TOPIC 2. ECONOMIC CONSIDERATIONS

Economic considerations have always been part of evaluations of wildlife resources, but at no other time in the history of game management have they been more important than now, in the 1980's. Increasing pressures on all resources as a result of increasing human populations, coupled with a rapidly-rising rate of inflation, results in increased pressures on both resources and people. High meat prices, for example, result in more backyard deer hunters intent on getting venison at the least possible cost. This and other examples of resource use are discussed in UNIT 2.1.

Wildlife is managed for profit in some areas of the world and the United States. The enhancement of wildlife populations on lands leased to hunters is a form of husbandry in parts of the United States, even though the wildlife is not owned by the landowners. Interestingly, the bison, once almost extinct, is now part of cattle ranching operations as a result of a breakthrough in fertile offspring produced by bison-cattle crosses. These considerations are discussed in UNIT 2.2.

Reindeer herding is a very old husbandry practice by a specific group of people, the Lapps. It is discussed in UNIT 2.3, WILD RUMINANT HUSBANDRY, even though it is not part of North American wild ruminant ecology, because there are proposals to establish more ranchers and elk ranchers in North America.

An understanding of the economic factors affecting wild ruminants, as well as the economic value of ruminant populations, is important when making management decisions relative to wild, totally free-ranging populations or semi-domesticated ones.

REFERENCES, TOPIC 2

ECONOMIC CONSIDERATIONS

BOOKS

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS----------	AUTHORS/EDITORS--	YEAR
aubo	psup	uppa	29	odvi	deer economics	pasto,jk; thomas,	1955
edbo	babo	nyny	92	game	game ranching: ecol sensib	debell,g	1970
edbo	laan	loen	335	----	lab animal handbook, vol 7	mcsheeny,t	1976

UNIT 2.1: RESOURCE USE

Resource uses considered in this UNIT include not only the uses of wild ruminants for recreation, meat, and hides, but also uses of their habitat resources for various purposes. The former are the traditional uses, and the latter very recent ones of considerable concern.

The recreation and enjoyment provided by wild ruminants when they are viewed, photographed, and hunted is a very important part of the total recreation picture in the United States and Canada. The attention a moose gets when feeding in a stream by a road in Yellowstone or a herd of elk in a meadow in Rocky Mountain National Park results in cars stopped on both sides of the road and people scurrying to get pictures and closer views. Sometimes more excitement is generated than expected; bison in Yellowson have on occasion charged tourists, resulting in personal injuries. The recreational values of seeing wild ruminants in such natural habitats far outweigh the values of zoo-type displays or museums of mounted specimens, even though zoos and museums present well-designed displays in the limited space available.

Hunting provides much recreation and considerable meat each year. Years ago, when the human population was lower and more dispersed, hunters were also more dispersed. Now, the city-to-country emmigration on opening day in some states is of massive proportions, and steps are taken to distribute hunters and hunting pressure more evenly.

The meat and hide resources taken by hunters are considerable, and they are usually used to good advantage. Wild game supplements the main diet, and hides are used for leather goods. Horns and antlers are also often saved as trophies and mementos, and head mounts are made when appropriate.

Man also has need for resources which come from the earth, and some of our efforts to extract these resources are beneficial and some detrimental to wild ruminant habitats. Farm fields are good sources of food for deer, with heavy grazing in some hay fields and consumption of grains such as corn being an important part of winter diets in some areas. The deer compete with the farmer, but this is tolerated up to a point.

The use of space resources for oil pipelines in Alaska and Canada has caused considerable concern in recent years. The space occupied by pipelines is but a tiny fraction indeed, but the barriers pipelines may be to movements and migrations may be considerable. The effects of such human disturbances are discussed in CHAPTER 5, TOPIC 2, UNIT 2.4.

It is important to realize that space is a resource and the shared use of space by man and wild ruminants is detrimental to some wild ruminant species when man's activities are minimal, and detrimental to all wild ruminant species when man's activities are maximal. Even though wild ruminants may appear to tolerate fairly high levels of human activities in

some situations, they are secretive and elusive animals, unable to accept and adapt to whatever man wishes to do without ultimate drops in productivity.

