
HEALY LAKE
KENNY LAKE
MENDELTNA
MENTASTA LAKE
NABESNA
NELCHINA
NENANA
NORTHWAY
PAXSON
SLANA
TANACROSS
TAZLINA
TETLIN
TOK
TOLSONA
TONSINA

District 18

BADGER ROAD
EIELSON/MOOSE CREEK
NEWBY
NORTH POLE
PLACK
RICHARDSON
SALCHA

TO: ALL SENATORS

FROM: SENATOR SHULTZ

DATE: MARCH 12, 1991

RE: DELTA CLEAR WATER AREA

********** ********** ********** **********

I am introducing a bill establishing the Delta Clearwater Public Use Area. There are some important differences in this bill as compared to other bills which seek to so designate an area.

First this bill does not prevent land disposals. Nor does it mandate a management plan. Further it guarantees traditional access and use of the fish and wildlife resources and does not preclude any specific type of development.

In addition the bill sets out a local management board to work with the commissioner in determining what type of plan if any is advisable for the area. The management board has no regulatory authority, but it can by unanimous vote cause an expedient review process of any management decision by the commissioner.

Finally, the bill prevents pay or per diem for management board members and stipulates the governor make appointments from highly active local organizations in the area. Only citizen members will be able to vote on the seven member board. All agency people will be advisory in their capacity on the management board.

This legislation has the support of the City Council, the Soil and Water District, the local Fish and Game Advisory Board, the Delta Sportsman Association, the local Parks and Recreational Board and the Deltana Corporation.

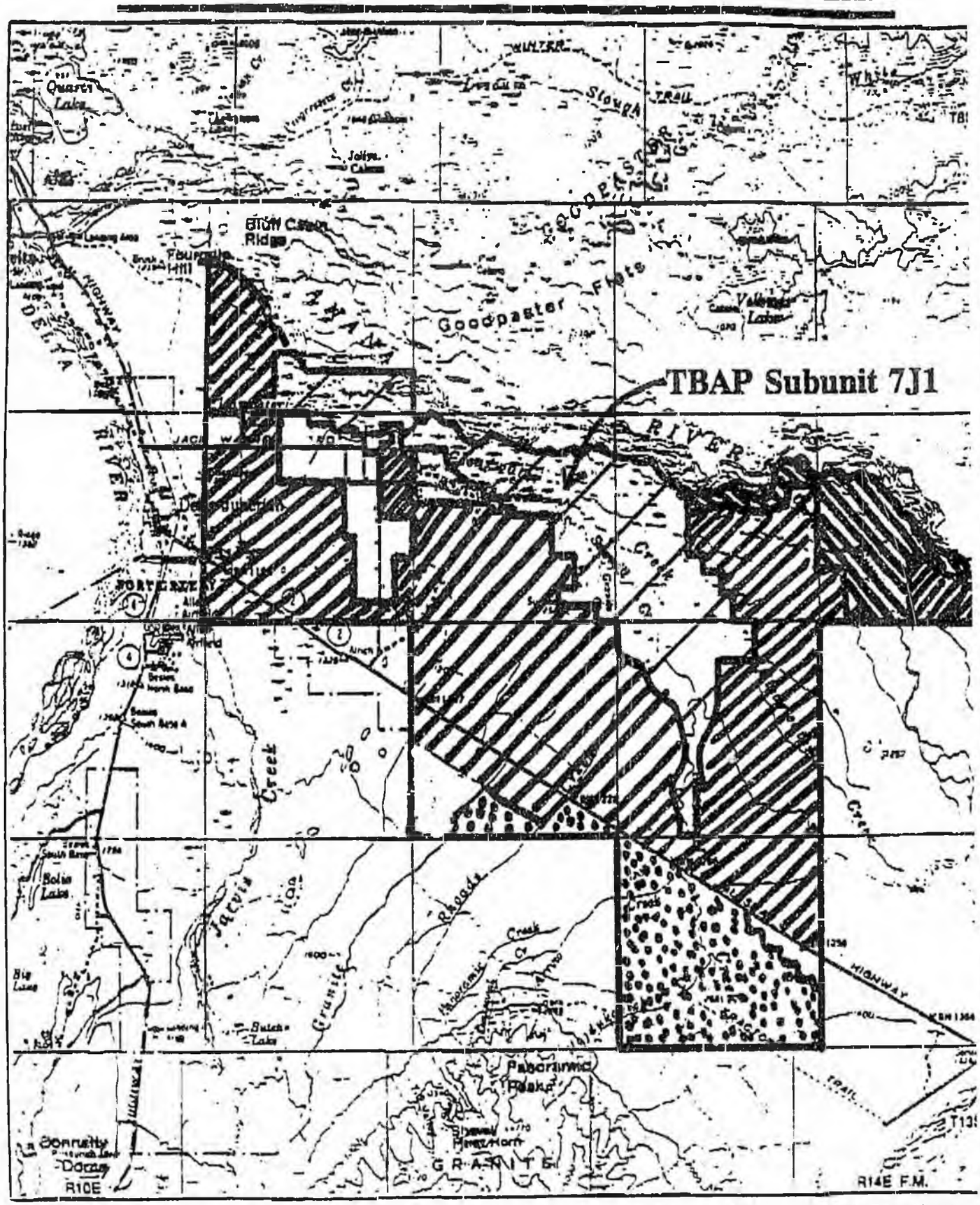
There are no inter-agency differences nor are there any objections by any federal agencies. In short I have yet to find anyone who locally does not want to see this twenty mile stream designated as a public use area and protected for future generations.

I have been told this unique 20 mile stream which originates as an artesian aquafer has the best water quality in the state. It is an important anadromous stream and supports a unique fresh water fishery. Anyone who has experienced the Clearwater understands the unique value of such a stream.

I invite your support for this legislation.

Tanana Basin Area Plan

DELTA/CLEARWATER RIVER



USGS 1:250,000 Big Delta, Mt. Hayes

0 8 scale in miles

Past DNR dispositions

Tanana Valley State Forest

Bison Range

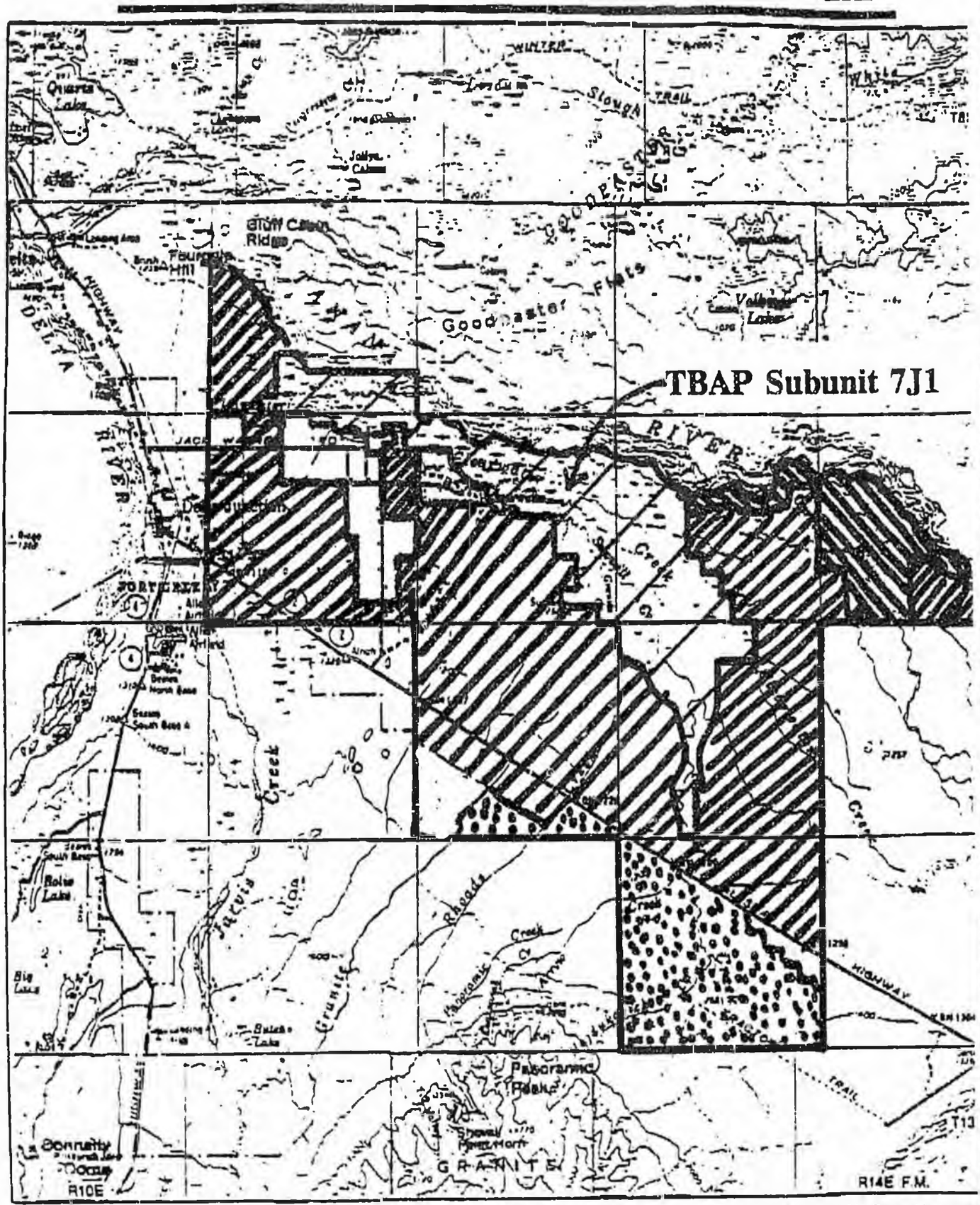
PLAN Rec. for Deig Area

OUTLINE OF designated AREA IN SB198

These areas are included in SB 198 designation

Tanana Basin Area Plan

DELTA/CLEARWATER RIVER



USGS 1:250,000 Big Delta, Mt. Hayes

0 8

scale in miles

Past DNR disposals

Tanana Valley State Forest

Bison Range

From - TANANA BASIN AREA PLAN - CHAPTER 3

Management Unit 7J
Delta/Clearwater River

Management Intent

General. State lands within this management unit will be managed to maintain and enhance the water quality, fish and wildlife habitat, and recreational resources. The potential effects from adjacent developmental activities on these resources must be considered while making land management decisions within this management unit.

The Delta/Clearwater River corridor, its headwaters, and surrounding wetlands are recommended for legislative designation as a State Recreation River. The purpose of this designation is to maintain the water quality, fish and wildlife habitat, and recreational resources of the river. Boundaries for this legislative designation should reflect the need to maintain these values.

Fish and wildlife. Habitat is a primary use in this unit. Because of the importance of this area as fish and wildlife habitat, any development proposal will require careful consideration of development impacts on fish and wildlife.

Recreation. Recreation is a primary use in this management unit. This management unit receives heavy fishing and boating use. Management of recreational uses, however, shall ensure maintenance and/or improvement of habitat.

Minerals. To prevent conflicts with the habitat, this area is closed to new mineral entry.

Watershed. The Delta/Clearwater River is one of the few entirely spring-fed stream systems in the basin. Protection of water quality is of primary importance to maintain the fisheries and recreation values.

Other resources. Material sales will not be allowed within this unit. Limited personal timber use is allowed where consistent with the primary management intent.

Management Guidelines

Management guidelines that apply to all state land are listed in Chapter 2. Some or all of those guidelines may apply to uses in this unit.

FROM TANANA BASIN AREA PLAN - CHAPTER 3

LAND-USE DESIGNATION SUMMARY
MANAGEMENT UNIT 7J: DELTA/CLEARWATER RIVER

	LAND USE DESIGNATIONS				
SUBUNIT	Primary Surface Uses	Secondary Surface Uses	Subsurface[1]	Prohibited Surface Uses[2]	COMMENTS
7J1	Public recreation Watershed Wildlife habitat		Closed	Land disposals Material sales Remote cabins	Recommended for legislative designation as a State Recreation River.

[1]Subsurface designations refer to locatable minerals. All areas are available for leasing for leasable minerals, except as noted for coal.

[2]Other uses such as material sales, land leases, or permits that are not specifically prohibited may be allowed. Such uses will be allowed if consistent with the management intent statement, the management guidelines of this unit, and the relevant management guidelines listed in Chapter 2.

From: TANANA BASIN AREA PLAN - CHAP. 4

AREAS RECOMMENDED FOR LEGISLATIVE DESIGNATION

INTRODUCTION

Several areas within the Tanana Basin are recommended for legislative designation either as State Recreation Rivers, State Recreation Areas, State Game Refuges, or State Critical Habitat Areas.

These recommendations are based on the outstanding public values in the proposed areas and the state's intent to retain these areas in public ownership. Legislative designations have been proposed only in areas possessing high resource values that

1) should clearly remain in public ownership permanently, and

2) the nature and value of the resources present require more restrictive management for protection than is possible under a general multiple use classification.

The following section lists these areas.

STATE RECREATION RIVERS

State Recreation Rivers established by the legislature are managed by the Department of Natural Resources (DNR), Division of Land and Water (DLW), under Alaska Statutes (AS) Title 38 and under the direction of the act that establishes the Recreation River.

There are no established criteria for State Recreation Rivers. In 1988, the legislature established six Recreation Rivers in the Susitna Basin. These are the only recreation rivers established in the state. The legislation is specific to those six rivers and provides little guidance for establishment of additional rivers throughout the state.

The TBAP planning team used the following guidelines when considering additions to the recreation river system:

1) to focus planning and management to solve or avoid important management problems (especially managing public use);
2) to recognize the state-wide or regional importance of the river's recreation resources;
3) to ensure long-term retention in public ownership and management to ensure public recreation, fishing, and hunting.

Three rivers in the Tanana Basin have outstanding public values and merit designation as State Recreation Rivers. The following is a brief description of each river and a

discussion of how each corridor will be managed.

Chatanika State Recreation River (Subunits 1E1 and 1U2)

The Chatanika River is very popular with Fairbanks residents for hunting, fishing, trapping, wildlife viewing, and motorized and non-motorized boating. Of the few clearwater streams with good access in the Tanana Basin, the Chatanika is the least developed river close to Fairbanks. The state will manage the river to maintain existing uses, and maintain the access while minimizing development that would likely change the character of the river uses, or the productivity of the fish and wildlife habitat along the river. To recognize the importance of this river to Fairbanks residents and to maintain the quality of the recreation and habitat in the river corridor, the area is recommended for legislative designation as a State Recreation River.

Nenana State Recreation River (Subunits 4R2, 4R3, 4R4, and 4R5)

The Nenana River corridor is one of the most important recreation areas in the state. The river's proximity to the entrance of Denali National Park and Preserve makes it one of the state's highest visitor-use areas. The river is heavily used by the public for rafting, canoeing, and transportation to hunting areas. The riparian corridor is important for moose and other mammals. Because of the river corridor's importance to the state's residents and visitor industry, the Nenana River corridor will be managed to maintain its current character and to protect its scenic, recreational, and fish and wildlife values. The river corridor currently is, and should remain, closed to mineral entry.

