

## PART II. BEHAVIOR OF WILD RUMINANTS

The behavior of wild ruminants is a fundamental consideration when evaluating ecological relationships and making management decisions. Some of behavior is based on a genetic memory, and some of it is learned. Examples of the former include maternal behavior, rutting behavior, and changes in activity levels with seasons. Examples of the latter include responses to snowmobiles, fences, pipelines, and artificial feeding.

Communications between animal and environment include the recognition of cues or stimuli that may or may not result in responses. When all of these are integrated by the animal, movement and activity patterns result. These are subject to absolute limitations imposed by the animal's physical and metabolic capabilities. These limits, plus other limitations imposed by behavioral traits, result in variable daily and seasonal ranges, depending on species, sex, time of year, and habitat characteristics. These considerations are discussed in CHAPTER 3.

Different species, ages, and sexes of wild ruminants exhibit different behavioral traits and patterns that are fairly consistent and predictable. Foraging behavior, reproductive behavior, play, and other behavior patterns are characteristic of different groups within a population. These patterns change with time, however, and both daily and seasonal rhythms may often be recognized. Transient changes in behavior also occur, of course, due to changes in the weather and local stimuli. Behavior patterns are described and, when possible, represented mathematically in CHAPTER 4.

Interactions within and between species result in a high degree of organization in animal societies. Such organization is not easily detected by occasional observations. Rather, prolonged study of a population and its functional groups is necessary to evaluate differences due not only to sex and age effects, but also to different population levels and different amounts of resources, especially food. Members of the same species and even members of different species, such as predator and prey, have abilities to communicate cues or stimuli that illicit different responses under different circumstances. Interactions within and between species are discussed in CHAPTER 5.

All behavioral acts must occur within the physical, physiological, and genetic limits characteristic of the individual's organism-environment relationships. Descriptions of behavioral acts and patterns are included in this PART II, but ecological analyses of their effects on populations and on management decisions come later, after discussions of PHYSIOLOGY AND METABOLISM (PART III), FORAGE CHARACTERISTICS AND RANGE RELATIONSHIPS (PART IV), and METEOROLOGY AND THERMAL RELATIONSHIPS (PART V). For now, it is important to remember that the physical, behavioral and physiological characteristics of wild ruminants are fundamental considerations in ecological analyses and in management decisions, and an understanding of these three major biological categories of animal characteristics is part of the foundation for further ecological analyses.

## GLOSSARY OF ANIMAL CODE NAMES

Wild ruminants are referred to in this PART 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

GENUS: Capreolus (roe deer)

SPECIES: C. capreolus

GENUS: Dama (fallow deer)

SPECIES: D. dama

GENUS: Cervus (Wapiti, elk)

SPECIES: C. elaphus (red deer)

GENUS: Alces (moose)

SPECIES: A. alces

GENUS: Rangifer (caribou)

SPECIES: R. tarandus

cerv

ca--

caca

da--

dada

ce--

ceel

alal

rata

FAMILY: BOVIDAE

GENUS: Bison (bison)

SPECIES: B. bonasus

GENUS: Capra (ibex, wild goat)

SPECIES: C. aegagrus (Persian ibex)

C. siberica (Siberian ibex)

bibo

cp--

cpae

cpai

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)

Elaphurus davidianus (Pere David's deer)

Cervus nippon (Sika deer)

Hydropotes inermis (Chinese water deer)

Muntiacus muntjac (Indian muntjac)

Moschus moschiferus (musk deer)

Ovis nivicola (snow sheep)

Ovis musimon (mouflon)

Ovis linnaeus (Iranian sheep)

Rupicapra rupicapra (chamois)

axax

elda

ceni

hyin

mumu

momo

ovni

ovmu

ovli

ruru

big game

domestic sheep

domestic cattle

domestic goat

domestic ruminant

herbivore

mammals

three or more species of wild ruminants

ruminants

ungulates

vertebrates

wildlife

wild ruminant

biga

dosh

doca

dogo

doru

hrbv

mamm

many

rumi

ungu

vert

wldl

wiru

## ORGANIZATION OF REFERENCE LISTS

Extensive reference lists, based on computer-assisted searches back to 1970 and manual searches of literature published prior to 1970, are included in each of the PARTS. The lists are organized in a functional way for use in the library rather than in the conventional alphabetized-by-author way, with the information necessary for locating the references in libraries given in abbreviated, one-line form. The reference books listed after each PART, CHAPTER, and TOPIC contain background information for the material covered, and may contain specific information for several of the UNITS and WORKSHEETS.