REFERENCES, UNIT 2.1

RESOURCE USE

SERIALS

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
JAASA	46--3	159	....	odvi	tempor & spat subsist patt	curren,cb,jr	1975
PAABA	610--	1	33	odvi	costs and benefits of herd	thomas,dw; pasto,	1956

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				odhe			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				ceel			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
JFRBA	32--1	171	176	alal	impact dam, athabasc delta	townsend,gh	1975

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
ARANB	15--1	68	88	rata	econ uncertnty, rata eater	smith,jge	1978
BPURD	1----	1	4	rata	ceel, potl impct dev popul	klein,dr	1975
BPURD	1----	4	9	rata	the scandinavian viewpoint	villmo,l	1975
BPURD	1----	9	11	rata	canad carib & nrthrn devel	jakimchuk,rd	1975
EVCNA	3---3	218	224	rata	env probs assoc arctic dev	west,gc	1976
				rata	continued on the next page		

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
JAVMA	164-7	695	696	rata	anims, model human disease	dieterich,ra	1974
LIWIA	35---	20	24	rata	oil stalks the caribou	belous,r	1972
ORYXA	10--4	220	235	rata	oil and wildlife in alaska	scott,p	1970
SBHRA	7-1/2	20	40	rata	quant interactn man & anim	pelosse,jl	1972
TNWSD	31---	45	55	rata	rata, oil explor compatib?	miller,fl	1974
UABPA	1----	11	14	rata	od, alask, problm & prospc	hemming,je	1975

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
HILGA	19--8	265	284	anam	od, food valu meat, factrs	cook,bb; witham,/	1949
JANSA	45--6	1477	1482	anam	ceel, use range futur meat	cook,cw	1977

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				bibi			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
AIWHA	14-12	534	540	ov--	goat, sheep, orig domestic	kyle,r	1972

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
BICOB	5---3	191	195	ovca	mined land reclam, alberta	etter,hm	1973
tdbca	13---	98	102	ovca	expenditurs, hunting,idaho	spillett,jj; morg	1969

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				ovda			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
ATICA	30--3	135	154	obmo	& man, cent canad sub-arct	burch,es,jr	1977
ATICA	30--4	246	....	obmo	& man in subarctc, archael	gordon,bc	1977
INWLA	2---5	12	15	obmo	musk-ox - it fed cave man	scott,jd	1972

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				oram			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
JANSA	40--5	1016	1019	many	potential as protein sourc	novakowski,ns; so	1975
MUOXD	15...	10	29	many	evol lndscap churchill riv	kupsch,wo	1975
VEZOA	1....	74	78	many	faun, age peat bog, archae	pidoplichko,ig; i	1975

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
ATRLA	12--5	67	79	bibo	cross wisent & domest catt	krasinska,m	1967

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
BICOB	6---4	274	284	wldl	sagebrush conversn projcts	vale,tr	____
BINPA	14	73	82	wldl	conseqs hydro elec projcts	gill,d	1978
BISNA	26	754	760	wldl	cons nat ecosys, fossil en	bormann,fh	1976
CEXBI	916--	1	36	wldl	econ impct, hunt, fish exp	rohdy,dd; lovegro	1970
JANSA	40--5	1009	1015	wldl	use wild & dom anim, genet	spillett,jj; bun/	1975
JRMGA	8---5	214	217	biga	biga & commerc meat consum	lloyd,rd	1955
JRMGA	10--2	67	70	biga	econ aspct lvstck-biga rel	kimball,tl	1957
JWIDA	6---4	397	401	wldl	use of to monitor zoonoses	trainer,do	1970
JWMAA	43--3	642	649	wldl	eval habitat, right-of-way	bramble,wc; byrne	1979
NAWTA	27---	255	267	wldl	econ aspct of on priv land	bolle,aw; taber,r	1962