The boundaries of the legislative proposal may require adjustment from boundaries in the plan to accommodate the needs of local communities and future municipal governments.

The Nenana River corridor north of Healy (management subunit 4R1) has been dropped from the recommendation for legislative designation as a state recreation river. This section of the river has lower recreation values, and receives less recreation use compared to the river above Healy. The river below Healy includes active and potential mining developments. This section of the river corridor will be opened to mineral entry.

Delta/Clearwater State Recreation River (Subunit 7J1)

This recommendation includes both the Delta-Clearwater River and Clearwater Lake. Clearwater Lake, and the lower Delta-Clearwater River are in a region of upwelling water from the alluvial fan of the Delta and Gerstle rivers. This water makes these areas some of the few waterbodies in interior Alaska that remain ice-free year-round. As a result, they are extremely important spawning areas (and for Clearwater Lake, a coho salmon rearing area) for late-run salmon. Clearwater Lake also provides nesting

habitat and is an important spring staging area for waterfowl.

The Delta-Clearwater River is popular for summer grayling and silver salmon fishing. Access is either by boat from the Tanana, or from the road system to the Delta-Clearwater upstream from the lake, or at a small launch site at the lake. A common float trip is down the creek with a take-out at the lake.

The Delta-Clearwater River is recommended for legislative designation as a State Recreation River because of its importance for recreation and for fish and wildlife habitat. The proposed recreation river will be closed to mineral entry.

State Recreation River Legislation

Legislative proposals for these areas should be developed by an interagency team and will be reviewed by the public prior to submission to the legislature. The interagency team will include representatives from the DNR divisions of Land and Water, Parks and Outdoor Recreation, Forestry, Agriculture, and Mining; from the Department of Transportation and Public Facilities, from the Department of Fish and Game, and from the Department of Environmental Conservation.

Legislative proposals developed for these areas will ensure that the river corridors are managed for multiple use, including hunting, fishing, and other recreational activities, habitat management, personal use timber harvesting, and water quality protection. Land sales and remote cabins will be prohibited in these corridors; however, public use cabins, and in some instances, commercial recreation facilities may be allowed. Provisions will be made for access across the river and for use of existing mining claims. The designations will not regulate use of private land in the unit.

In developing legislative proposals, boundaries of units for these rivers may be modified. Legislative proposals should follow the subunit boundaries in general; however, when these areas are looked at in greater detail, modifications may be necessary. Any modification will be consistent with the management intent for the corridor.

Until the legislature takes action on these proposals, these areas will be managed consistent with the guidelines stated above and the section of Chapter 3 in the plan for each management unit. The boundaries of areas subject to these guidelines can be found in this plan or on maps at DNR's Northern Regional Office in Fairbanks.

STATE RECREATION AREAS

State Recreation Areas are established by the legislature and managed by the Alaska Division of Parks and Outdoor Recreation. State recreation areas are units of the park system and possess a diversity of outdoor recreational opportunities. The dominant

Alaska State Legislature

SENATOR DICK SHULTZ

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Home: P.O. Box 487
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Member
Finance Committee
Transportation Committee
Special Committee on Oil & Gas

Senate
District J

MEMORANDUM

District 17

ALCAN BORDER
ANDERSON
BIG DELTA
BOUNDARY
CANTWELL
CHICKEN
CHISTOCHINA
CLEAR
COPPER CENTER
DELTA JUNCTION
DENALI PARK
DOT LAKE
DRY CREEK
EAGLE
EAGLE VILLAGE
GAKONA
GLENNALLEN
GULKANA
HEALY
HEALY LAKE
KENNY LAKE
MENDELTNA
MENTASTA LAKE
NABESNA
NELCHINA
NENANA
NORTHWAY
PAXSON
SLANA
TANACROSS
TAZLINA
TETLIN
TOK
TOLSONA
TONSINA

District 18

BADGER ROAD
BIELSON/MOOSE CREEK
NEWBY
NORTH POLE
PLACK
RICHARDSON
SALCHA

TO: ALL SENATORS

FROM: SENATOR SHULTZ

DATE: MARCH 12, 1991

RE: DELTA CLEAR WATER AREA

********** ********** ********** *********

I am introducing a bill establishing the Delta Clearwater Public Use Area. There are some important differences in this bill as compared to other bills which seek to so designate an area.

First this bill does not prevent land disposals. Nor does it mandate a management plan. Further it guarantees traditional access and use of the fish and wildlife resources and does not preclude any specific type of development.

In addition the bill sets out a local management board to work with the commissioner in determining what type of plan if any is advisable for the area. The management board has no regulatory authority, but it can by unanimous vote cause an expedient review process of any management decision by the commissioner.

Finally, the bill prevents pay or per diem for management board members and stipulates the governor make appointments from highly active local organizations in the area. Only citizen members will be able to vote on the seven member board. All agency people will be advisory in their capacity on the management board.

This legislation has the support of the City Council, the Soil and Water District, the local Fish and Game Advisory Board, the Delta Sportsman Association, the local Parks and Recreational Board and the Deltana Corporation.

There are no inter-agency differences nor are there any objections by any federal agencies. In short I have yet to find anyone who locally does not want to see this twenty mile stream designated as a public use area and protected for future generations.

I have been told this unique 20 mile stream which originates as an artesian aquafer has the best water quality in the state. It is an important anadromous stream and supports a unique fresh water fishery. Anyone who has experienced the Clearwater understands the unique value of such a stream.

I invite your support for this legislation.

FISCAL NOTE

STATE OF ALASKA
1992 LEGISLATIVE SESSION

BILL NO. SB 198

Revision Date: 12/18/91
Department Affected: Fish and Game
Title: An Act establishing the Delta Clearwater Public Use Area
BRU: Habitat
Component: Habitat
Sponsor: Senator Shultz
Requestor:
COMPONENT SERIAL NO. 4 8 6

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 93	FY 94	FY 95	FY 96	FY 97	FY 98
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE FUND SOURCE:	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER FUND SOURCE:						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

Estimate of current year impact: No impact on current year.

ANALYSIS: (Attach a separate page if necessary.)

Prepared By: Frank Rue, Director
Phone: 465-4105
Division: Division of Habitat
Date: 12/19/91
Approved by Commissioner:
Agency: Department of Fish and Game
Date: 12/20/91

Distribution (by preparer): Leg. Fin., Legislative Sponsor, Requestor, OMB/DBR, Gov. Legis. OSC., & Impacted Agency(ies).

Rev 10/7/91

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SB 198

Revision Date: 04/11/91 Department Affected: Fish and Game

Title: An Act establishing the Delta Clearwater Public Use Area BRU: Habitat

Component: Habitat

Sponsor: Senator Shultz

Requestor: COMPONENT SERIAL NO. | | 4 | 8 | 6 |

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	0	0	0	0	0	0
TRAVEL	0	0	0	0	0	0
CONTRACTUAL	0	0	0	0	0	0
SUPPLIES	0	0	0	0	0	0
EQUIPMENT	0	0	0	0	0	0
LAND & STRUCTURES	0	0	0	0	0	0
GRANTS, CLAIMS	0	0	0	0	0	0
MISCELLANEOUS	0	0	0	0	0	
TOTAL OPERATING	0	0	0	0	0	0
CAPITAL	0	0	0	0	0	0
REVENUE	0	0	0	0	0	0

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER						
TOTAL	0	0	0	0	0	0

POSITIONS:

FULL-TIME	0	0	0	0	0	0
PART-TIME	0	0	0	0	0	0
TEMPORARY	0	0	0	0	0	0

Estimate of current year impact: no impact on current year

ANALYSIS: (Attach a separate page if necessary.)

Prepared By: Frank Rue, Director Phone: 465-4105

Division: Division of Habitat Date: 4/11/91

Approved by Commissioner: Don Somerville

Agency: Department of Fish and Game Date: 4/12/91

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

Rev 10/90

DEPARTMENT OF FISH AND GAME
POSITION PAPER

Bill No: Senate Bill 198

Sponsor: Senator Shultz

Division: Habitat

Bill Title: An Act establishing the Delta Clearwater Public Use Area

Department Position: Support if amended.

This measure designates nearly all vacant and unappropriated land within the Delta Clearwater River watershed as the Delta Clearwater Public Use Area. The measure requires DNR to develop a management plan to regulate public uses, provides for prohibition or restriction of incompatible uses, and establishes a management board to oversee DNR land management of the Public Use Area. Management of the Public Use Area may not restrict lawful sport and subsistence fishing, hunting, or trapping rights allowed by the Board of Fisheries or the Board of Game.

The Department supports the concept of protective legislation for the Delta Clearwater River. The Delta Clearwater River is a unique, highly productive grayling and coho salmon spawning stream with road access and campgrounds supporting the fifth largest Arctic grayling fishery in Alaska. Clearwater Lake also provides nesting habitat and is an important spring staging area for waterfowl. The economic value of the Delta-Clearwater River was conservatively estimated by a 1987 Salcha-Delta Soil and Water Conservation District study at $2.1 million dollars annually. Maintenance of the quality of aquatic habitats and water is directly related to maintaining the recreation and economic values of the Delta Clearwater River for future generations.

Local interest in protecting the Delta-Clearwater River watershed is high. Clearwater Lake was first identified in DNR's 1975 planning study that was a precursor to the Delta-Salcha Area Plan as an area that should be legislatively designated as a wildlife refuge. In 1984 ADF&G drafted a measure to make Clearwater Lake part of a proposed Delta-Clearwater Critical Habitat Area. This draft legislation was never introduced. In 1985, the Salcha-Delta Soil and Water Conservation District initiated a study to assess existing sedimentation problems within the Delta Clearwater River watershed.

Senate Bill 198 Position Paper Continuation

In 1987, the local soil and water conservation district initiated discussions with the Division of Agriculture to investigate opportunities for acquiring and preserving additional greenbelts and conservation easements throughout the watershed. In late 1989, a local Delta ad-hoc committee comprised of private citizens was formed to evaluate land management options for the Delta Clearwater River. In 1990 the ad hoc committee recommended legislative designation of the Delta Clearwater as a recreational river corridor and development of a comprehensive river management plan. In 1990, the Tanana Basin Area Plan update also recommended that the Delta Clearwater River corridor, its headwaters, and surrounding wetlands receive legislative designation as a State Recreational River. The Tanana Basin Area Plan further included general guidance requiring all state lands within the Delta Clearwater River management unit to be managed to maintain and enhance water quality, fish and wildlife habitat, and recreational resources.

Clarification is needed on the effect legislative designation will have on other public and private inholdings within the outer boundaries of the public use area, including the ADF&G's management and habitat enhancement activities on portions of the Delta Bison Range, University of Alaska Experimental Station, Tanana Valley State Forest, Division of Park's state camping facilities, and private agricultural, subdivision and recreational parcels. Other potential options for legislative designation might include recreational river or public use area status. Further clarification and would be helpful on (1) the relationship, if any, of the Delta Parks and Recreation Advisory Board and the Delta Clearwater Management Board, (2) the appropriateness of creating a management board versus advisory board, and (3) the legal ramifications of the measure's proposal to grant the Delta Clearwater Management Board authority to restrain DNR management decisions pending formal reconsideration.

If the desire is to have the Commissioner of DNR regulate boating under Article 8, Section 14 of the State Constitution, there should be clear statutory authority for him/her to do so.

Commissioner's Signature Ron Somerville Date 4/12/91

SB

200

SENATE COMMITTEE REPORT

FIRST COMMITTEE OF REFERRAL

DATE: 3/13/91 FURTHER: Finance

Date of 5-Day Notice: _____
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: _____

Resources Committee considered SB 200

Prince William Sound science center trust fund; efd.

and recommended:

[ ] replace with _____ CS _____ [ ] same title [ ] new title

[ ] attached amendment(s)

[ ] _____ letter of intent adopted

[ ] do pass

[ ] do not pass

[ ] no recommendation

[ ] individual recommendations

[ ] further referral to _____

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:

[ ] fiscal note(s) _____

_____

_____

_____

[ ] appropriation-no fiscal note

Department(s)/Date:

[ ] zero fiscal note(s)_____

_____

_____

_____

[ ] Governor's bill w/fiscal note

SIGNING DO PASS:

_____

_____

_____

_____

_____

_____

OTHER RECOMMENDATIONS:

_____

_____

_____

_____

_____

_____

_____
Chair: Signature and Recommendation

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. SB 200

Revision Date: March 14, 1991

Department Affected: Revenue

Title: An act establishing the Prince William science center trust fund

BRU: Treasury

Component:

Sponsor: Menard

Requestor: Resources and Finance

Component Serial No.

	1	2	1

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES	5.0	5.0	5.0	5.0	5.0	5.0
TRAVEL						
CONTRACTUAL	20.0	20.0	20.0	20.0	20.0	20.0
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	25.0	25.0	25.0	25.0	25.0	25.0
CAPITAL						
REVENUE						

FUNDING: (Thousands of Dollars)

GENERAL FUND						
FEDERAL FUNDS						
OTHER	25.0	25.0	25.0	25.0	25.0	25.0
TOTAL	25.0	25.0	25.0	25.0	25.0	25.0

POSITIONS:

FULL-TIME						
PART-TIME						
TEMPORARY						

Estimate of current year impact:

ANALYSIS: Basic personal services and contractual costs for a trust fund managed by the Treasury division. Contractual costs would consist of external investment management, auditing and custodial services. Future costs increases are dependent on the asset growth of the trust fund from contributions and market gains.

Prepared by: Brian C. Andrews

Phone: 465-2350

Division: Treasury

Date: March 11, 1991

Approved by Commissioner:

Agency: Revenue

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

Rev 10/90

SB

216

FIRST COMMITTEE OF REFERENCE

DATE: 3/20/91 FURTHER: Finance

Date of 5-Day Notice: March 26, 1992
(in accordance with Uniform Rule 23)

DATE TURNED INTO OFFICE: April 27, 1892

Resources Committee considered SB 216

Authorizing moose and caribou farming.

and recommends it be replaced with

and recommended:

[X] replace with _____ CS SB 216 (Res) [ ] same title [X] new title

[ ] attached amendment(s) and report it back as follows

[ ] _____ letter of intent adopted

[ ] do pass

[ ] do not pass

[ ] no recommendation

[X] individual recommendations

[ ] further referral to _____

ATTACHES NEW FISCAL NOTE(S):

Department(s)/Date:

[X] fiscal note(s) _____

Department(s)/Date:

[X] zero fiscal note(s) ADF&G 4/1/92 for SB

[ ] appropriation-no fiscal note

[ ] Governor's bill w/fiscal note

SIGNING DO PASS:

OTHER RECOMMENDATIONS:

Sens. Cotten & Zharoff signed No Recommendation
Senator Eliason signed no recommendation 20 - 1
nothing happens

Chair: Signature and Recommendation

Reprinted from Rangelands
Vol. 9, No. 5, October, 1987
Rangelands 9(5), October 1987

Game Ranching in Western Canada

Lyle A. Renecker and Henry M. Kozak

Trends in the world meat markets have been towards leaner meats as people become more conscious of fat, cholesterol, and energy values. As a result, beef markets have become depressed. Venison is naturally a lean meat with a low percentage of intramuscular fat but high levels of protein. Thus, the sale of meat from wild ungulates raised on commercial game ranches could serve as an alternative to meet the demands for leaner meats.