The headings for the lists of BOOKS are:

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

The TYPE of book could have either an author (aubo) or an editor (edbo). Publishers (PUBL) and CITY of publication are given with four-letter mnemonic symbols defined in the GLOSSARY. 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 lists key words from the title. The AUTHORS/EDITORS' names and YEAR of publication are given in the last two columns. Thus all of the essential information for finding each book in the library is given on just one line.

Serial publications that pertain to each division are listed with a slightly different format. (Serials are identified by a five-character, generally mnemonic code called CODEN, published in 1977 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), key words from the title (KEY WORDS), AUTHORS, and YEAR.

Specific authors and dates of publication can be located quickly by scanning the two right-hand columns. If the author's name fits in the 17 characters, some character spaces are left blank. If there are two authors and all of the first author's name and part of the second author's name fits in the 17 character spaces, the second author's name is truncated at the right margin of the author column. If there are more authors that do not appear in the author column due to lack of space, a slash (/) is added in the 17th space of the column.

References cited in the text material and in the WORKSHEETS are given under LITERATURE CITED in the traditional format (author, date, title of article, journal, volume, issue number, and page numbers).

A third category, OTHER PUBLICATIONS, may be included at the beginning of PARTS or in the CHAPTERS. This category contains references to publications that are not authored or edited books or serials listed by BioSciences Information Service. Examples are "Transactions of the Northeastern Deer Study Group Meetings" and "Biannual Pronghorn Antelope Workshop, Proceedings." Both of these contain many articles on deer and pronghorns, respectively, but are not included in the one-line abbreviated form. Such publications are listed by titles, which should make it possible to locate the publications in libraries.

#### HOW TO USE THIS SYSTEM

The one-line format used to list references makes it possible to list several thousand references in a minimum amount of space. The logic of the one-line entries in the reference lists is based on the order of decision-making when finding literature. First, the references are grouped according to biological functions and relationships discussed in this book. Second, species of interest are selected. Third, journals containing references to be read are located in the library. Fourth, the publications are located in the journals. The use of this reference list format in the library will confirm the logic of this arrangement. Call numbers and stack levels should be added in the margins so references may be quickly located in a particular library.

CODEN entries are identified by the full title of the serial publication and its country, territory, or commonwealth of origin in the APPENDIX. CODEN entries in the serial lists are alphabetized. This results in some of the full titles being out of alphabetical order. Since the user of this book will usually work from CODEN to consult the list of full titles in the APPENDIX, this disorder will result in nothing more than occasional inconvenience. Most of the full titles will be near alphabetized, so the CODEN for a specific serial can be quickly found by scanning the appropriate part of the list.

Serials, including journals and report literature, constitute the major portion of the literature on wild ruminants. Scientists are urged to publish their findings in recognized journals so the results of their work are readily available.