wldl continued on the next page

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS----------	AUTHORS----------	YEAR
NAWTA	36---	428	438	wldl	communicatng values, kenai	steinhoff,hw	1971
NAWTA	39---	483	485	wldl	env eff surf min, need mgt	platts,ws	1974
PHSCA	23--1	1	14	wldl	contrib econ to valu theor	boulding,ke	1956
QBMAA	44--4	697	713	anim	powr line rght-of-way, use	gysel,lw	1962
UABPA	1----	1	33	wldl	wldlf in economy of alaska	buckley,jl	1957
UTSCB	23--1	16	....	wldl	wldl - a community resourc	berryman,jh	1962
WRNDA	12...	413	451	rumi	role, rumi, world food sup	cuthbertson,dp	1970
XAPRA	177--	1	14	wldl	wood plnt trial, mine recl	howard,gs; rauzi/	1979
XFWLA	246--	1	5		game save meat - it is valuable	rasmussen,di	1943
XFWWA	98---	1	16	wldl	wld animals as source food	talbot,lm	1966
ZEJAA	24--2	72	88	wldl	mode prot fr constrc canal	schneider,e; woel	1978

UNIT 2.2: MANAGING WILDLIFE HABITATS FOR PROFIT

Wildlife habitats may be managed for profit even though the wild animals using the habitats are under the jurisdiction of the state or province. Landowners have the privilege of controlling access to their land, and if fees are charged for the use of the land for hunting, the profit-motive may be realized.

Charging for use of land brings about certain expectations by the user and legal responsibilities on the landowner. Users expect to be charged reasonable rates in relation to the likelihood of success, and that likelihood must be reasonably high before such an enterprise will be successful.

Small farms are not well-suited to paid-hunting because the resident population of deer or other species is too low, and the animals are too wide-ranging. A group of small farms may be feasible; cooperative agreements may be arranged that involve several landowners.

Large ranches are more suited to paid hunting than small farms. Landowners in Texas and other western states provide more opportunities for commercialized hunting than landowners in the eastern states do. Hunting fees vary greatly, of course. Rates may be levied on a per day basis, on a success basis, or a combination of both.

Landowners who are collecting fees for use of their land must provide control over access in order to be fair to those paying. Reasonable precautions must also be taken in order to avoid problems that could be blamed on negligence. Liability insurance is a very wise investment for such operations.

Hunting in North America has been much less commercialized than in Europe, and a larger spectrum of the citizenry participates in hunting. In the United States and Canada, hunting has not been an activity of the rich, elite, or fortunate few. This will change, but I have no idea how fast changes will occur. One thing is certain; changes will run in the direction of more controlled access to private land rather than less access as human populations increase, wild ruminant populations decrease, and resource uses become more competitive.

REFERENCES, UNIT 2.2

MANAGING WILDLIFE HABITATS FOR PROFIT

SERIALS

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
AKASA	2----	65	68	od--	econ imprtnc, arkansas dee	wood,r	1947
JRMGA	18--5	247	250	od--	potnl retrn deer vs lvstck	ramsey,cw	1965

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				odvi			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				odhe			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				ceel			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				alal			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				rata			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				anam			

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

bibi

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

ovca

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

ovda

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

obmo

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

oram

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

JANSA 40--5 1000 1008 game commer use game anim, rnge teer,jg
JANSA 40--5 1016 1019 wldl potential as protein sourc novakowski,ns; so 1975
JANSA 45--6 1477 1482 ceel anam, rangeland, meat prod cook,cw 1977

NAWTA 33--- 192 204 game bionom, ethic implic, harv teer,jg; forrest, 1968

OOKHA 9---- 26 28 ungu [prospects for econom use] bannikov,a 1964

UNIT 2.3: WILD RUMINANT HUSBANDRY

Wild ruminant husbandry is the term applied when the animals rather than their habitats are managed, or raised with some control over their distribution through the year, and harvested rather selectively and heavily in the fall.

Wild ruminants have not been "farmed" or "ranched" in North America except in a few instances. The most economically important use of a wild ruminant in ranching may well be the crossing of bison and cattle. A major breakthrough occurred in 1960 when fertile offspring were produced from bison cattle crosses, resulting in the "beefalo" breed. This breed is 3/8 bison, 3/8 charalois, and 1/4 herford. Advertisements for beefalo stock appear regularly in farm magazines.