Recently, Geist (1985) presented a view that game ranching is a threat to conservation of wild ungulates. Earlier, Odum (1971) showed the need to diversify wildlife management, such that a mixture of protective (parks and reserves), productive, and multiple-use systems are practiced. In this article, we will attempt to clarify many of the misconceptions about game ranching and outline the benefits of this new promising industry.

Historical Perspective

Wild indigenous herbivores have been closely associated with human occupation of North America for thousands of years. Paleolithic man exploited large numbers of herbivores in North America more than 100,000 years ago (Martin 1973). In recent times, wild game has been used as subsistence food. As settlements in North America expanded, there was uncontrolled decimation of wild herbivores. Present management concepts are designed to place controls on removal rates of wildlife and guarantee a supply of wild stock for sport hunting. However, with this view of wildlife management, there is a lack of diversity as outlined by Odum (1971) to service the variable needs of the public. In Alberta, resources are generally managed as multiple-use or compromise systems which attempt to satisfy the conflicting demands of several users. Parks are few and the area reserved for resource protection within their boundaries is relatively small. Game ranching is a means of providing this missing dimension to wildlife management. It adds the concept of conservation to lands allocated to agriculture by reversing the transformation of natural habitat to cultivation. As a result, the many rare and threatened species in the highly productive prairie and aspen parkland will be perpetuated.

Interest in game ranching as a commercial enterprise has grown during recent years in western Canada. Initially, Elk Island National Park, Alberta, Canada, served as the model for large-scale management of a mixed-species assemblage of native ungulates (Telfer and Scotter 1975). The herbivore guild, most suited for extensive game ranching in habitats of prairie parkland and aspen-dominated boreal forest zones of western Canada, is a combination of bison, wapiti, and moose, of which bison is the largest contributor in biomass and productivity (Renecker et al. 1987).

Authors are research assistants, Department of Animal Science, University of Alberta, Edmonton, Alberta, Canada T6G 2P5.

Game Ranching or Farming

Game ranching is a production strategy whereby high fencing costs are diluted by increasing size of the land base and management inputs are minimized. Here, carrying capacity is maximized through a mixed-species grazing system. Because of this need for a large contiguous land base (>25 km²) (Hudson and Blyth 1986) there are few opportunities for private landowners to establish extensive ranches.

A mixture of open grassland, and forested areas and wetlands, such as found in Elk Island National Park, are necessary to exploit a mixed-species grazing strategy on extensive ranches.

Indian and Metis settlements are the best candidates for this strategy since they are associated with large tracts of communally owned land necessary for the mixed-species approach (Hudson 1981). Additionally, game ranching is an opportunity for native people to acquire a feeling of self-importance and income in a manner which is compatible with their traditional concepts. For example, the opportunities produced by this new wildlife industry, which are similar to the tradi[illegible]al lifestyle of native peoples, have been [illegible]by [illegible]glala Sioux in South Dakota for many years ([illegible]ne first commercial large scale or extensive ga[illegible], Canada was established in 1980 on land of the Kikino Metis Settlement in north-central Alberta.

With large properties, it becomes more difficult to control animal movements for calving, velvet antler removal, autumn rut and round-ups, and to take advantage of all economic opportunities. For example, the initial direction of the Kikino Metis Settlement venture was towards a large scale management sysem with a low labour requirement. However, experience revealed a greater need for control of animal populations (Renecker and Biewald 1985). The trend of this operation has been to intensify with the addition of subdivisional fences to gain fall control over animal movement. In New Zealand, early game farmers first raised red deer on extensive properties in the harsh environments of mountain hillsides. The trend was soon changed towards an intensive style of pastoral management on lowland ranges with sheep replacing the deer on hillsides. This shift in range use and

management of lands in New Zealand has resulted in higher fecundity and economic returns which offset the costs of fencing (Yerex 1982).

Current legislation of Alberta is being designed to address the promising industry of game ranching. Present policies and regulations discourage the viability of extensive systems. For example, new born calves will require an ear tag and lip-tattoo within 1 month after birth. This is not feasible on large-scale enterprises because of the secretive animal behavior and cryptic coloration of young. It may be necessary to develop management systems whereby ranchers will assign females to smaller paddocks during parturition for identification and tagging. This requirement will identify animals on game ranches and distinguish them from wild stock.

An important factor of game farming is that meat production is not an important strategy until sufficient breeding stock is available. After 20 years of commercial production in New Zealand, meat production remains a secondary strategy to live animal sales[1]. Currently, populations of deer on farms in New Zealand exceed 500,000 animals and until stock numbers increase to 1 million head, supplies will not be sufficient for demands of world venison markets[2]. In Alberta, time will be required for similar acquisition of breeding stock.

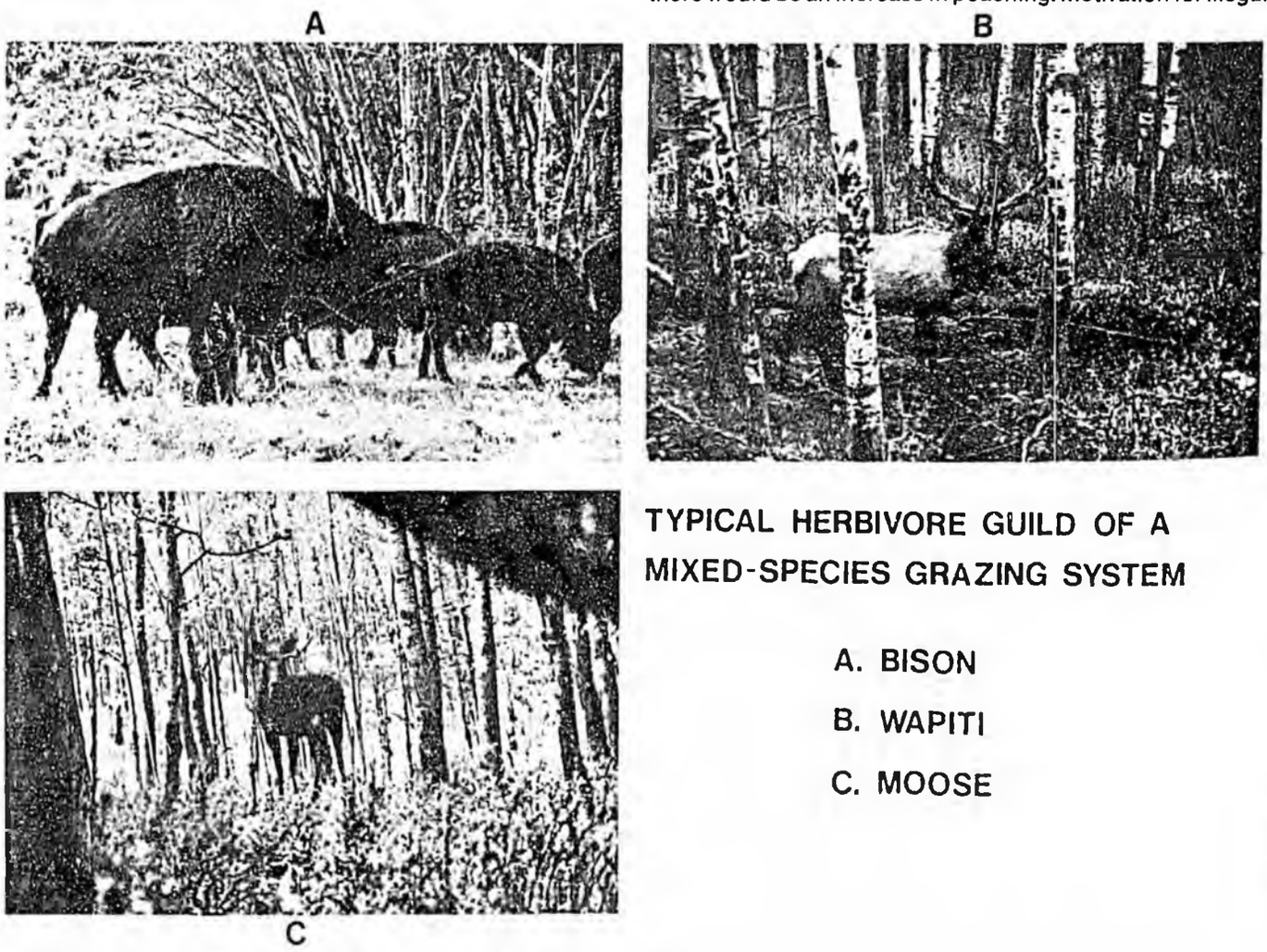
[1]K. Drew, Invermay Agric. Res. Center, New Zealand, pers. commun.
[2]T. Hayward, Agric. Canada, Canada, pers. commun.

Agricultural and Conservation Benefits

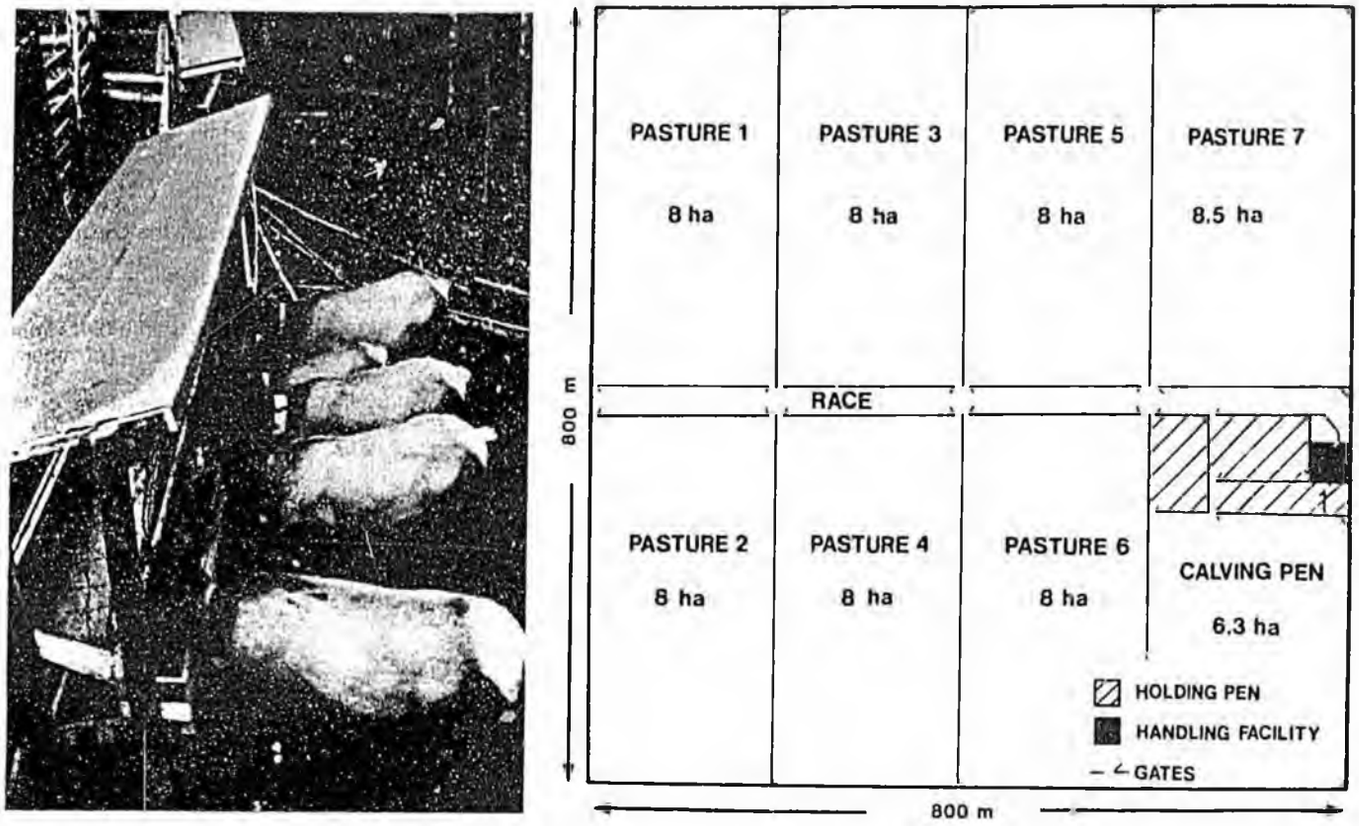
Game ranching was first proposed and investigated on extensive tracts of marginal lands in the aspen boreal forest zone of western Canada by Telfer and Scotter (1975). Land costs, the need to control animal movements, and maintenance of a high level of fecundity will require private enterprise to intensify operations with high stocking rates on smaller paddocks. The game farms will not push the frontier into wilderness lands. In the near future, game ranches will probably replace conventional agriculture on productive lands as was experienced in New Zealand (Yerex 1982). With the development of game farms, lands would be restored to grassland communities where wapiti would replace cattle as the dominant herbivore. Because of their adaptability, wapiti have been recognized as the most productive species in an environment with a mosaic of habitat types and are equally as productive as cattle on good pastures (Alsager and Alsager 1984). So far, only a few game farms have been established for production of valuable breeding stock.

Potential Problems

One anticipated problem about game ranching is that there would be an increase in poaching. Motivation for illegal



Ungulate species of a game ranch in the aspen-dominated boreal forest.



Intensive wapiti farms are smaller properties with internal fences which adopt full control over animal movements and permit supplementary feeding programs.

harvesting of wild stocks is already at least equal to the regulated harvest for some ungulates (Renecker et al. 1986). By legalizing the sale of meat and other by-products from farmed native ungulates, pressure is removed from wild populations as world markets become saturated. Illegal ventures would become less profitable as prices are controlled thereby reducing the motivation to poach and the entry of illicit products into the marketplace.

Velvet antlers and venison are wildlife tissues stimulating the most concern because of their commercial value. Arguments state that velvet antlers can easily be taken at any point in time during their development. However, velvet antlers are only of commercial value to Korean buyers as a folk medicine for about one week each year. Decimation of wild stock for velvet antlers is not a real problem because of the low opportunity for encounter of wild stock in boreal and montane habitats. Super A Grade velvet antlers occur in early June prior to the last bifurcation of the growing antler. Complete sedation and restraint of the animal are required to ensure that the animal and its antlers can be handled with the necessary care. Damage to the velvet immediately dictates a lower grade and eliminates a profit margin and the motivation for illegal entry of this product into the marketplace. It would be impossible for persons without experience in techniques of animal immobilization, animal behavior and velvet antler removal to remove a product of any value. Also, world supplies have been high, markets extremely volatile and few buyers will deal with quantities of less than one tonne. Because supply now meets demand, there are more constraints on quality of Super A grade velvet which leads to lower overall prices. As a result, most commercial operations in New Zealand are not orientated specifically for velvet antler production. In order to sell antler velvet in Alberta, an individual must be in posession of a valid big game farm permit. The permit holder is obligated to submit monthly records of animal inventory to the Government. The sale of products must match the animal inventory thereby eliminating the entry of illegal products to the marketplace.