## REFERENCES, PART II

## BEHAVIOR OF WILD RUMINANTS

## BOOKS

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS-----	AUTHORS/EDITORS--	YEAR
aubo	dodo	nyny	1220	----	lives of game animals	seton,et	1929
aubo	dipr	nyny	276	----	problems of relative growt	huxley,js	1932
aubo	meth	loen	150	----	social behavior in animals	tinbergen,n	1953
aubo	ccth	spil	250	----	animal visn: what anim see	smyth,rh	1961
aubo	prha	ecnj	171	----	behavio aspects of ecology	klopfer,ph	1962
aubo	anth	nyny	305	----	the sense of animals & men	milne,l; milne,mj	1962
aubo	olbo	edsc	653	----	animal dispersion, soc beh	wynne-edwards,vc	1962
edbo	elpu	nyny	933	----	acoustic behavior of anima	busnel,rg	1963
aubo	phli	nyny	240	----	the senses of animals	matthews,lh; knig	1963
edbo	jwis	nyny	349	----	maternal care in mammals	rheingold,lh,ed	1963
aubo	jwis	nyny	771	----	mechanisms of animal behav	marler,p; hamilto	1966
edbo	acpr	nyny	159	----	natural hist of aggression	carthy,jd; ebling	1964
edbo	uchp	chil	307	----	soc behav, organiza, verte	etkin,w	1964
aubo	blai	nyny	204	----	animal communication	frings,h; frings,	1964
aubo	cnha	loen	132	----	vision in vertebrates	tansley,k	1965
aubo	meth	loen	150	----	soci behav, animals, verte	tinbergen,n	1965
aubo	macm	nyny	113	----	sensory mechanisms	case,j	1966
aubo	macm	nyny	118	----	integral animal behavior	davis,d	1966
aubo	jwis	nyny	432	----	pattern, animal communitie	elton,cs	1966
aubo	mhbc	nyny	534	----	anim behav: ethol, com psy	hinde,ra	1966
aubo	wile	nyny	771	----	mechanisms of anim behavio	marler,p; hamilto	1966
aubo	isup	amia	277	----	of predation and life	errington,pl	1967
aubo	prha	ecnj	297	----	introdu to animal behavior	klopfer,ph; hailm	1967
aubo	hill	loen	760	----	the chemical senses	moncrieff,rw	1967
aubo	thcr	nyny	182	----	communi in the animl world	evans,wf	1968
aubo	plpr	nyny	418	----	ethology of mammals	ewer,rf	1968
edbo	saco	phpa	563	----	abnormal behavior in anima	fox,mw	1968
aubo	dove	nyny	166	----	pschol, behav, zoos,circus	hediger,h	1968
aubo	epdu	nyny	298	----	the magic of the senses	droscher,vb	1969
edbo	botc	loen	647	----	the behav of domestic anim	hafez,ese	1969
aubo	tapl	nyny	183	----	animal senses	burton,r	1970
edbo	apcc	nyny	412	----	comm, chem sig: advan chem	johnston,jw,jr; /	1970
aubo	wbse	phpa	601	----	the vertebrate body	romer,as	1970
edbo	acpr	nyny	336	----	chemical ecology	simeone,jb; sondh	1970
aubo	wbse	phpa	574	----	fundamentals of ecology	odum,ep	1971
aubo	uchp	chil	349	----	animal behavior	scott,jp	1972
aubo	whfr	sfca	458	----	wildlife ecology	moen,an	1973
edbo	dohr	stpa	416	----	territory	stokes,aw	1974
edbo	dohr	stpa	401	----	social hierarch, dominance	schein,mw	1975
aubo	bhup	cama	607	----	sociobiol, the new synthes	wilson,eo	1975
edbo	acpr	nyny	344	----	mamm olfact, reprod, behav	doty,rl	1976
edbo	wiwi	bama	532	----	behavior of domestic anima	hafez,ese	1976

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TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS-----	AUTHORS EDITORS--	YEAR
aubo	dohr	stpa	361	----	biblio of quantita ecology	schultz,vll; ebe/	1976
edbo	dohr	stpa	411	----	vertebrt social organizatn	banks,em	1977
edbo	plpc	nyny	609	----	chemical signals, vertebra	muller-schwarze,/	1977
edbo	jwis	nyny	364	----	quantitative ethology	colgon,pw	1978
aubo	mhbc	nyny	452	----	comparative anim behavior	devisbury,da	1978
edbo	plpr	nyny	183	----	aggress, domnce,indv spcng	krames,l; /	1978
edbp	dohr	stpa	369	----	evolution of play behavior	muller-schwarze,d	1978
edbo	wiso	wadc	206	----	animal behavior	teague,rd,ed; moe	1979
edbo	acpr	nyny	540	----	biochemistry taste, olfctn	cagan,rh; kare,mr	1980
aubo	oxup	loen	688	----	animal play behavior	fagen,rm	1981
aubo	fost	nyny	426	cerv	antelope, deer of n america	caton,jd	1877
aubo	rokp	loen	597	cerv	deer,great britain, irelnd	whitehead,gk	1964
aubo	huho	nyny	426	od--	deer, antelope of america	caton,jd	1877
edbo	stac	hapa	668	od--	deer of north america	taylor,wp	1956
aubo	stac	hapa	128	od--	if deer are to survive	dasmann,w	1971
aubo	vipr	nyny	194	od--	deer of the world	whitehead,gk	1972
aubo	omcc	eail	107	odvi	the white-tailed deer	madson,j	1961
edbo	nhfg	conh	256	odvi	the white-tai deer, new ha	siegler,hr	1968
aubo	ucap	beca	567	odhe	a herd of mule deer	linsdale,jm; tomi	1953
edbo	unbp	line	605	odhe	mule, black-tailed, n amer	wallmo,oc	1981
aubo	oxup	loen	215	ceel	herd, red deer,stud, behav	darling,ff	1937
aubo	stac	hapa	386	ceel	elk of north america	murie,oj	1959
aubo	wiwe	eail	125	ceel	the elk	madson,j	1966
aubo	ucap	beca	209	ceel	tule elk	mccullough,dr	1971
aubo	cite	oxen	74	ceel	ecology of red deer	mittchell,b; stai/	1977
edbo	wimi	wadc	....	ceel	ecology, mngmnt,n amer elk	thomas,jw; towel in pr	
aubo	uwyp	lawy	294	ceel	n amer elk: ecol,behav,mgt	boyce,ms; hayden-	1979
aubo	utop	toon	280	alal	north american moose	peterson,rl	1955
aubo	macm	nyny	300	rata	bar-gr car of north canada	pike,w	1892
aubo	ukap	laka	163	rata	bar-ground carib, keewatin	harper,f	1955
aubo	qupr	oton	339	rata	migratory, barren-ground c	kelsall,jp	1968
aubo	stac	hapa	238	anam	prnghrn antlp & its mngmnt	einarsen,a	1948
aubo	stac	hapa	225	anam	hunting pronghorn antelope	popowski,b	1959
aubo	rowa	loen	....	bovi	wild oxen, sheep, goats of	lydekker,r	1898
aubo	utop	toon	991	bibi	n amer buffalo, wild state	roe,fg	1970
aubo	thcr	nyny	242	bibi	the buffalo	haines,f	1970
aubo	aakn	nyny	339	bibi	the time of the buffalo	mchugh,t	1972
aubo	swap	atoh	374	bibi	the buffalo book, saga ani	dary,d	1974
aubo	ucap	beca	316	bibi	n amer bison, evol, classi	mcdonald,jn	1981