Buffalo ranches are also found in many states, from the west to the east coast. These ranchers raise bison from native stock obtained from surplus animals removed from wild or semi-wild herds in the western states. Buffalo ranchers must have strong, high fences. Wire netting up to six feet high is desirable as bison are not nearly as docile as domestic cattle.

Proposals for deer, elk, and moose farms recur with different modes of operation. Some would combine the tourist industry with meat production, and others would be strictly for meat production. Such endeavors could be successful, but raising wild ruminants should not be thought of as a slightly-modified cattle or sheep operation. Wild ruminants do have some unique characteristics, and there are technical problems that need to be solved.

Just as bison reached very low numbers and have since recovered, both in the wild and in semi-wild herds, muskox are also being raised in confinement.

Reindeer husbandry is a very old practice in the Scandanavian countries and in Russia. The migratory Lapps have tended herds for centuries, living very much the same way that their ancestors did until the last few years, when marked changes have taken place. Reindeer are slaughtered for meat and hides, and recently, antler velvet has been commanding high prices as an export to Asian countries where it is processed for sale as an aphrodisiac. The last practice has caused some concerns and raised questions in the reindeer industry.

Mechanization has caused marked changes in reindeer operations. The snowsled, or snowmobile, has had the greatest impact as it has greatly increased the mobility of the herders. Increased communication capabilities and the need for education has also changed the life-style of the nomadic Lapps, with less tendency for family units to move, resulting in a more settled existence. The reindeer must be moved, however, for winter and summer pastures are easily overgrazed.

There are many references to reindeer husbandry in the literature where a more complete picture of approaches to the husbandry of wild ruminants may be gained. There is, perhaps, not only room for both wild and semi-wild herds of our present wild ruminants but some good reasons why both should be part of the wild ruminant picture in the years ahead.

REFERENCES, UNIT 2.3

WILD RUMINANT HUSBANDRY

BOOKS

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS	AUTHORS/EDITORS	YEAR
aubo	hutc	loen	....	----	a history of domestic anim	zeuner,fe	1963
edbo	alpc	chil	....	----	domest,exploitn plnt, anim	ucko,pj; dimbleby	1969
aubo	cfst	spva	....	rata	reindeer husbandry, 2nd ed	zhigunov,ps	1961
aubo	usdi	juak	....	rata	reind hust, ecolog princip	sjenneberg,s; sla	1979
aubo	nyzs	nyny	254	bibi	the american bison	garretson,	1938
aubo	haho	nyny	85	obmo	oomingmak,nunivak is, alas	matthiessen,p	1967

SERIALS

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				odvi			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				odhe			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				ceel			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
ORYXA	7----	301	304	alal	domestc, russian natl park	yazan,y; knorre,y	1964

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
ANHUA	35--8	12	12	rata	barley sprts, suppl, alask	anonymous	1980
ATICA	3....	27	44	rata	reindeer industry, alaska	lantis,m	1950
FDSRA	22...	1	8	rata	introduced reinde, georgia	bonner,wn	1958
FENNA	95--4	1	61	rata	reindeer husbandry, finlnd	helle,r	1967
FMFUB	7---4	393	398	rata	human fright cries, acoust	pelosse,jl	1974
GEORA	49...	76	94	rata	arctic reindeer industry	sonnenfeld,j	1959
IUCSB	16...	159	169	rata	obmo, husbandr as land use	scotter,gw	1970
JOMAA	49...	....	....	rata	dev of reind husb in canad	treude,e	1968
JRMGA	5---4	243	251	rata	dev reind indust in alaska	hanson,hc	1952
JRMGA	18...	301	305	rata	reinde ranchng, fennoscand	scotter,gw	1965
JRMGA	25--3	167	174	rata	reindeer ranching in canad	scotter,gw	1972
NAWTA	1----	424	427	rata	canada's reinde experiment	bonnycastle,rhg	1936
OOKHA	2....	27	28	rata	return the reindeer to our	michurin,l	1963
ORYXA	11--4	268	269	rata	finland's reindeer	montonen,m	1972
PRIRA	1....	120	....	rata	wild reindeer of sakhalin	mishin,ip	1952
UABPA	8....	1	82	rata	reindee ecol, mngmnt, swed	skuncke,f	1969
XAMPA	207--	1	40	rata	raising reindeer in alaska	palmer,lj	1934
ZETIA	32--2	199	208	rata	anim acoustic signa, human	pelosse,jl	1973
ZHIVA	1954.	62	68	rata	organization of food basis	ustinov,vi; pokr/	1954
ZOGAA	33...	55	64	rata	contribution to the mainta	seitz,a	1966
ZOLZA	45--4	599	608	rata	wld rein,basin,pyasina riv	krechmar,av	1966