Illicit sales of meat from wild stock has been forseen as a potential problem of the sale of meat from commercially raised animals. Currently, the federal meat regulations require ante-mortem inspection which ensures observation before slaughter. The marketplace will also stipulate conformity in carcass quality such that the cosmetic characteristics and moisture content of the carcass will be standardized by grain feeding animals for 30-60 days prior to slaughter. This will assure foreign and domestic buyers of a consistent and high quality product for the marketplace. European markets have rigorous standards for slaughter facilities in countries which export venison into the European economic community. Initially, only one such facility will be available in Canada. Finally, all saleable cut meats can be vacuum packaged with a distinctive government seal, thus policing "street pedalling" and illegal marketing of venison. Ultimately, the fact remains that commercial buyers of this specialty product will not trade with illicit sources and jeopardize their

business licence when a consistent legal supply of venison is available. Game ranching may not serve to curb the poaching problems that currently exist but it certainly will not augment them since it is the consistent quality of the game ranched product that is desired by the consumer.

Predictably, game meat from ranches and farms will supply the world demands for venison. With the development of the game ranching industry, a constant supply of meat will be distributed to world retailers.

In southern Alberta, the spread of agriculture has been a limiting factor to pronghorn antelope populations (Barrett 1982). As the population of people relative to animal density in North America increases, management systems for wildlife change. These needs will be independent of the development of game ranching.

Currently, the scale of the game ranching industry in Alberta is small. There are approximately 2,700 privately owned wapiti on 85 ranches which encompass about 4,900 ha. If herd growth and expansion of the land base were equal to 20% per year, by the year 2000, we would expect about 29,000 wapiti on 52,400 ha. This would be equal to approximately 0.08% of the area of Alberta or 0.2% of the area of the State of Colorado. At present, conventional agriculture encompasses 29% of Alberta's land area (Anon. 1981).

It must be emphasized that this industry will develop with sound and factual concepts. Positive interest in game ranching is high as it offers viable alternatives to conventional agriculture on marginal lands. It is an enterprise which offers traditional benefits and a feeling of self respect to Native and Metis people. Game ranching provides an opportunity to reverse the transformation of wilderness lands into cleared rangelands required by conventional agricultural practices while landscapes on existing marginal agriculture lands could be enhanced by selecting animals adapted to these environments. If we take time to realize the advantages, it will be possible to recognize that game ranching is diversifying, not replacing wildlife management concepts.

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MEMORANDUM

STATE OF ALASKA
DEPARTMENT OF FISH AND GAME

TO: The Honorable Lloyd Jones
Chairman
Senate Resource Committee
Alaska State Legislature

DATE: April 8, 1992

FILE NO:

THRU: Ron Somerville
Deputy Commissioner
Department of Fish and Game

TELEPHONE NO: 465-4190

SUBJECT: SB 216 Game Farming

FROM: David G. Kelleyhouse
Director
Division of Wildlife Conservation

For several years, Alaskan wildlife biologists have been aware of potential problems associated with game farming/ranching ventures in other states and Canadian provinces. Information has been sketchy, anecdotal and passed primarily through personal communications at conferences. I recently read an excellent overview paper by Dr. Valerius Geist (Professor of Environmental Design, University of Calgary, Alberta, Canada) that addresses specific instances of problems caused by game farming/ranching throughout North America. I was stunned by the magnitude and severity of the problems and the huge costs associated with addressing them. A draft of that paper is attacned and I urge all members of the committee to take the time to read it.

If there are any doubts as to the advisability of allowing the husbandry of "domesticated" wild animals in Alaska, Dr. Geist's paper should lay them to rest. True successes are largely limited to Third World countries with burgeoning human populations and accelerated losses of wildlife habitat such as the case in some African nations. Only time will tell if even these situations actually prove successful in the long-term.

In Alaska we enjoy largely unexploited wildlife habitats and populations and a low human population density. Our wildlife generally has been spared introductions of devastating livestock and wildlife diseases and parasites due to geographical isolation. Alaska's wildlife is tremendously valuable and promises even greater value in the future. A wide diversity of Alaskans currently benefits from our wildlife resources personally, culturally, and economically. More intensive management of wildlife in the natural state can meet growing demands for subsistence, recreation, and tourism.

I have severe reservations concerning the advisability of additional game farming/ranching ventures in Alaska. Decisions to embark on such a course should be guided by the best available information. The Division of Wildlife Conservation will provide such information to all parties upon request.

Dr. Charles Schwartz of the department's Moose Research Center (MRC) in Soldotna has been investigating the domestication and husbandry of moose for many years. The following information is drawn from his experience at the MRC, his visits to moose ranches in the Soviet Union, and personal contacts with every known game farm/ranch, research facility, and zoo in North America that has captive moose.

- Of 29 known "parties" that have moose in North America
  26 responded to Schwartz' questionnaire.
  24 rely on supplementary feeding; 2 on natural browse.
  (number of moose held range from 1 to 6)
  The MRC has 20-25 captive moose

- Moose have been held by individual parties from periods ranging from 1 to 52 years (the MRC has been in operation since the late 1960s).

- Of 26 respondents, 3 produce moose for commercial purposes; none indicated economic viability of moose ranching except for sale of breeding stock (bulls $1500, cows $3500).

- Of the three commercial breeders, none raise moose as their primary farmed species (primary species are elk, reindeer, or bison--all herd animals).

- Material costs alone (no labor) of fencing for moose farmers in 1987 averaged $13,000 per mile. A 1 mi^2 enclosure (4 linear miles of fencing, costing $52,000) in the best moose habitat can support 3-4 moose in the long term; up to 10 moose for 2 years. The MRC spends $15,000/year on winter supplementary feed (approx 20 animals); $11,000/year on plant operation.

- Under intensive management and confinement, susceptibility of moose to disease causes excessive mortality of calves from contamination of small pastures or barnyards.

- 70% of all calves (including orphans) raised by the the 26 respondents died before 1-yr of age. Fewer than 20% of animals survive past 6 years. No survival past 10 years. In Soviet Union and on MRC, maximum survival is 12 years. In the wild, survival to 18 years.

- Soviet moose husbandry using "free grazing" system at Pechora from 1949-69 raised 174 moose; 63 disappeared by straying, poaching, and predation; 29 died of disease, nutritional problems, injuries. Only 57 (less than 33%) were slaughtered or distributed to other breeding projects.

- Of three moose farms in the Soviet Union, two have been closed and one has been converted to a research facility for nutritional and physiological study similar to Alaska's MRC.

Alaska could benefit from game ranching

William R. Wood

Views expressed here do not necessarily represent those of the Daily News-Miner

Of Alaska wilderness and wildlife, relative to the rest of the nation, there is a very great amount. Empty lands? Not necessarily.

After the large acreage transfers authorized under the historic land settlement act have been accomplished, the state of Alaska will own about 104 million acres, about 28 percent of the total Alaska land mass; Alaska Native people will own an additional 44 million acres, about 12 percent, or roughly ⅛ of all Alaska. Together the non-federal lands will represent a bit more than two-fifths or 40 percent of the total. The federal government will retain ownership of nearly three-fifths or 60 percent of Alaskan lands.

This vast acreage apparently is dedicated almost entirely to wilderness and wildlife purposes. Initially after transfer much of the land in Native private ownership will remain essentially wilderness with minimum use by people. Of the state's portion, nearly ⅔ has been classified for fish and wildlife. A tiny amount has been classified for agriculture, about 2 percent, and only 16 percent for commercial forestry production.

Then an inescapable fundamental top-priority question facing all Alaskans, including Native Alaskan communities, is working out some reasonable balance in the use of their lands.

To resolve the fundamental "All Alaska" question will take more than emotionalism, fixed ideologies of any extreme, and selfish specialized interests, however attractive out of context, or in isolation from consideration of the general good.

Any acceptable resolution will require a painfully realistic assessment of potential land resource uses, creative concepts for immediate, mid-term, and long-range uses that fit into a reasoned and well-balanced design for utilization. Truly this is a process without end—so long as the human mind and spriit prevail on earth. There is no quick fix in prospect.

Given the above, is there a common-sense approach to bringing Alaskan wilderness and wildlife into greater production for the benefit of residents in an all-inclusive sense? That is what our endless quest for an answer to our land issue is all about.

The goal of leaving a place better than we found it, over-simplified for clarity, exemplifies husbandry-at-its-best of the natural resources available to us, in reality merely lent to us for a brief time.

For some of the state's marginal lands, including private ownership lands, game ranching holds much promise. It may offer the soundest approach to bringing a portion of Alaskan wilderness and wildlife into greater production to enhance the several "good-life" styles we enjoy in the North.

A strong case can be made for game ranching in Alaska, particularly in the Interior, but also in Southcentral and southwestern and northwestern areas. In Southeast Alaska the game ranching principle already is being used successfully in the fishing industry. The good case for can be spelled out readily in outline from successful game ranching operations elsewhere. Such experience and state-of-the-art practices must be examined closely in relation to the particular Alaska project or series of projects that undoubtedly will be proposed this year and subsequently.

For discussion, to whom does Alaska state wilderness wildlife belong? All of us? Then how can we best preserve it and increase its productivity in multiple ways for the common good?

How can a reasonable portion of Alaska state and private lands be set aside for game ranching, beginning perhaps with a pilot project or two?

There are several types of game ranching operations, including but not limited to: those government-operated for preservation of species and tourism, with culling of herds open for recreational hunting, including trophy taking, on a limited permit basis; private club-type operations with access limited to members and their guests only; and private operations for profit, featuring a wide range of income-producing possibilities, from meat production and trophy taking to general recreation, sightseeing, picture taking, and esthetic fulfillment to be derived from wilderness and wildlife.

Paramount for consideration of continued success for private enterprise game ranching is not only the preservation but the enhancement of scientific principles of both wilderness and wildlife. Attempts at "exploitation for profit only" are doomed to fail promptly. An enlightened, well-informed people will not tolerate them.

To what extent might limited game ranching, especially in Interior Alaska, relieve pressure upon other wilderness lands and their wildlife? That pressure is building up dramatically. In particular, might a game ranching pilot project featuring Delta buffalo serve more than one good purpose, including resolution of the present farmer vs. buffalo conflict in the Delta agricultural area? Both/and rather than either/or.

Let's think this game ranching prospect through together beginning with a positive and constructive analysis of possibilities as well as problems. Let's reason together and act sensibly for the general good without political posturing or attempted manipulation. Is this too much to ask in face of the number one priority basic issue of land utilization in Alaska?

There is urgent necessity here that demands immediate attention.

FAIRBANKS NEWSMINER 17 NOV. 1982

y qualified for formal state recognition and a place on this year's ballot.

During the convention, party members also decided how to deal with the question of party ballots in the upcoming statewide voting later this year.

If the Legislature votes to keep the ballots open to voters of all parties, Green Party candidates will be listed along with all the other candidates as usual, said Sykes. If the Legislature decides on a Republ-

And if each party is assigned its own ballot, said Sykes, members have elected to allow voters, whether registered with the Green Party or not, to use the Green Party ballot as long as they do not vote on any other ballot.

Sykes also said Green Party members affirmed their list of key values and priorities. They include gender equality, grass-roots democracy, ecological wisdom, respect for diversity, nonviolence, social justice, decentralization of govern-

future," he said. "That's where the Green Party is different."

The party also voted to sponsor a ballot initiative for statewide health reform, Sykes said.

The Green Party has grown from 300 members statewide in 1990 to 1,089 members, according to the state Division of Elections.

The Green Party convention will wind down Monday following a morning meeting of the Green Party Council, the party's statewide governing body.

Mike Mathers/News-Miner

n of the Canning River
n to their first daugh-
n to wrap her.

Farming task force urges specialization

By BRIAN O'DONOGHUE
Staff Writer

The future of agriculture in Alaska depends not on seeding big projects with state dollars, but on tree farms, moose ranching and other efforts that market specialized, quality products, according to a task force preparing recommendations for Gov. Walter Hickel.

After months of public hearings around the state, Hickel's 11-member task force is nearing completion of drafting recommendations on a new state agriculture policy for the 1990s.

During a public hearing Friday at the University of Alaska Fairbanks, a consensus took shape within the task force in support of the following points:

- Better marketing efforts are needed, possibly in conjunction with an improved state inspection program.
- The state should continue to make land available for farming, but in smaller blocks under a variety of sales conditions and homesteading options.
- The Legislature needs to address problems created by the restricted titles conveyed in recent agricultural land programs. These programs have left farmers dependent on state loans for development, as the ag-titles are "not bankable," as task force chairman Harold Heinze put it.
- The state should support practical research, while doing a better job of spreading the news about successful products and technologies.
- The state needs to assure the availability of farm operating loans to finance seed, fertilizer or other annual purchases.
- Tree farming and other select forestry programs should be managed as a form of agriculture, giving farmers on state "ag parcels" the option of raising such crops.
- The task force supports "unrestricted ownership and domestic breeding of all animals, including game species.

"That little point there will be controversial," Heinze said, alluding to Fish and Game's past opposition to moose farming legislation.

Task force member Mike Schultz suggested the recommendations should be linked to specific production goals. "I thought one of our duties would be to set a goal of where we ought to be eight, 10 years from now," said the Delta Junction farmer.

Lt. Gov. Jack Coghill agreed. "I think we're all on the same wavelength of having an overall agriculture policy," said Coghill. "That plan has got to be put in there someplace."

Heinze said he favored more general policy statements.

"One of the problems of putting in goals is it sounds like the mistakes of the past," Heinze said. "Let the marketplace control. We've heard a lot from small family farms. They're alive and well. Most of them are just telling us to get out of the way."

Members of the task force include Heinze, Coghill, Schultz, Jim Carter, Dave Wright, Bob Havemeister, Rob Sexton, James Drew, Herb Eckman, Mark Kulstad and Bob Baer.

Brian O'Donoghue
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Activist who launched

Game Production: Agricultural Diversification For Alaska?

Lyle A. Renecker

It has become abundantly clear in recent years that agricultural enterprises must diversify if they hope to survive. North America has wrestled with the concept of alternative agricultural practices for over 20 years. Farmers no longer want to approach this business of agriculture with all "their peas in one pod." Political subsidy wars, stabilization plans, depressed commodity prices, and over-production are among the reasons why traditional farming is less profitable and why farmers are diversifying their conventional farm businesses. To the real people in the agricultural sector—the farmers—any change must offer a positive cash flow. More importantly, it must gain the confidence and general interest of farmers.

Consumer trends have been towards healthier and leaner meat products. Meat from native wild ungulates is a natural candidate because of its lean qualities, low percentage of intramuscular fat, and low energy content. In 1986, a conference was held in Des Moines, Iowa which provided 100 options for diversification of the farming community. Deer farming was among them. Commercial game farming would seem a natural alternative to conventional agricultural enterprises that choose to diversify and attempt to meet the greater demand for leaner meats. Here, I describe some of the history behind game production in North America, important political and conservation considerations that involve the game industry and private sector, and how Alaska may fit into the greater global picture.