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TYPE	PUBL	CITY	PGES	KEY WORDS-----	AUTHORS EDITORS--	YEAR
aubo	uopr	nook	247	ov-- great ark of the wld sheep	clark,jl	1964
aubo	uchp	chil	383	ov-- mt sheep, behavior, evolut	geist,v	1971
aubo	coup	itny	248	ov-- mt sheep, man, norther wil	geist,v	1975
aubo	uchp	chil	383	ovca mount sheep: behavi, evolu	geist,v	1971
aubo	usgp	wadc	242	ovca the bighorn of death valley	welles,re; welle	1961
aubo	qupr	oton	166	obmo muskoxen in canada	tener,js	1965
aubo	haho	nyny	85	obmo oomingmak, expedi, nunivak	matthiessen,p	1967
aubo	doup	nyny	318	many americ anim; popular guide	stone,w; cram,we	1902
aubo	cscs	nyny	347	many our big game	huntington,d	1904
aubo	cscs	nyny	1267	many life hist northern animals	seton,et	1909
aubo	ropr	nyny	129	many wildlife in alaska, ecolog	leopold,as; darli	1953
edbo	holt	nyny	264	many records of n a big game an	boone & crockett	1958
aubo	ropr	nyny	547	many mammals of north america	hall,er; kelson,k	1959
aubo	ucap	beca	586	many wildlife of mexico	leopold,as	1959
aubo	vipr	nyny	304	many wildlife in america	matthiessen,p	1959
aubo	repu	nyny	335	many principals of mammalogy	davis,de; golley,	1963
aubo	blsp	loen	308	many guide, study of productivi	golley,fb; buechn	1968
aubo	jhpr	bamd	769	many mammals of the world	walker,ep; paradi	1968
aubo	whfr	sfca	458	many wildlife ecology	moen,an	1973
aubo	utop	toon	438	many the mammals of canada	banfield, awf	1974
edbo	iucn	mosw	940	many behav & its rela to mngmnt	geist,v; walther,	1974
edbo	stac	hapa	494	many big game, n amer, ecol,mgt	schmidt,jl; gilbe	1978
aubo	dalt	laen	271	dada fal de: histor, distr, bio	chapman,d; chapma	1975
aubo	repu	nyny	1023	dome bioenergetics and growth	brody,s	1945
edbo	coup	itny	1463	dome duke's physiol domest anim	swenson,mj	1970
aubo	acpr	nyny	202	ungu reproductive behav, ungula	fraser,af	1968



## OTHER PUBLICATIONS

Proceedings of the White-tailed Deer in the Southern Forest Habitat Symposium (First meeting in 1962)

Transactions of the Annual Meeting of the Northeast Deer Study Group (Annual meeting beginning 1964)

Proceedings of the North American Moose Conference (Fifth conference in 1968)

Proceedings of the International Reindeer/Caribou Symposium (First meeting in 1977, second in 1980)

Proceedings of the Biennial Antelope States Workshop

Mace, R. U. 1954. Oregon's Pronghorn Antelope. Oregon State Game Comm., Corvallis, OR. 25 p.

Skinner, M. P. 1924. The American Antelope in Yellowstone National Park. Roosevelt Wildl. Forest Exp. Sta., Syracuse, N.Y. 32 p.