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				anam			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
CNJNA	38--1	87	90	bibi	x doca, feedlot study, clv	peters,hf	1958
CNJNA	46...	157	164	bibi	x doca, range calf product	peters,hf; slen,s	1966
CNJNA	56...	489	496	bibi	x doca, pre-,pstwen wt, cv	lawson,je; keller	1976
CNJNA	58--4	537	545	bibi	x doca, influ bisn %, wean	keller,dg; lawson	1978

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				ovca			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				ovda			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
IUCSB	24--2	909	920	obmo	behavior and domestication	wilkinson,pf	1974
IZYBA	5----	58	65	obmo	herd of musk-oxn in captiv	oeming,a	1965
NGGMA	137..	862	79	obmo	domestictng wild and wooly	teal,jj,jr	1970

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
				oram			

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
ATRLA	12...	385	389	bibo	doca, studies on hybridztn	krasinska,m; puce	1968

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
FAFLB	13...	19	23	game	game on farms	kettlitz,wk	1962
IUCSB	9----	113	119	vert	biol eff,non-nativ environ	de vos,a; petride	1967
IUCSB	24--1	14	55	ungu	mother-infant relationshps	lent,pc	1974
IUCSB	24--2	530	541	ungu	mgt hrds, rel to domestica	baskin,lm	1974
IUCSB	24--2	603	617	ungu	behav problm, captiv,domes	kiley,m	1974
IUCSB	24--2	830	852	ungu	behav,hsbndry,s afric rnch	bigalke,rc	1974
IUCSB	24--2	882	887	game	dvlpmnt,s africn game rnch	deane,nn; feely,j	1974
IUCSB	24--2	888	892	wldl	hsbndr,rhodesian game rnch	johnstone,pa	1974
IUCSB	24--2	893	899	game	game ranching in texas	teer,jg	1974

Bannerman, M. M. and K. L. Blaxter (Eds.). 1969. The husbanding of red deer; proceedings of a conference held at the Rowett Institute, Aberdeen, January, 1969. Aberdeen, Rowett Research Institute and the Highlands and Islands Develop. Board. 79 p.

Deakin, A., G. W. Muir and A. G. Smith. 1935. Hybridization of domestic cattle, bison and yak. Canadian Dept, Agric. Tech. Bull, no. 2. 30 p.

Kerr, M. A., V. J. Wilson and H. H. Roth. 1970. Studies on the agricultural utilization of semi-domesticated eland (Taurotragus oryx) in Rhodesia, 2. Feeding habits and food preferences. Rhodesian J. Agric. Res. 8:71-77.

Knorre, P. 1961. The results and perspectives of domestication of moose. Trudy Pechoro-Illychskovo Gos. Zapovednika, no. 9. Komi ASSR Pub. 263 p.

Knorre, P. 1961. The results and perspectives of the domestication of the moose. Translation from the Russian in the Can. Wildl. Serv. Library, Ottawa. Papers of the Pechora-Ilych State Reservation 9:5-177.

Leeds, A. 1965. Reindeer herding and Chukchi social institutions. In Man, culture, and animals. eds. A. Leeds and A. P. Vayda, pp. 87-128, Amer. Assoc. for the Advancement of Sci. Washington, D.C.

Posselt, J. 1963. The domestication of the eland. Rhodesian J. Agric. Res. 1(2):81-87.

Skinner, J. D. 1967. An appraisal of the eland as a farm animal in Africa. Anim. Breeding Abstrs. 25(2):177-186.

Teal, J. J., Jr. 1958. Golden fleece of the Arctic. The Atlantic 201:76-81.