Historical Perspective

Lyle A. Renecker, Assistant Professor of Animal Science (Reindeer), School of Agriculture and Land Resources Management, University of Alaska Fairbanks.

Man has been associated with the use of native wild herbivores in North America since Paleolithic times more than 100,000 years ago. Prior to the arrival of European fur traders, the Great Plains of North America were abound with wildlife. An estimated 35-75 million plains bison and about 10 million wapiti lived on the continent.

In historic times, native ungulates were utilized as an available source of food first by indigenous Indians and then by explorers and later by settlers who arrived in North America in search of new homes. From his explorations in western Canada, Samuel Hearne in 1770 stated that "moose were the easiest of the deer kind to tame." Homesteaders quickly recognized the favorable disposition of moose and often trained them as beasts of burden or for light farm chores (Figure 1).

However, as this new civilization pushed westward, populations of wild ungulates were slaughtered because of the unprecedented need for food by the frontier settlements and loss of habitat to conventional agriculture. Bison herds were soon decimated in such numbers that between 1873 and 1875 approximately 6.75 million head were killed (most in the United States Midwest). By 1889, William Hornaday estimated that only 635 bison remained in North America. Existence of plains bison today stems from the private efforts of a Flathead Indian and seven ranchers. The roots of plains bison populations were largely derived from 54 wild calves that were caught and raised by these private individuals. This historical event was of great consequence in the conservation of the species and delivers a message about the role of the farmer in wildlife management.

Interest in the commercial production of native herbivores continued to thrive in Canada. In 1915, the Federal Department of Agriculture established a program to evaluate the potential of plains bison x cattle crosses. The purpose was to develop a breed that retained the natural adaptive characteristics of bison to extreme environmental conditions, but maintain the favorable meat characteristics and

temperament of cattle. The program was terminated in 1973. Based on the research findings over the years of the program, it was determined that cross breeding the two species would not be as successful as concentrating on improving the bison or cattle.

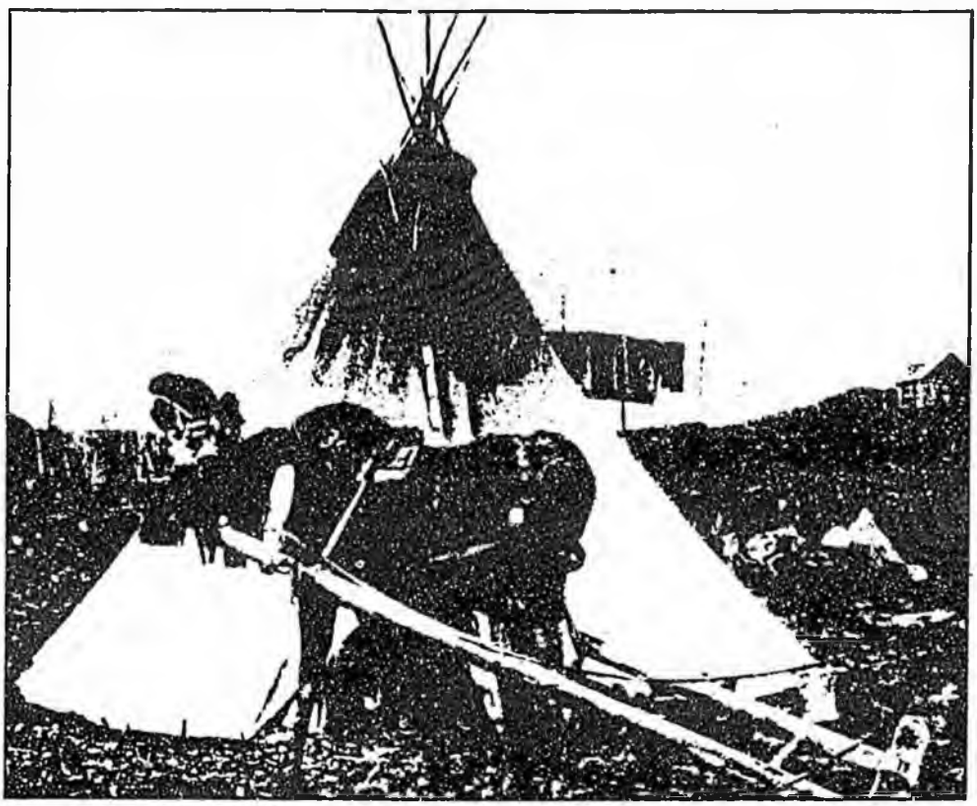

Figure 1. Moose pulling an Indian travois in north central Alberta (c. 1899). Photograph by C.W. Mathers; permission granted by Saskatchewan Archives (Renecker et al. 1989).

Early Interest in Production Strategies

With establishment of Elk Island National Park, a working model of a mixed-species grazing system was initiated. This production strategy utilized an assemblage of a grazer (bison), mixed feeder (wapiti), and browser (moose) which have minimal overlap in their winter food habits. The Kikino Metis Settlement, in North Central Alberta, Canada was the first to apply this large-scale (game ranch) management system to a commercial operation. This strategy dilutes the cost of fencing by increasing the size of the land base to more than 9 ½ miles square and minimizes the labor-input by stocking animals at carrying capacity with no supplementary feeding. However, the experience of the Kikino Wildlife Ranch was one of little control over animal movement and economic opportunities were limited to winter when animals can be baited into corrals or traps. The decision of the Kikino operation was a change in direction to more intensive management.

Few private land owners possess the large contiguous tract of land that is necessary for an extensive game ranch. As a result, most commercial operations have been intensive game farms, on smaller properties, with supplementary feeding, which orchestrates a farm management program that exploits all economic opportunities.

Game farming in some Canadian provinces has been increasing at a rate of 30% per year. There are about 17,700 wapiti and 82,600 plains bison on commercial farms and ranches in Canada and the United States. At this stage of development, the game/bison farm industries are largely constrained by availability of breeding stock. It is logical to predict that it will require about 15-20 years for the industry to grow and reach a stable level that is based on the price of meat. For example, if the commercial population of wapiti in Canada continued to grow with the assumptions of good management and normal harvest of products and animals, by 2004, a respectable over-wintering herd of more than 200,000 head would be present on farms (Figure 2). This stock would produce annually 10,500 tons live weight of wapiti for meat production and 133 tons of velvet antlers (Figure 3) for total gross returns of about $62 million (US).

Industry Development in Alaska at a Glance

Physical Environment

The climate of Alaska is extremely pulsed with short warm summers from June to September and typically cold winters with a mean January

minimum temperature of about -19° F in the Interior. The vegetation varies from temperate forest to montane and tundra types. Only a small proportion of Alaska has a climate and soil base that is suitable for cultivation and crop production. These areas consist of the Cook Inlet-Susitna Lowland and the Tanana Valley of the Interior Alaska Lowlands. Where agriculture is practiced, the principal crops grown in Alaska are cereals (barley and oats), grasses for hay and silage, and potatoes. Because of extremely cold winters and frost conditions forage legume crops are not widely grown in Alaska.

Generally, crop production and grazing in these regions are limited by a growing season which varies from three to four months. However, on Kodiak Island and the Aleutians, grazing can be maintained year round with some supplemental feeding. The best soils for grass production are those with good drainage, have a natural vegetation cover of grasses and forbs, and receive adequate precipitation. Organic soils are poorly drained and susceptible to flooding and erosion. Tundra soils are generally limited in depth and by the environment and not good for intensive agricultural production.

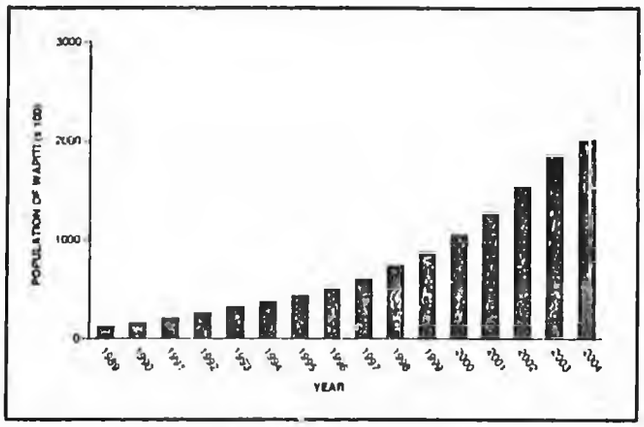

Figure 2. Projected growth of the population of wapiti on Canadian game farms until 2004.

Commercial Game Production

Under the current game farm regulations in Alaska, commercial game production is permissible with bison, musk oxen, reindeer, or wapiti. Commercial reindeer herding has been practiced by indigenous people in the state of Alaska since the turn of the century. During the industry's development, health, management, and marketing programs have been developed and applied. The result has been an extremely important industry to both the Seward Peninsula, where much of the industry is concentrated, and the state as a whole. Because of their adaptive behavior and tolerance to harsh environments, wapiti and bison are other target species that could be easily farmed by the private sector in the agricultural regions of Alaska. For example, wapiti eat less than cattle, adjust quickly to conventional feedstuffs, and their gregarious behavior is compatible with intensive production. Each of these species has adapted to northern environments. With interest in alternative agriculture systems, ecological, physiological, and behavioral adaptations of these wild or semi-domestic species could be deployed with an advantage to the farmer. These species have growth cycles adapted to the seasonal food supply and cold tolerance and digestive systems to efficiently utilize native, as well as, domestic forages. For example, bison have adapted to more efficient utilization of low quality feedstuffs than cattle, wapiti are very productive with high growth rates, and reindeer have adapted to both extensive herding in the tundra and, as with other species, they have shown promise for intensive farm operations.

The Private Land Issue

Perhaps the greatest challenge that faces government wildlife agencies is management of resources on private lands. It is difficult to convince a farmer that he should not drain a wetland, clear a forest, or plow a grassland if it translates into more cash returns and less disparity in his annual budget. The farmer requires a tangible benefit in order to fully appreciate the importance of these marginal agricultural lands. Game and bison farming may have created that tangible benefit.

During the winter of 1986-87, there was an estimated 1 million acres of topsoil lost in Western Canada from wind erosion. From pre-settlement to 1985, about 40% of the prairie wetlands disappeared, and during 1984-85, some calculations have shown that forests were being removed at a rate of 80 ac/hr in Western Canada. These areas, like many in Alaska, are marginal, fragile, and probably should never have been altered. They were excellent habitats and range for wapiti and bison and with proper

cies that are naturally adapted to these conditions. With the high value and returns for reindeer, wapiti, and bison, intensive farm operations should seriously consider diversifying conventional agricultural enterprises. If the cost of production is 70-76 percent that of beef and the returns are two-to-three times the price of beef, as has been observed for wapiti and bison (as described by Renecker et al., 1989: p. 264), then it is only common sense to provide the best management possible. Currently, there is one wapiti producer in the state of Alaska. However, it is important for every perspective game farmer to understand the infrastructure, management, and production needs of the species to be farmed and the markets where they can sell their products. But, a new industry must remember that strong public support is maintained through developments that are ethical and logical. There must also be a clear direction in the regulatory procedures of the industry and this originates from consistent definitions mentioned earlier. This new industry of game farming could offer a method of agricultural diversification for Alaskan farmers, however, we will never know unless we conduct the necessary research on which to develop the industry. In a capsule, the needed research is: a) a study of relocation and nutritional stress; b) herd health programs; c) pasture management; d) herd management and productivity; and e) market development, product consistency, supply consolidation. ❑

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DRAFT 14/August/1991

GAME RANCHING: BOVINE TUBERCULOSIS AND OTHER ILLS

Valerius Geist, Faculty of Environmental Design, The University of Calgary, Calgary, Alberta, Canada, T2N 1N4 fax:403-284-4399; P 403-220-6601/ 288-1508.

Tom Thorne.....

As predicted, the rise in "game ranching" in North America, that is, commerce in dead wildlife, has begun the removal of policies that protected wildlife effectively for over 70 years, has led to an upsurge in wildlife crimes, and the spread of livestock diseases to wildlife, livestock, and people. A case in point is the epidemic of bovine tuberculosis (Mycobacterium bovis) on deer ranches in western Canada and the United States, which began early in 1990. The end is not in sight. In the Province of Alberta alone, about 2,000 from 4,200 captive elk (Cervus canadensis) have been destroyed because of Tb or are destined for destruction. The disease spread to cattle, pigs, bison and humans; as of August 2, 1991, 36 people are under medical supervision for bovine Tb contracted from elk. The disease spread from Montana to Alberta, Saskatchewan and Colorado, and there were independent outbreaks of bovine Tb on game farms in British Columbia and Ontario. Millions of dollars in public funds have been expended to deal with this epidemic. Other disease problems are in the offing. Before dealing with these matters, however, two important problems need to be addressed.

Science Council of Canada in studies of science and public policy (Background Studies No. 46 & 47). The game ranching controversy is therefore only one example of this expensive malaise which scientists should be aware of.

There is a second important matter: the manner in which the disease epidemic has been handled points to a warning by Beryl L. Crowe (1969) about the behaviour of bureaucracies (the watchdogs hired by the public to guard the public's interest) in her discourse on Garett Hardin's (1968) "The Tragedy of the Commons". Crowe (op. cit) warned:"Our best empirical answer to the question...Who shall watch the watchers themselves? - have shown fairly conclusively... that the decisions, orders, hearings and press releases of the custodians of the commons...give the large, but unorganized groups in American society symbolic satisfaction and assurances. Yet, the actual day-to-day decisions and operations of these administrative agencies contribute, foster, aid and indeed legitimate the special claims of a small but highly organized groups to differential access to tangible resources which are extracted from the commons. This has been so well documented in the social sciences that the best answer to the question of who watches over the custodians of the commons is the regulated interests that make intrusion on the commons."

CHRONOLOGY OR OVERVIEW OF THE PROBLEM A circular by the U.S. Department of Agriculture of December 7th, 1990, reports that in April 1990 two herds of fallow deer of 380 animals were destroyed in British Columbia to control Tb; of 13 deer with Tb lesions, 3

CORRECTION

THIS DOCUMENT
HAS BEEN REPHOTOGRAPHED
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The disease epidemic illustrates some difficulties for scientists addressing policy issue. Our formal communications are impotent to deal with the quick, far-reaching decisions of the market place and politics. The prodigious speed of political decisions altering legislation, outstrips any reasonable time-table of knowledgeable debate engaged in and expected by scientists. Time to reflect, let alone do research is minimal. Changes in legislation may appear as a fait a compli, discouraging further involvement. Public communications by Canadian governments supporting vested interests have been void of scholarly disinterest and rigour, let alone in a form conducive to scholarly discourse. Secrecy and misinformation distributed by public agencies are a concern, as this has not been without effect on the credibility of fellow scientists within agencies. Even to document above requires a break with our mode of referencing, for how does one deal with documents justifying political decisions, that make no pretends at scholarship, but deal with unfounded beliefs and unwarranted assumptions? One bright spot is investigative reporting because it aims to allocates blame. Consequently, it risks court challenges and hostile, public cross-examination. Investigative reporting is normally credible and has been made use of here.