Transactions of the Interstate Antelope Conference

Transactions of the North American Wild Sheep Conference (Second meeting in 1976)

Transactions of the Desert Bighorn Council (Annual meeting beginning 1957)

Proceedings of the International Mountain Goat Symposium

Proceedings of the Annual Conference of Western Association of State Game & Fish Commissioners (Annual conference beginning 1921)



# LIST OF PUBLISHERS - PART II

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.

aakn	Alfred A. Knopf	New York, NY	nyny
acpr	Academic Press	New York, NY	nyny
anth	Antheneum	New York, NY	nyny
apcc	Appleton-Century-Crofts	New York, NY	nyny
bhup	Belknap Press of Harvard University	Cambridge, MA	cama
blai	Blaisdell	New York, NY	nyny
blsp	Blackwell Scientific Publications	London, England	loen
botc	Bouilliere, Tindall & Cassell	London, England	loen
ccth	Charles C. Thomas	Springfield, IL	spil
cite	Cambridge Institute of Terrestrial Ecology	Cambridge, England	caen
cnha	Chapman & Hall	London, England	loen
coup	Cornell University Press	Ithaca, NY	itny
cscs	Charles Scribner's Sons	New York, NY	nyny
dalt	Dalton	Lavenheim, England	laen
dipr	Dial Press, The	New York, NY	nyny
dodo	Doubleday Doran	New York, NY	nyny
dohr	Dowden, Hutchinson, & Ross	Stroudsburg, PA	stpa
doup	Doubleday, Pace, & Co.	New York, NY	nyny
dove	Dover Pub. Co.	New York, NY	nyny
elpu	Elsevier Press	New York, NY	nyny
epdu	E. P. Dutton	New York, NY	nyny
fost	Forest and Stream Publishing Co.	New York, NY	nyny
haho	Hastings House Publishers	New York, NY	nyny
hill	Hill	London, England	loen
holt	Holt	New York, NY	nyny
huho	Hurd Houghton	New York, NY	nyny

isup	Iowa State University Press	Ames, IA	amia
iucn	International Union for the Conservation of Nature and Natural Resources	Morges, Switzerland	mosw
jhpr	John Hopkins Press	Baltimore, MD	bamd
jwis	John Wiley and Sons, Inc.	New York, NY	nyny
macm	MacMillan Co.	New York, NY	nyny
meth	Methuen & Co., Ltd.	London, England	loen
mhbc	McGraw-Hill Book Company, Inc.	New York, NY	nyny
nhfg	New Hampshire Fish & Game Dept.	Concord, NH	conh
olbo	Oliver & Boyd	London, England	loen
omcc	Olin Mathieson Chem. Corp.	East Alton, IL	eail
oxup	Oxford University Press	London, England	loen
phli	Philosophical Library	New York, NY	nyny
plpc	Plenum Publishing Corporation	New York, NY	nyny
plpr	Plenum Press	New York, NY	nyny
prha	Prentice-Hall, Inc.		
qupr	Queen's Printer	Ottawa, Ontario	oton
repu	Reinhold Publishing	New York, NY	nyny
rokp	Routledge & K. Paul	London, England	loen
ropr	Ronald Press	New York, NY	nyny
rowa	Rowland Ward	London, England	loen
saco	Saunders Publishing Co.	Philadelphia, PA	phpa
stac	Stackpole Company, The	Harrisburg, PA	hapa
swap	Swallow Press	Athens, OH	atoh
tapl	Taplinger	New York, NY	nyny
thcr	Thomas Crowell Company	New York, NY	nyny
ucap	University of California Press	Berkeley, CA	beca
uchp	University of Chicago Press	Chicago, IL	chil
ukap	University of Kansas Press	Lawrence, KA	laka
unbp	University of Nebraska	Lincoln, NE	line
uopr	University of Oklahoma Press	Norman, OK	nook
usgp	United States Government Printing Office	Washington, DC	wadc
utop	University of Toronto Press	Toronto, Ontario	toon
uwyp	University of Wyoming Press	Laramie, WY	lawy
vipr	Viking Press	New York, NY	nyny

wbsc	W. B. Saunders Company	Philadelphia, PA	phpa
whfr	W. H. Freeman Company	San Francisco, CA	sfca
wile	Wiley	New York, NY	nyny
wimi	Wildlife Management Institute	Washington, DC	wadc
wiso	Wildlife Society, The	Washington, DC	wadc
wiwe	Winchester-Western Press	East Alton, IL	eail
wiwi	Williams and Wilkins	Baltimore, MD	bama