Teal, J. J., Jr. 1970. Operation musk ox 1969. Amer. Scandinavian Rev. 58:11-23.

Zhigunov, P. S., ed. 1961. Reindeer husbandry. English translation, 1968, U. S. Dept. of Commerce, Clearinghouse for Federal Scientific & Tech. Information, Springfield, Va.

CLOSING COMMENTS

This CHAPTER has been a departure from biology, but is nevertheless an important part of management decision-making. It's importance is greater than both the number of pages devoted to it and the number of references available in the literature. Expansions of these considerations will be made as the ecological framework becomes both more complete and more computerized, with social and economic subroutines inserted at the appropriate place and time in the computing cycles. This one area of needed research is discussed in the next CHAPTER on RESEARCH NEEDS, along with evaluations of the present status of knowledge.

A. N. Moen
March 8, 1982

GLOSSARY OF SERIAL CODENS - CHAPTER TWENTY-FOUR

Serials are identified by five-character, generally mnemonic codes called CODEN, listed in 1980 BIOSIS, LIST OF SERIALS (BioSciences Information Service, 2100 Arch Street, Philadelphia, PA 19103).

The headings for the lists of SERIALS are:

CODEN VO-NU BEPA ENPA ANIM KEY WORDS---------- AUTHORS---------- YEAR

The volume and issue numbers (VO-NU) are given after the CODEN entry, followed by beginning page (BEPA), ending page (ENPA), species discussed (ANIM)1, KEY WORDS from the title, AUTHORS [truncated if necessary, slash (/) indicates additional authors], and YEAR.

AIWHA Animals (London)
AKASA Arkansas Academy of Science Proceedings
ANHUA Animal Nutrition and Health
ARANB Arctic Anthropology
ATICA Arctic (Canada)
ATRLA Acta Theriologica (Poland)

BICOB Biological Conservation
BINPA Boreal Institute for Northern Studies, University of Alberta Occasional Publication
BISNA Bioscience
BPURD Biological Papers of the University of Alaska Special Report

CEXBI see CEXSB
CEXSB Colorado State University Experiment Station Bulletin

EVCNA Environmental Conservation

FAFLB Fauna and Flora (Transvaal)
FDSRA Falkland Islands Dependencies Survey Scientific Reports
FENNA Fennia
FMFUB Forma et Functio (West Germany)

GEORA Geographic Review

HILGA Hilgardia

INWLA International Wildlife
IUCSB International Union for Conservation of Nature and Natural Resources Publications New Series
IZYBA International Zoo Year Book

JAASA Journal of the Alabama Academy of Science
JANSA Journal of Animal Science (US)
JAVMA Journal of the American Veterinary Medical Association (US)
JFRBA Journal of the Fisheries Research Board of Canada
JFUSA Journal of Forestry (US)
JOMAA Journal of Mammalogy (US)
JRMGA Journal of Range Management (US)
JWIDA Journal of Wildlife Diseases (US)
JWMAA Journal of Wildlife Management (US)

LIWIA Living Wilderness

MUOXD Musk-ox

NAWTA North American Wildlife and Natural Resources Conference, Transactions of the (US)
NFGJA New York Fish and Game Journal (US)
NGGMA National Geographic Magazine
NVWLA Nevada Wildlife

OOKHA Okhota i Okhotnich'e Khozyaistvo
ORYXA Oryx

PAABA Pennsylvania Agricultural Experiment Station Bulletin
PHSCA Philosophy of Science
PMACA Papers of the Michigan Academy of Sciences, Arts and Letters
PPPAA Pacific Science Congress Proceedings
PRIRA Priroda (Moscow)

QBMAA Michigan Agricultural Experiment Station, Quarterly Bulletin

RIJUA Riistatieteellisia Julkaisuja (Finnish Game Research)

SBHRA

tdbca Transactions of the Desert Bighorn Council
TNWSD Transactions of the Northeast Section, The Wildlife Society

UABPA Biological Papers of the University of Alaska
UTSCB Utah Science (US)

VEZOA Vestnik Zoologii

WLSBA Wildlife Society Bulletin
WRNDA World Review of Nutrition and Dietetics
WSCBA Wisconsin Conservation Bulletin