The bypass of informed debate makes utter waste of the available scientific resources and collective knowledge so dearly acquired by society, usually with public funds. This insight, unfortunately, is not original, as it was also reached by the

Science Council of Canada in studies of science and public policy (Background Studies No. 46 & 47). The game ranching controversy is therefore only one example of this expensive malaise which scientists should be aware of.

There is a second important matter: the manner in which the disease epidemic has been handled points to a warning by Beryl L. Crowe (1969) about the behaviour of bureaucracies (the watchdogs hired by the public to guard the public's interest) in her discourse on Garett Hardin's (1968) "The Tragedy of the Commons". Crowe (op. cit) warned:"Our best empirical answer to the question...Who shall watch the watchers themselves? - have shown fairly conclusively... that the decisions, orders, hearings and press releases of the custodians of the commons...give the large, but unorganized groups in American society symbolic satisfaction and assurances. Yet, the actual day-to-day decisions and operations of these administrative agencies contribute, foster, aid and indeed legitimate the special claims of a small but highly organized groups to differential access to tangible resources which are extracted from the commons. This has been so well documented in the social sciences that the best answer to the question of who watches over the custodians of the commons is the regulated interests that make intrusion on the commons."

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had came from Oregon and one from a large fallow deer ranch in New York, where 8 deer with Tb-like lesions have been noticed in the last 4 years. A fallow deer farm in Florida, where one deer imported from New York died of Tb, was to be tested. In a herd of about 250 red deer and elk imported from Canada into New York, 10 from 197 deer tested positive for Tb; two red deer that tested positive had come from New Zealand via Canada. One of the Canadian bull elk, sold to a farm in Wisconsin, died of TB.

In June 1990 an elk, imported May 1988 from Montana close to Yellowstone National Park, died of TB on an Alberta ranch; the stock of 150 elk, 12 deer and 15 bison was killed on December 9th. 23 of the elk were confirmed with TB. On the exporting Montana game ranch, in January 1991, 28 from 143 elk were found to be infected with TB; more were found in July. Four Montana elk ranches were subsequently placed under quarantine. Depopulation of the TB infected elk has been refused, because Montana will not pay market value, but offers only $50 compensation per elk destroyed. 150 elk sold from the Alberta index ranch were traced to 35 elk ranches in Alberta and 5 in Saskatchewan, which were placed subsequently under quarantine. This increased by February 1991 to 62 ranches in Alberta and 13 in Saskatchewan. In Ontario a large game ranch containing Tb was depopulated in November 1990. By July 1991 about 800 of 2,000 elk destined for depopulation had been killed in Alberta; additional elk await slaughter in Saskatchewan.

There is concern that bovine Tb may have escaped into free-

living elk. In Montana, 83 publicly owned elk were found in 1988 mingling with captive elk on a ranch now known to hold 28 Tb infected elk from 143. The public elk were released. Of the 28 infected elk, 22 are bulls, which one expects to investigate and lick the visiting wild elk, and pass on the disease. This could lead to Tb not only in Yellowstone elk, but also in the bison. In Alberta, in 1990, a minimum of 41 elk escaped from quarantined or Tb infected game ranches, or are unaccountably missing; if 4,200 elk are held captive in Alberta, then this represents an minimum escape rate of about one percent per anum. In addition, a wild bull elk was shot when he tore down a portion of the game fence to reach captive elk on a ranch now quarantined; one elk escaped but was shot. On a ranch with Tb infected elk, 14 elk and 6 deer are missing. The elk may have escaped and are now mingling with wild elk close to Banff National Park. One tagged deer was shot in hunting season. Four eyewitnesses reported seeing free-roaming elk with ear tags and steamers in the general region. A government mission to kill these elk shot 4 untagged, disease free elk. An escape of 25 elk occurred from a ranch on June 3, 1990. Most were recaptured, but 5 bulls were never found. Another 2 elk escape from a now quarantined farm in summer. The real escape figures may be higher as indicated by a source within the Alberta government. Game ranchers are required to report their inventory monthly. However, some game ranches are so large, that the fate of individual animals may be unknown to the owners. This makes adequate testing for Tb impossible. How such registration,

in conjunction with the low compliance and enforcement, can prevent irregularities or provide fool-prof information.

Since the game ranching industry is currently young, its fences new and strong, and the elk valuable and well guarded, one may ask what will happen a few years hence when the fences are corroded and the elk less valuable. With 150,000 ranched elk projected in Alberta, will there be 2,000-4,000 ranched elk escaping annually to mingle with 12,000 wild elk. How many will carry non-native genes and diseases? Will native elk go extinct through hybridization or disease epidemics?

Matters are aggravated by the illegal capture, sale and transportation of potentially diseased and genetically polluted wildlife in a huge continental wildlife market. A game rancher, convicted earlier for illegal trafficking in elk in Alberta, was arrested in Idaho in 1991 with 68 elk and illegal elk x red deer hybrids on an unlicensed game farm. Two of the elk tested positive for brucellosis and were destroyed. The investigating officer reported that another thirty elk and hybrids had been shipped to Canada, raising the spector of bovine brucellosis having been introduced with these elk. There are cases in New Mexico, Colorado, Montana and Idaho where large-scale theft of public elk is suspected or charged. This includes states containing elk with spongiform encephalopathy; some of these elk were destined for Canada. An Alberta game rancher, fined $25,000 for moving elk for sale without permit, shipped genetically manipulated "shooter bulls" to a ranch in Montana, were the bulls

were destined to be killed in "trophy hunts". A shipment of elk from a Tb infected ranch was sold to a buyer with a fictitious name; they have not been traced. Lanka et al. (1990) report that some veterinarians pointed out that Canada's import procedures were easy to circumvent.

The escape of bovine TB into wild elk is no idle threat. A Tb epidemics struck the fledgling deer ranching industry in New Zealand, as reported by THE DEER FARMER in an ongoing fashion. The disease escaped into feral red and fallow deer and into the opossum (Trichosurus vulpecula), and now covers about one third of both, the North and the South Island. In 1985 TB struck deer farms in Denmark; it spread to cattle and imposed a notable burden on the public purse (WILD UND HUND 91/29 Jan. 1989 pp. 20-21). A Tb outbreak began 1985 in Great Britain when 95 from 391 red deer (C. elaphus spp.) imported from Hungary were found to be diseased; deer ranchers are demanding public compensation and better methods to test for Tb (WILD UND HUND 92/30 July 1989, pp. 18-19). In great Britain bovine Tb escaped into badger (Meles meles); this led to efforts to eradicate badgers. Earlier this century, in the former Buffalo National Park in Alberta, bovine Tb spread from cattle to bison and infected 6 percent of the elk and moose, and one percent of the mule deer (Tessaro 1986).

Bovine Tb, which appears with high stocking rates of captive deer, is technically difficult to detect, may survive normal quarantine periods, and lie dormant in herds for years. Elk with advanced Tb may look quite normal and had been misdiagnosed by

vets for weeks in Alberta. As in New Zealand, so elk herds on several ranches in Canada had tested negative, but suffered Tb outbreaks nevertheless. The first "index" elk in Alberta was reputedly tested twice for Tb, and showed negative reaction both times. A Montana elk rancher complained about the testing: "We done it and done it. You'd think some of our elk are drug addicts; they've got so many puncture holes in them". By February 28, 1991 Agriculture Canada admitted that the imported elk had been tested for Tb with inadequate methods. It had been aware that the available Tb tests were inadequate, and said so earlier on p. 4-22 of a document entitled "Evaluation of brucellosis and tuberculosis in bison in Canada" produced in 1989. I quote:"The detection of tuberculosis in wildlife is hampered by the lack of proven test methods. There is no reliable blood test, intradermal tuberculin test have not been properly evaluated in many wildlife species, and lymphocyte activation tests are not yet perfected".

Tb infected elk passed the disease to a pig in Alberta as early as June 1990, but that had been kept secret, as had been the case of an infected bison, or the Tb infected fallow deer in B.C. On March 26, Tb was confirmed in cattle which shared a ranch with 350 elk, 219 of which tested positive for the disease.

The first case of a human becoming infected with bovine Tb from handling infected elk, a veterinarian, was reported on Feb. 28, 1991; the number had increased to 36 infected persons under medical care by August. About 20 percent of the persons in contact with ranched elk tested positive for Tb. Those who are

infected with bovine Tb are urged to undergo a 9 months preventive treatment, which however, cannot be handled by all patients. On June 21 it was reported that four workers at a rendering plant became infected by bovine Tb, despite Agriculture Canada's assurance that there was no danger in handling carcasses of infected elk. Rendering and slaughtering plants thereafter refused to handle elk, while the meat inspectors announced through their union on July 24 that the inspectors are not trained to deal with tuberculosis in elk and that they are concerned about their personal as well as the public's health. The Alberta Restaurant and Food Services Association announced July 26 their concern about diseases and the inability to distinguish legal from illegal elk meat. Even Alberta's cattle commission began to voice concerns. By August 2, the infection of four wildlife technicians with bovine Tb from handling dead elk, despite precautions, led to a moratorium in Alberta on autopsies of diseased elk. Additional cases of bovine Tb being transferred from elk to humans are under investigation in Saskatchewan.

Cervid ecology and social behaviour are factors in the spread of tuberculosis. In elk Tb infections break out in the respiratory and digestive system, and as contagious running sores on the exterior of the body. An elk in the latter stages of the disease may drip contagious saliva, feces, urine and puss. Yet elk with advanced Tb may not appear sick. If Tb escapes into elk in the Rockies, then, in time, one will see in national parks tame elk with advanced Tb mixing with tourists on golf courses,

picnic areas, lawns, camp grounds etc., These, contaminated by contagious body fluids of infected elk, may remain hazardous for weeks. Dogs walked on leashes along promenades will almost certainly lick Tb infected puss, risking infection. Diseased elk in the foothills will graze the same areas as cattle, passing on Tb to cattle, as do feral red deer in New Zealand. That would end all hope for a Tb-free status for Canadian cattle, unless, of course, elk are eradicated from the wilds.

Elk groom themselves and others. A contagious elk will work contagious saliva with its tongue into its fur daily. Elk that know one another groom each other. They normally lick the body parts that the companion cannot reach, such as the neck, withers, croup, ears and head. Thus one contagious elk can infect the fur of many elk through social grooming. One thus expects elk free of tuberculosis internally, but carrying the Tb bacterium in their fur where they are expected to survive for weeks. Anyone handling such elk risks not only contaminating his hands, but also dislodging tiny airborne bits of dried sputum containing Tb bacteria that may be inhaled. At risk are not only veterinarians shaving hair with power-sheers from the neck of elk to make cervical Tb tests, but anybody handling the fur of an elk, be they sport or native hunters, wardens, and personnel handling and processing ranched elk.

Livestock diseases have spread to free-living wildlife. Elk in the Yellowstone ecosystem did acquire bovine brucellosis (Brucella abortus)(Rush 1932; Honess and Winter 1956; Davis

1990). Swine brucellosis (B. suis biotype 4) spread from domestic reindeer in Alaska and northern Canada into caribou, grizzly bears, wolves, Arctic foxes, dogs and northern native people (Meyer 1966; Neiland et al. 1968; Neiland 1975; Broughton et al. 1970; Tessaro and Forbes 1986; Gates et al. 1984). While U.S.D.A. dismissed the idea of quarantining Yellowstone National Park, Agriculture Canada, supported by a number of federal and provincial agriculture and wildlife agencies, was deadly serious about depopulating bison infected with bovine tuberculosis and brucellosis Wood Buffalo National Park.

The costs to the Canadian federal government of controlling the TB epidemic on game ranches is high. In Alberta 52 veterinarians and technicians were trying to cope with the Tb outbreak; Agriculture Canada admitted in January 1991 to 25 veterinarians employed full time on the TB epidemic. In a dition to the cost of tracing and testing thousands of captive elk, deer, bison and domestic cattle, the testing of over 400 humans who had been in contact with the diseased elk and placing 36 of these under medical supervision and treatment, and the cost of law enforcement, compensation was paid to game ranchers for every animal destroyed to eliminate the TB epidemic. For cattle the law sets an upper limit to compensation of $1,500 per head, but for elk the compensation limit was to be market value.

Market value for elk is set by auctions. Bids at a Nov. 8 auction in Alberta reached $3,391 for a bull calf, $8,183 for a yearling cow, and $12,464 for cow elk. On November 11 the press

reported that Agriculture Canada and Alberta's Agriculture Animal Health Division had stated that elk destroyed in the TB epidemic could be compensated for at $8,000-20,000 a head. At a Dec. 1 auction bids exceeded $16,000 for bred cow elk. However, the arbitration panel consisting of appointees from Agriculture Canada, Agriculture Alberta and the Alberta Game growers was instructed by the federal government to disregard that auction, as there had been irregularities. Only auctions prior to October 31, were to be considered by the panel. As late as December 5th reliable sources informed that Agriculture Canada considered paying up to $15,000 compensation per elk destroyed. The Ontario game ranch, depopulated of TB infected stock, cost the public $2 million, and the first elk ranch depopulated in Alberta of 150 elk, 12 deer and 15 bison cost taxpayers $1.5 million. With mounting public concern over the tens of millions of dollars that would have to be paid out in compensation to elk ranchers, Agriculture Canada announced a compensation rate of $7,500 per female and $3,500 per bull elk destroyed. Game ranchers then lobbied that elk destroyed in the TB epidemic be replaced by elk from national parks.

The eradication of bovine Tb has been an ongoing goal in Canada since 1907, towards which much progress was made. In addition to annual operating costs for the Tb eradication programme (i.e. $3.35 million in 1978), $18 million were paid out in compensation for cattle destroyed between 1922-1987 (Anonymous 1989:4-9); between 1980-1990 $2.5 million were paid out in

compensation. This compares to $5.3 million paid in compensation to game ranchers by the federal government for about 900 elk destroyed between June 1990 and 1991; another 1,100 elk await depopulation, pending agreement by a slaughter plant to accept the potentially diseased elk. About $250,000 per month is spent in additional operating cost by Agriculture Canada to control the Tb epidemic in elk.

Potentially expensive is the threat to Canada's aspirations to gain a TB free status by 1992. Such a status would be worth not only more than one hundred million dollars in livestock exports annually, but it would save cattle ranchers the expensive Tb testing of their herds. There are also costs due to criminal investigations, but no estimates are available.

Even with a better TB test for elk, the sheer scale of the game ranching industry at maturity, the poor husbandry on marginal operations, the scale of illegal trafficking in game animals, and the lack of enforcement of regulations, will make expensive disease outbreaks inevitable. Agriculture Canada banned in November 24, 1990, the imports of all deer and camelids, and their transport between provinces even for show purposes. A ban on all movements of farmed wild species was put in place in Dec. 8, but was rescinded four weeks later; it had outraged ranchers of exotic stock. Without legal requirements to identify the cause of death of wildlife dying on game ranches, there is a high probability that reportable diseases will not be discovered in time, and that infected herds remain a long time in commerce.