XAMPA U S D A Miscellaneous Publication
XAPRA U S D A Production Research Report
XBRPA U S Bureau of Sport Fisheries and Wildlife Resource Publication
XFWCA U S Fish and Wildlife Service Circular
XFWLA U S D I Fish and Wildlife Service, Wildlife Leaflet
XFWWA U S Fish and Wildlife Service Special Scientific Report - Wildlife

ZEJAA Zeitschrift fuer Jagdwissenschaft
ZETIA Zeitschrift fuer Tierpsychologie
ZHIVA Zhivotnovodstvo
ZOGAA Zoologische Garten
ZOLZA Zoologicheskii Zhurnal (USSR)

LIST OF PUBLISHERS - CHAPTER TWENTY-FOUR

The headings for the lists of BOOKS are:

TYPE PUBL CITY PAGE ANIM KEY WORDS---------- AUTHORS/EDITORS-- YEAR

All essential information for finding each book in the library is given on just one line. The TYPE of book could have either AUTHORS (aubo) or EDITORS (edbo). Publishers (PUBL) and CITY of publication are given with four-letter mnemonic symbols defined below. The PAGE column gives the number of pages in the book; ANIM refers to the species discussed in the book (given as a four-letter abbreviation of genus and species), and KEY WORDS listed are from the title. The AUTHORS/EDITORS and YEAR of publication are given in the last two columns.

acpr	Academic Press	New York, NY	nyny
alpc	Aldine Publishing Company	Chicago, IL	chil
babo	Ballentine Books	New York, NY	nyny
cfst	Clearinghouse for Fed. Sci. & Tech. Info., U. S. Dept. Commerce	Springfield, VA	spva
depc	Dell Publishing Co.	New York, NY	nyny
dwfe	Defenders of Wildlife and Friends of the Earth	Washington, DC	wadc
haho	Hastings House Publishers	New York, NY	nyny
hutc	Hutchinson	London, England	loen
laan	Laboratory Animals Ltd.	London, England	loen
macm	Macmillan Co.	New York, NY	nyny
nyzs	New York Zoological Society	New York, NY	nyny
psup	Pennsylvania State University Press	University Park, PA	uppa
usdi	U. S. Dept. Interior	Juneau, AK	juak
wimi	Wildlife Management Institute	Washington, DC	wadc

GLOSSARY OF ANIMAL CODE NAMES

Wild ruminants are referred to in this CHAPTER by a 4-character abbreviation from the family, genus and genus-species. These are listed below under Abbreviation.

Scientific names of North American wild ruminants are those used in BIG GAME OF NORTH AMERICA, edited by J.C. Schmidt and D. L. Gilbert (1979: Stackpole Books, Harrisburg, PA 17105, 494 p.), and may be different from the scientific names given in the original literature.

The abbreviations used for North American wild ruminants are listed below.

CLASS: MAMMALIA

ORDER: ARTIODACTYLA	Abbreviation
FAMILY: CERVIDAE	cerv
GENUS: Odocoileus (deer)	od--
SPECIES: O. virginianus (white-tailed deer)	odvi
O. hemionus (mule deer)	odhe
GENUS: Cervus (Wapiti, elk)	ce--
SPECIES: C. elaphus	ceel
GENUS: Alces (moose)	
SPECIES: A. alces	alal
GENUS: Rangifer (caribou)	
SPECIES: R. tarandus	rata
FAMILY: ANTILOCAPRIDAE	
GENUS: Antilocapra	
SPECIES: A. americana (pronghorn)	anam
FAMILY: BOVIDAE	bovi
GENUS: Bison (bison)	bi--
SPECIES: B. bison	bibi
GENUS: Ovis (sheep)	ov--
SPECIES: O. canadensis (bighorn sheep)	ovca
O. dalli (Dall's sheep)	ovda
GENUS: Ovibos	
SPECIES: O. moschatus (muskox)	obmo
GENUS: Oreamnos	
SPECIES: O. americanus (mountain goat)	oram

The abbreviations used for European wild ruminants are listed below.

CLASS: MAMMALIA

ORDER: ARTIODACTYLA	Abbreviation
FAMILY: CERVIDAE	cerv
GENUS: Capreolus (roe deer)	ca--
SPECIES: C. capreolus	caca
GENUS: Dama (fallow deer)	da--
SPECIES: D. dama	dada
GENUS: Cervus (Wapiti, elk)	ce--
SPECIES: C. elaphus (red deer)	ceel
GENUS: Alces (moose)	
SPECIES: A. alces	alal
GENUS: Rangifer (caribou)	
SPECIES: R. tarandus	rata
FAMILY: BOVIDAE	
GENUS: Bison (bison)	
SPECIES: B. bonasus	bibo
GENUS: Capra (ibex, wild goat)	cp--
SPECIES: C. aegargrus(Persian ibex)	cpae
C. siberica (Siberian ibex)	cpsi

OTHERS

Abbreviations for a few other species and groups of species may appear in the reference lists. These are listed below.

Axis axis (axis deer)	axax
Elaphurus davidianus (Pere David's deer)	elda
Cervus nippon (Sika deer)	ceni
Hydropotes inermis (Chinese water deer)	hyin
Muntiacus reevesi (Chinese muntjac)	mure
Moschus moschifer (Chinese musk deer)	momo
Ovis nivicola (snow sheep)	ovni
Ovis musimon (moufflon)	ovmu
Ovis linnaeus (Iranian sheep)	ovli
Rupicapra rupicapra (chamois)	ruru
big game	biga
domestic sheep	dosh
domestic cattle	doca
domestic goat	dogo
domestic ruminant	doru
herbivore	hrbv
mammals	mamm
three or more species of wild ruminants	many
ruminants	rumi
ungulates	ungu
vertebrates	vert
wildlife	wldl
wild ruminant	wiru

JULIAN DAY: MONTH AND DAY EQUIVALENTS*

Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Day
1	001	032	060	091	121	152	182	213	244	274	305	335	1
2	002	033	061	092	122	153	183	214	245	275	306	336	2
3	003	034	062	093	123	154	184	215	246	276	307	337	3
4	004	035	063	094	124	155	185	216	247	277	308	338	4
5	005	036	064	095	125	156	186	217	248	278	309	339	5
6	006	037	065	096	126	157	187	218	249	279	310	340	6
7	007	038	066	097	127	158	188	219	250	280	311	341	7
8	008	039	067	098	128	159	189	220	251	281	312	342	8
9	009	040	068	099	129	160	190	221	252	282	313	343	9
10	010	041	069	100	130	161	191	222	253	283	314	344	10
11	011	042	070	101	131	162	192	223	254	284	315	345	11
12	012	043	071	102	132	163	193	224	255	285	316	346	12
13	013	044	072	103	133	164	194	225	256	286	317	347	13
14	014	045	073	104	134	165	195	226	257	287	318	348	14
15	015	046	074	105	135	166	196	227	258	288	319	349	15
16	016	047	075	106	136	167	197	228	259	289	320	350	16
17	017	048	076	107	137	168	198	229	260	290	321	351	17
18	018	049	077	108	138	169	199	230	261	291	322	352	18
19	019	050	078	109	139	170	200	231	262	292	323	353	19
20	020	051	079	110	140	171	201	232	263	293	324	354	20
21	021	052	080	111	141	172	202	233	264	294	325	355	21
22	022	053	081	112	142	173	203	234	265	295	326	356	22
23	023	054	082	113	143	174	204	235	266	296	327	357	23
24	024	055	083	114	144	175	205	236	267	297	328	358	24
25	025	056	084	115	145	176	206	237	268	298	329	359	25
26	026	057	085	116	146	177	207	238	269	299	330	360	26
27	027	058	086	117	147	178	208	239	270	300	331	361	27
28	028	059	087	118	148	179	209	240	271	301	332	362	28
29	029	[060]	088	119	149	180	210	241	272	302	333	363	29
30	030		089	120	150	181	211	242	273	303	334	364	30
31	031		090		151		212	243		304		365	31

* For leap year, February 29 = JDAY 60. Add 1 to all subsequent JDAYs.