Evidence against game ranching has been compiled by wildlife departments in the United States, while trying to keep out this industry, or to limit the damage it has already done. A report prepared by Lanka et al. (1990) and submitted to court in Wyoming, presents evidence to show that: (1) many wildlife diseases cannot be identified accurately or at all in living animals, (2) that quarantine regulations are inadequate to catch many diseases, (3) that import regulations have been deliberately flouted, (4) that ranched wildlife continues to escape from game ranches for many reasons: breakage of poorly-maintained fences, breakage due to trees falling on fences or due to storm floods, snow drifts forming about fences and tearing them down during the snow melt, big game animals damaging fences, and gates being left open due to accident, carelessness or vandalism. The difficulties encountered in Canada dealing with the TB epidemic confirm Lanka et al. (1990).

Here are two additional foreseeable disease problems: Meningeal worm. Studies done by Dr. W. M. Samuel, University of Alberta, have shown that elk may become carriers of the meningeal worm Paraelaphostrongylus tenuis (Nematoda), which is indigenous to white-tailed (Odocoileus virginianus Z.) deer of North America (Anderson 1972). There is no method available to consistently identify carriers of this parasite, quarantined elk included. There is no prescription to kill the parasite in situ. There is thus no way to guard wildlife against this disease except a prohibition on all movement of elk into areas free of meningeal

worm. This policy has been adopted by Alberta, but not by other provinces and states.

Currently, white-tailed deer in the west are not infected with meningeal worm as the disease halts, roughly, at the Manitoba - Saskatchewan border. With elk as potential carriers, there is a danger that escaped elk from game ranches carry this disease into uninfected white-tailed deer populations. This would have devastating consequences to populations of mule deer (O. hemionus R.), elk, moose (Alces alces L.), bighorn sheep (Ovis canadensis S.), bison, mountain goats (Oreamnos americanus D.), mountain caribou (Rangifer tarandus caribou G.) populations and domestic livestock.

Spongiform encephalopathy (SE). This is a fatal, incurable brain degeneration that breaks out after a long latency period, up to 30 years after oral infection in humans (Brown 1990). SE is named after the species it is found in (scrapie in sheep, Bovine Spongiform Encephalopathy [BSE] in British cattle, Downer Syndrome in American cattle [Gibbs et al. 1991]; wasting disease in elk and mule deer [Williams and Young 1980, 1982], Transmissible Mink Encephalopathy [TME] in mink [Marsh et al. 1991]). This gives the impression of many types of SE, but note Paul Brown's (1990:38) comment:"The separation of transmissible spongiform encephalopathies into veterinary and human categories is fundamentally artificial, as they all result from the same pathological process, involving the transformation of a normal host-encoded protein into amyloid fibrils that accumulate in and

eventually destroy the brain". In humans SE has several variants, all transmissible, including Creutzfeld-Jakob-Disease (CJD), Gerstmann-Streussler-Scheinker-Syndrome (GSS) and kuru. Many technical reviews of SE and current updates preclude the need for a detailed review here (Weissmann 1989; Kimberlin 1990; Brown 1990: Paine 1990; Odenwald (1990). Uncertainties due to paucity of research on a number of important public health questions, combined with a nearly indestructible infectious agent that currently cannot be removed safely during food processing (Taylor 1989; Brown et al. 1990; Brown and Gajdusek 1991), the rapid spread of the disease geographically, the alteration of pathogenicity in passage between species, the long latency periods expected with oral transmission in food, and the dreadful pathology, make this a very troubling disease - particularly when found in free-living wildlife.

Moreover, the refereed literature presents but a part of the important information, as shown by investigative reporting, in particular by the German weekly DER SPIEGEL (No.32/21:254-255, 1990; No.32/44: 164-166, 1990; No. 45/3 p.189, 1991; see also CBC "Quirks and Quarks", 27th Oct. 1990). It revealed not only unpublished interpretations of the data by the researchers themselves, or exposed the selective perception of agricultural spokesmen, but it also showed how the meat industry circumvented regulations designed to contain the spread of the disease.

Of importance here is that elk and mule deer (Odocoileus hemionus) are known carriers of SE in the western U.S. (Williams

and Young 1980, 1982; Bahmanyar et al. 1985; Guiroy et al. 1991 a, b), that the disease has been found in captive and free-living cervids, that in elk there appears to be fairly rapid lateral transmission, that the geographic distribution of the disease is not known, and that little funding is available to find out. Spongiform encephalopathy in elk and mule deer contains the same infectious protein as scrapie (Guiroy et al. 1991 a, b). "Wasting disease" as used by Bringans (1987) for wapiti in New Zealand is unrelated, and may be a nutritional deficiency disease. In Britain "mad cow disease" probably developed in cattle fed on the protein meal prepared from sheep cadavers, though a spokesman for the rendering business (Wilson 1989) critizies that this hypothesis has not been tested despite the industries offer of tangible co-operation. Scrapie has only been spread experimentally to cattle by tissue injection (Gibbs et al. 1999). Oral infection is suspected in five species of African antelope which died of SE in zoos (Kirkwood et al. 1990). Here SE spread from female to young and erupted quickly, that is, within 2-3 years. SE appeared in mink on U.S. fur ranches fed meat of cattle that died of "downer syndrome"; cattle inoculated with mink SE tissue also developed SE, and the infected cattle in turn were able to pass on SE via inoculation and the oral route to healthy mink (CBC "Quirks and quarks", 27th Oct. 1990; Marsh et al. 1991). SE has been found in British cats (Leggett et al. 1990) and in Norwegian foxes (Hagen and Bjerkas 1990). In humans kuru is transmitted orally (Brown 1990), but CJD does not correlate

with the consumption of sheep. However, a current outbreak of CJD in Czechoslovakia is associated with intensive sheep husbandry (DER SPIEGEL 32/21:254-255, 1990); the consumption of sheep eyes as practiced in Libya by the Jewish community has been linked to increased CJD (SCIENCE 247[4942]: 523, 2/2/1990; DER SPIEGEL 32/21:254-255, 1990). CJD has been linked to iatrogenic infections from rabies vaccine produced from sheep brains (Arya 1990), and to injections of hormones extracted from human pituitaries (Brown 1990).

The incidence of SE in elk is difficult to determine, since it can be currently identified only post mortem. The disease surfaced in captive and free-living cervids in Wyoming and Colorado. In sheep scrapie is transmitted laterally through the ingestion of the expelled placenta, and there is evidence that SE is also transmitted laterally in elk. North American cervids could contract SE where their ranges overlap with those of sheep infected with scrapie or cattle with Downer Syndrome. Elk are likely to nibble the bones of dead sheep or cattle, a possible rout of SE infection if the bones are from stock that died of SE and contain residues of bone marrow. However, SE has not been reported in Eurasian red and fallow deer, though these species overlap with domestic and wild caprids. In British zoos, deer must have been fed the same rations as African antelope that did develop SE. Maybe Eurasian deer, unlike elk and mule deer, have evolved some protection against SE due their long evolutionary association with many species of caprids where SE is endemic.

The disease agent has not been found in muscle tissue, which is considered fairly safe to eat, but internal organs carry the disease agent. However, the practice of sawing through spinal cord, brain and marrow, and thus spraying the carcass with a film of infected neural tissue and bone marrow would contamination the meat with SE. The practice of removing brain, spine, large nerves and lymph nodes, all loci of BSE virinos, as once required by German import regulations, has been condemned as inadequate. One cannot remove large nerve strands and lymph nodes adequately in fresh meat and not at all in frozen slabs of meat.

Cooking infected tissues is not adequate to remove the infectious SE agent; it has survived heating at 360° C and autoclaving (Brown et al. 1990). Burning of carcasses, not burial, is the only safe way of destroying the infectious agent as the causative agent survives burial in soil (Brown and Gajdusek, 1991).

SE infected elk on game ranches could remain a long time in commerce because SE is so difficult to detect. Elk, for reasons of antler harvest and building up herds, are kept alive on game ranches longer than the normal latency period for the SE disease agent to multiply and reach the central nervous system. This increasing the risk of elk, saturated with the infective agent, being send off to slaughter. There could be an element of risk in eating elk meat coming from ranched herds. The element of risk in eating sheep or beef is less as sheep are eaten primarily as lamb and beef as 2-3 year old animals, well before the spread of the

SE agent through the internal organs, lymphatic system, bone marrow and central nervous system.

DISCUSSION Ironically, game ranching is promoted by agricultural bureaucracies in Canada as "alternative agriculture". Concerns that game ranching stimulates commercial poaching, that escapes from game farms put at risk native wildlife through genetic pollution, competition and diseases, while diseases also endangered public health, native people and livestock, that incompatibility of free ranging populations of ranched species and of predators was a threat to native wildlife, that farming wild species has not been found to be boon for conservation (Klein 1970; Ehrenfeld 1974; Holmes 1982; Swenson 1983; Geist 1985, 1988, 1989; Pruitt 1985; Samuel 1987; Onderka and Wishart 1988; Onderka et al. 1988; Lanka et al. 1990) fell on deaf ears. So did the fact of TB epidemics in farmed and feral deer in New Zealand, Great Britain and Denmark.

Early in 1990 Canadian agricultural bureaucracies argued at public hearings for the extermination of the last wild herd of buffalo (Bison bison L.), the bison of Wood Buffalo National Park (Connelly et al. 1990). These bison, infected in 1925 with bovine Tb and brucellosis, were rated so dangerous to livestock, wildlife and public health, that $22 million in public funds were to be spent eradicating the diseases. Agriculture Canada pointed to its investment in a Tb free status for Canada's cattle, and to the expected economic benefits.

However, the "diseased bison problem" appeared contrived,

because these bureaucracies forcefully supported game ranching, which was known to be a great disease threats. History proved it within two months with a Tb epidemic on game farms. The diseased bison, in their 65 years of existence, had accounted for no known infection of livestock or humans. This compares to 36 humans infected by ranched elk with Tb within a year, plus infected livestock, and the likely loss to Canada of an expected Tb free status for its cattle herds in 1992.

As bovine Tb spread through Canadian elk ranches infecting humans and livestock, agricultural bureaucracies belittled the dangers from Tb or other diseases. On July 18, 1991, in the midst of the Tb epidemic, the Alberta government announced that it had legalized the sale of elk meat. With game ranching entrenched, there is a permanent "disease bridge" for livestock diseases to cross from captive big game to wild populations and back. Will raccoons become the equivalent of the brush-tailed opossum in New Zealand in spreading Tb? Damage to tourism and agriculture from reportable diseases born by wildlife is no longer a question of if, but only of when.

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RAISING MOOSE

In 1949, the experimental moose farm started out with 14 moose under the age of three years old, with the idea of raising a domestic animal, and today there are domesticated animals of the third and fourth generation in the herd, all direct descendents of the first fourteen. New-born calves up to five days old were found to be the most suitable for bottle-feeding on cow's milk and for domestication. They become attached for life to the individual feeding them. Such calves can be turned loose without fear that they will run away. At the age of three the tame animals usually bear their first calves and in subsequent years reproduce regularly. Some nearly always have two calves; others usually one calf; while others the chances of producing one or two are about the same. The farm has thus disproved the widely held belief that moose do not reproduce in captivity. Moreover some of the animals are now twelve years old and only one adult has died of disease. The best results seem to come from a system of year-round unrestricted grazing, with the animals unattended by a herdsman, periodically rounded up for check-ups and held in temporary corrals during the calving and mating season. -- THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY, DEC. 1964

Calf Moose are born anytime between April to the beginning of June, usually in mid-May. They grow up quickly. Bottle-raised male roe and red deer regularly turn vicious and dangerous when they grow up and come into rut. This has rarely been experienced with the largest and strongest of deer, the moose. The reason maybe that male moose in rut are quiet and gentle. Since the moose becomes tame so easily, their young have often been bottle raised in the Balties, Sweden, and Russia. From 1946 until 1948, moose were first captured when one to three days old for the moose

farm. Such animals became extremely tame and attached to humans. -- GRZIMAK ANIMAL LIFE ENCYCLOPEDIA 1962 - VOL. 13

New born calves up to five days old were found to be the most suitable for bottle-feeding on cow's milk and for domestication. They do not show any fear of man and, having lost their mother, follow him around on their own accord. They readily drink cow's milk from a feeding bottle and become attached for life to the individual feeding them. Such calves can be turned loose without fear that they will run away. At the age of three years old the tame animals usually bear their first calves and in subsequent years reproduce regularly. When calves were taken away from their domesticated mothers immediately after birth and bottle-fed, the milk cows were found to transfer their maternal instinct to the milkers. -- THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY - Dec. 1964.

Moose Farming?

The Tanana Athabascan Indians, who lived around Fairbanks before the foreigner came, purposely modified the environment to produce more food. The Indians recognized that spruce forests provide no food for moose and that they set fires to produce more moose browse.

Ivar Skarland is one of the few to have studied the early ways of life. --- ALASKA SCIENCE NUGGETS - NEIL DAVIS (PAGE 146)

Moose meat is low in calories and cholesterol making them very attractive for production and world wide markets. They grow up to 5 lbs. a day for the first six months.

The moose has been allowed to pasture unrestrained from October to the end of May - during the entire time the moose farm has been in existence, there has not been a single instance of loss of domesticated to roaming wild moose. The rearing and training moose to conditions of domestication absolutely eliminate the seasonal migrated instinct. The application to domesticated moose allows a many - fold increase in economic return over what we receive from wild moose by managed hunting - EXPERIMENTAL MOOSE FARMING 1956 - RUSSIA

And all the above is in addition to the resources that will be made available from these animals. The hides can be tanned and made into clothes, crafts and collectibles, the bones can be made into tools (fleshing tools), crafts (dogsled made from jaw bone), or ground for fertilizer or sold to a dog food industry. The antlers can be made into crafts (knifehandles, belt buckles...) or perhaps ground for the orient (Elk horn in velvet sells for $26.00 an ounce)

and even the hard toes can be made into jewelry (resembling the look of baleen).

This one resource would be profitable for many different and diverse industries, ranging from tourist businesses, airlines, hotels, garages, filling stations, photographers, truckers tanneries, biologist, teachers, vets, and artists and craftmans and on and on...

UTILIZING DOMESTICATED MOOSE FOR TRANSPORT

Moose possess many qualities of value as a draft animal. -- easily traverse: bogs, densely littered forests, deep snow, have great physical strength, are provided with food anywhere, in winter do not require warm quarters, and are docile to handle. At the same time these animals have their special biological peculiarities. One characteristic is their sedentary way of life. Utilizing moose for draft requires purposeful preparatory training of them from an early age. Practical work on the moose farm shows that there exists well-defined individual variations in the amount of work a moose can do. In this regard selective culling has a great effect on the creation of work moose. A program for work moose must take into account seasonal variations in the yearly cycle of the moose. Moose have the greatest capacity for work in the autumn months. However, using greatly aroused and vicious bulls for work at this time is impossibly dangerous, and after the rut, they lose up to 20% of body weight. Hence, it is concluded that bull moose in general are of little use for work, and it is advisable to use nothing but castrated moose for this purpose. Castration causes moose to become very gentle and tractable, taking no part in the rut. They continue to gain body weight, and therefore, in autumn and the first half of winter, they are in excellent working condition. Castration does not adversely affect growth of moose (even if it is carried out on a four-month old) and promotes apparent increase in the hardiness of these animals. With the approach of warm spring and summer weather the work efficiency of moose is reduced, since the life activity of nearly all moose is lowered at this time and are mainly active at night and spend most all day lying in shady and cool parts of the forest or in small ponds. Therefore, at this time, work on the moose farm was done only at night and periodically. -- 1956, Experimental Moose-farm, pechora-Ilych National Park, Russia

Since the moose become tame so easily, their young have often been bottle raised in the Baltics, Sweden, and Russia. A biologist, Dr. Peter Krott who resided in Finland, tried to ride two bottle-raised young moose and drive them before a wagon. Almost full grown, they were strapped into a special harness, bridles, and halters without any resistance on the first attempt. This could not be done with any young horse, no matter how tame, since it is more ticklish. Because a metal bit would be to cold in the winter, they had rubber. They did not pay any attention to the sleigh behind them and walked around with harness and sleigh as if on their way to pasture. After twenty minutes, they would browse in the bushes, they would lay down to recover from the strain. Later Peter Krott travel ed to several towns in Finland to show off his team. The two large animals would follow their master, who lured them up the ramp onto the truck with a cabbage. Their halters were tied to the front wall and, while the truck was moving, they would lie down quietly, When they turned their heads their dangerous antlers were only millimeters from Mr. Krott's eyes - proof of how precisely they could control their movements. When Krott called them, they immediately put their muzzles under his arm and followed like dogs. They were not bothered in their shows by the crowds, the many cyclist, cars, and buses. Only at the station were they terrified when a train dashed past them, although after the train was gone, they calmed down and returned without any difficulties to the exhibition grounds. The children were delighted when, amidst the crowd, the animals lay down to rest and ruminate. Even a private plane flown right above their heads did not bother them.

In the Soviet Union, they were more successful with training moose for riding and pulling carts. Cliff Drawings discovered in Siberia show that moose tended by humans or hitched to a sleigh, suggesting the moose was once as domesticated an animal

as the horse and the cow. As early as 1938, the experimental institute of Serpuchowsk near Moscow had thirteen tame moose who were hitched daily to a sleigh. They would pull one ton and a half cubic meters of logs for fifteen kilometers. Unfortunately, this station was ruined during the German occupation. Later rebuilt in Siberia in the state nature preserve where the moose's main diet grows plentifully. From 1946 to 1948, moose were first captured when one to three days old for the moose farm. They immediately drank cow's milk from the bottle. Such animals because extremely tame and attached to humans. Already at an age of two to three months, the animals are put into a halter and attached to a post with a rope. Within a few weeks, they learn how to walk on a leash. It is important that they not only obey the familiar person's voice, but also that they respond to the sound of a horn. Otherwise, they would only follow the people they know. As soon as the moose have reached a weight of 130 to 150 kilograms, about six months old, they are trained to carry loads and to pull carts. At three years, their training is completed and they are ready for work. They may be ridden and pull weights of several hundred pounds. Full-grown moose can carry up to 250 pounds, which is one third of their live weight. The moose may turn out to be of use for labor in the north. It needs no special food supply, as horses, or gasoline as cars. Deep snow, swamp, or fallen trees are no obstacles for it. Even in the winter it does not need a stable, but can lie down on the snow.

In Livonia, a forester named Harry Walter had a male moose,who skillfully jumped though an open window into and out of his room. During meals it would lie in the living room, and it followed him in the forest like a dog. While it could be ridden, it would not tolerate a saddle. -- GRZIMAK ANIMAL LIFE ENCYCLOPEDIA VOL. 13

POSSIBILITIES OF USING MOOSE FOR MILK PRODUCTION

Because of its qualities of composition, moose milk appears to be a very important food product, especially for northern regions on a subsistence economy and with under-developed animals husbandry where there is found a notable shortage of fresh milk.

Moose milk is a pure white color, much thicker than cow's milk, without smell, having a characteristic salty-astringent taste, easily turned (curdled). When added to sweetened coffee or tea, it acts like cow's cream. When poured in a thin stream, the milk quickly evaporates and in the dry state resembles cheese in taste.

Moose milk shows a very high quality, it is significantly more nutritious than cow's milk. Studies show that butter made from moose milk contained much more vitamin A, C, and D. -- 1956 - EXPERIMENTAL MOOSE - FARMING PECHORA - ILYCH NATIONAL PARK, RUSSIA

A female moose in the wild gives an average of 150 liters of milk per year. Due to regular milking, the lactation period may be extended from four to six months. On the Moose farm, after six years, the best female gave almost six liters daily, 402 liters per year. -- SOVIET UNION, EXPERIMENTAL FARMING IN STATE NATURE PRESERVE OF 1962, GRZIMAK ANIMAL LIFE ENCYCLOPEDIA VOL. 13

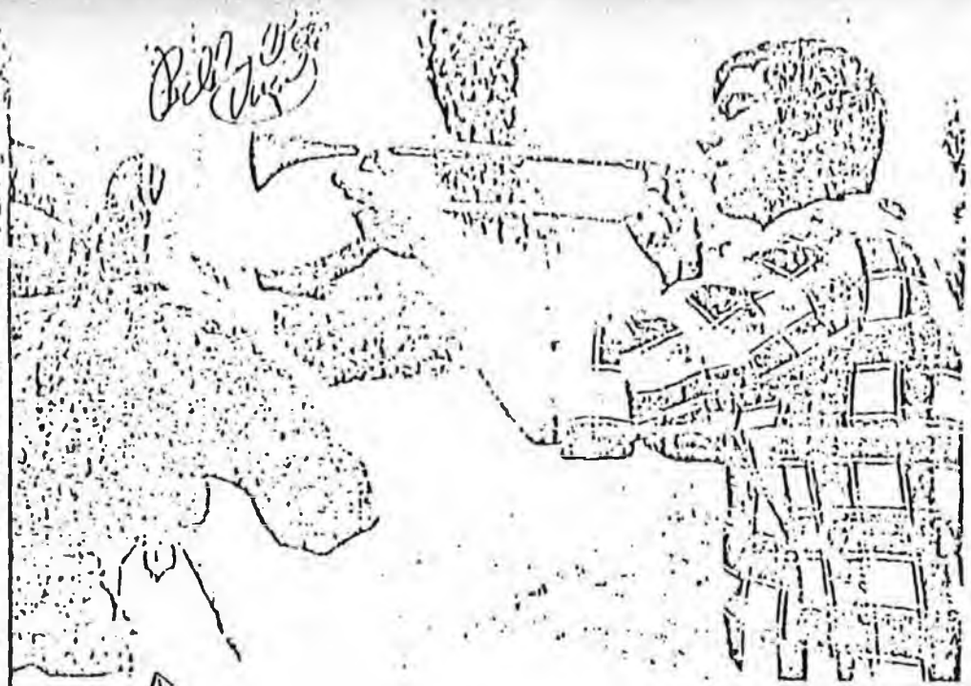
Early in the morning in answer to the bugle call, the moose appear on the edge of the forest, there are already more than 40 moose at the Kastroma Farm, which is only eight years old. In answer to the bugle call the moose come out of the forest to the pens. Salted water is ready for them and milk and oatmeal for the calves. Some Moose cows yield

as much as six quarters of milk a day. And what milk! It is five times richer in protein and fat than ordinary cow's milk. It churns to excellent butter. The moose are not at all fussy about their feed, and that makes them ideal domestic animals in forested and marsh - covered regions. A year-old female strayed from a herd, two years later the animal accidentally came upon the person who had been it's herdsman. Hearing the voice, it ran up to him, sniffed at the man's face and nosed and poked its muzzle into his pocket, where he used to keep tidbits for the animals. She followed the man some five or six miles to the farm and never left the place. It is interesting that the moose did not turn wild after two years of living with wild moose. -- KOSTROMA AGRICULTURAL EXPERIMENTAL STATION SOVIET LIFE, MAY 1974

It has been established that the milking process does not present any difficulties or danger to the milkers. The moose cows return punctually from their pastures to the farm to be milked. At first a milk yield of 75 to 150 litres per cow was obtained for the lactation. Fourteen years later the top figure has been boosted to 430 litres per cow by various milking methods.

Moose milk contains, on average, 10 percent of fat, some .15 percent of protein, and many vitamins. Appreciable differences in milk yield between cows suggests possibilities of boosting milk productivity by selective breeding. -- THE JOURNAL OF THE FAUNA PRESERVATION SOCIETY, DEC. 1964

Soviet Life
May 1974



Moose

"Milking Moose"

(In the European countrys Moose are known as ELK)

By Matvei Khromchenko

EVERY MORNING the year round, no matter what the weather, a bugle calls through the village of Sumarokovo. The bugler is patient, persistent, repeating his notes until the elk appear on the edge of the forest. The day has begun for the elk-breeding farm at the Kostroma Agricultural Experimental Station.

Elk were close to extinction at the turn of the century; they were much too tempting and easy game for hunters. Only extreme conservation measures saved them, and today there are half a million in the Soviet Union. From the central forests (including those in Kostroma Region), the elk gradually moved up to the Caucasus and the Carpathians.

Cliff drawings discovered in Siberia show that the elk was once as domesticated an animal as the horse and the cow. We do not know why it went wild again.

People tell the story of a year-old female that strayed from a herd in open pasturage in the Siberian taiga. Two years later the animal accidentally came upon the person who had been its herdsman. Hearing the voice, it ran up to him, sniffed at the man's face and nose and poked its muzzle into his pocket, where he used to keep tidbits for the animal. It followed the man some five or six miles to the elk-breeding farm and never left the place. It is interesting that the elk had not turned wild in the two years it had lived with wild elk.

So domesticating elk is not too difficult. The problem is to get them used to herd life and a fixed order of things.

But the job is worth doing. Some elk cows at the Kostroma farm yield as much as six quarts of milk a day. And what milk! It is five times richer in protein and fat than ordinary cow's milk; it churns to excellent butter. The elk are not at all fussy about their feed, and that makes them ideal domestic animals in forested and taiga-zone regions, Siberia and the Far East, for example, where the fodder is sparse.

There are already more than 40 elk at the Kostroma farm, which is only eight years old. Early in the morning, in answer to the bugle call, the elk come out of the forest to the pens. Salted water is ready for them and milk and oatmeal for the calves. The cows have to be milked and, from time to time, weighed and measured. Then they're led out to the forest to graze till evening. This is not to keep them from scattering but to get them more accustomed to herd life.

Four young people—Alexei Mikhailov, the farm's director, and his wife Polina (both are graduates of Kostroma's Agricultural Institute) and laboratory assistants Nadezhda Durkina and Alexei Kelip—make up a team whose practical research has awakened interest beyond Kostroma Region. Last spring something happened at the farm which even got some attention abroad. Nineteen calves were born on one day. And not one of them died. An acknowledged record holder here is Nakhodka, who has already dropped nine calves: one the first year and twins annually ever since.

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Game production in western Canada

LYLE A. RENECKER, CHARLES B. BLYTH & CORMACK C. GATES

Abstract

Since 1970, interest in commercial game production has increased as conventional agriculture searched for innovative ways to diversify. Initially, Elk Island National Park, with its productive populations of bison (*Bison bison*), moose (*Alces alces*), and wapiti (*Cervus elaphus*) served as a model for the emerging game industry. However, several legal and economic forces now favour more intensive systems. Development of commercial bison and wapiti operations was motivated largely by attractive returns for breeding stock (US$ 2500), meat (US$ 8/kg), and velvet antlers (US$ 100/kg). In early 1987, there were 251 commercial operations in the prairie provinces holding 5100 bison and 2900 wapiti. Despite several obstacles including inimical legislation and limited supplies of breeding stock, these numbers are increasing rapidly. This new industry provides an incentive for landscape conservation on private lands and offers a culturally consistent livelihood for native people.

Introduction

The western interior of Canada once supported a highly productive large herbivore community which included bison, wapiti, moose, mule deer (*Odocoileus hemionus*), white-tailed deer (*O. virginianus*), and pronghorn antelope (*Antilocapra americana*). These ungulates have provided a subsistence and economic base for native peoples since glaciers retreated some 12,000 years ago (Ray, 1974). But, by the end of the 19th century, this rich grazing system was largely replaced by conventional agriculture. Today, declining profitability of crop and livestock production has encouraged farm diversification. Though in its infancy, game ranching in western Canada is being actively considered as one of several alternative agricultural technologies.

Emergence of game production

During prehistoric and early historic times, subsistence hunters followed two different hunting patterns. Plains Indians depended primarily

on plains bison (*B. b. bison*) for food, clothing, and shelter. Boreal Indians subsisted on a more diverse harvest of furbearing animals, waterfowl, deer, moose, wapiti, wood bison (*B. b. athabascae*), and caribou (*Rangifer tarandus caribou*). To both cultures, the parkland (ecotone between the boreal forest and the great plains) was an important part of their seasonal subsistence pattern. With the onset of winter, bison from the adjacent plains moved northward to the parkland (Roe, 1970) followed by Plains Indians who relied upon them for survival and the wood and habitat afforded by this habitat (Ray, 1974). Concomitantly, some Boreal Indians moved southward to winter in the parkland.

By 1790, the Northwest and Hudson Bay fur trading companies had penetrated the western prairie provinces of Manitoba, Saskatchewan, and Alberta. Trade in pemmican (a mixture of dried pounded meat, fat, and often berries) soon exceeded that of furs. The journals of traders and explorers provide numerous references to the provisioning of large quantities of game meat. During the mid 1800s, Fort Edmonton required approximately 500 bison annually representing a daily consumption of over 300 kg (DeSmet, 1847; Webb, 1967). Most bison were procured from September to May whereas moose, deer, wapiti, and smaller animals provided an alternative food source during summer when bison moved southward to the plains (Losey, 1978).

By the late 1860s, heavy demands on wild herds had taken their toll. The depletion of ungulates did not go unnoticed. Early conservation efforts included legal proclamations such as 'The Buffalo Ordinance' of 1877. This and other legislation was enacted to prevent further depletion of wildlife from uncontrolled hunting, but was largely ineffective. As a result, plains bison were eliminated from the parkland and prairies, and only a few wood bison were left in the northern boreal forest (Soper, 1941). Wapiti were reduced to a few remnant populations.

During the next 30 years, forest succession proceeded rapidly with vastly reduced grazing by native herbivores and fewer fires (Lewis, 1976). With legal land title and rail transport systems in place by the late 1800s, agricultural development and timber harvesting proceeded at an uncontrolled pace. Agricultural development initially concentrated in the most productive landscapes, extending more slowly into marginal northern areas.

Early interest in game production was in response to dwindling numbers of wild animals in the late 1800s (Sifton, 1916). The adaptability of wapiti to intensive management was soon recognised (Lantz, 1910). In 1915, the Dominion Department of Agriculture established an experimental bison/cattalo (bison x cattle hybrid) herd to evaluate prospects of developing a new breed for western agriculture (Rorabacher, 1970).

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