

TOPIC 2. HABITAT MANAGEMENT AREAS

Habitat management areas discussed in this TOPIC include wildlife management areas (UNIT 2.1), wildlife refuges and preserves (UNIT 2.2), wilderness areas (UNIT 2.3), parks, national monuments, and recreation areas (UNIT 2.4), and state and national forests (UNIT 2.5). These areas are identified by their legal status rather than by political boundaries as states and provinces are, and their legal status is usually attained as a result of their geological and ecological characteristics. Once a certain type of legal status has been attained, laws governing such areas apply. Thus the Boundary Waters Canoe Area in northeastern Minnesota may not be the sight of active habitat management practices as vehicular traffic, airplanes, chemicals, fire, etc are not allowed or strictly regulated. Yellowstone National Park, like other national parks, is not open to hunting. National forests, on the other hand, are logged by private contractors, so habitat management effects occur, by design or default.

Habitat management areas are sometimes set up for the benefit of particular species or groups of species. Such areas may be particularly effective for some groups, such as waterfowl, because their needs are rather distinct and they use rather small local areas with high intensity. Wild ruminants are large animals that often range widely, making it more difficult to set aside areas of particular value to a group of animals.

Wildlife management areas, refuges and preserves, wilderness areas, parks, and state and national forests are all of potential benefit to wild ruminants. Wildlife management areas, state and national forests are usually available for habitat management practices, and they are usually open to hunting. Refuges, preserves, wilderness areas, parks, and recreation areas are often not available for habitat management practices, and they are usually not open to hunting. Thus there is a range of habitat management practices possible on areas set aside for different purposes. The UNITS which follow include discussions of these different possibilities.

UNIT 2.1: WILDLIFE MANAGEMENT AREAS

Wildlife management areas are publicly or privately owned areas set aside for the primary purpose of managing the habitat for the production of wildlife. Most states have a program for the acquisition and management of such areas. Areas selected for purchase or lease as management areas are often important habitats that are vulnerable to destruction as wildlife habitat, "development" as human habitat. Critical wintering areas, calving grounds and south-slope concentration areas are examples of areas that appear to be particularly important to populations, and have high priorities for designation as wildlife management areas.

Management of the summer ranges of wild ruminants has not been given much attention. It is green and growing, though not necessarily of the nutrient quality necessary for high production by the consumers. Weather conditions, such as dry spells, affect primary production, but do not usually cause mass mortality as adverse winter range conditions might. Thus summer range is usually not managed. Differences in productivity have been observed, however; a mule deer herd on poor summer range in Utah had fall weights ranging from 65 to 82% of the fall weights of those on a good summer range in Idaho, and ovulation rates of does in the poor range were only 67% of those on the good range (Julander et al. 1961). Until good estimates of animal requirements are made, quality of summer range, or any range at any time of the year, remains to be estimated subjectively.

Response of mule deer to management of summer range in the Kaibab National Forest, Arizona were demonstrated by Hungerford (1970). Reseeding practices resulted in improved summer deer conditions and a 25% better farm crop. Yearlings were more responsive to management effects than adults, which is biologically reasonable because one-year old animals simply do not have the body mass and reserves to sustain themselves during the first winter that adults have. Thus yearlings were in poorer condition in June in the Kaibab National Forest than adults were, with rib and hip bones showing after mid-June. The yearlings that fed in seeded meadows and logged and burned areas appeared to be in good condition before mid-June. Summer coat condition also developed more rapidly on the later deer (Hungerford 1970).

There are few studies that show benefits of management practices on wild ruminants, while there are many studies that show the effect of overpopulation on both animal and range. The benefits of wildlife management areas should be evaluated and expressed in terms other than numbers alone. If habitat improvement practices result in increases in numbers and enhanced body condition, there is additional justification for investing time and money in such areas and in management practices.

LITERATURE CITED

- Hungerford, C. R. 1970. Response of Kaibab mule deer to management of summer range. J. Wildl. Manage. 34(4):852-869.
- Julander, O., W. L. Robinette, and D. A. Jones. 1961. Relation of summer range condition to mule deer herd productivity. J. Wildl. Manage. 25(1):54-60.

REFERENCES, UNIT 2.1

WILDLIFE MANAGEMENT AREAS

SERIALS

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
PCGFA	29---	481	492	odvi	energy bal criterion acqui	rayburn,eb; giles	1975

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS	AUTHORS	YEAR
JWMAA	25--1	54	60	odhe	sum range condi, herd prod	julander,o; robi/	1961
JWMAA	34--4	852	862	odhe	resp kaibab m-deer man sum	hungerford,cr	1970
NAWTA	3----	368	375	odhe	deer mngment on the kaibab	boone,rp	1938

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

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

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

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

CODEN	VO-NU	BEP	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

UNIT 2.2: WILDLIFE REFUGES AND PRESERVES

Wildlife refuges, "places to flee from the hunter," seem, at first glance, to be good for wildlife. Burroughs (1946) states "...it was generally believed that closing an area to all hunting would work wonders in increasing game populations, particularly if predator species were kept in check. This belief is still widespread among sportsmen, and it is difficult to convince them that factors other than over-hunting and predation may be more important in limiting animal populations."

The statement above was made 30 years after Michigan "entered the game refuge business," and 8 years after federal aid in wildlife restoration funds were made available. He summarizes the state's experiences with refuges and hunting, noting that a rise and decline of big game refuges in Michigan as a shift from "refuge" to "public hunting ground" followed the build-up of deer numbers and over-browsing of a winter range.

If a refuge or preserve functions as it is intended to, providing a place to live with a low risk of death before old age, then populations of wild ruminants quickly build up to levels that will drastically alter the plant communities on the refuge. Changes in numbers can be demonstrated quickly and easily with the exponential predictions described in CHAPTER 19, UNIT 4.2, and the forage requirements of different populations may be estimated by going through the weight→metabolism→forage required sequence of calculations for populations.

Life, ecologically, includes birth and death. A species is successful when the rates of these significant events result in population that are in balance with range resources. Birth is obviously necessary, and death is equally necessary whenever there is a limit to resources needed.

When, and under what conditions do refuges serve a useful purpose? Refuges serve a useful purpose when range resources are abundant and animal numbers are few due to factors other than the supply of range resources. Suppose over-hunting resulted in the extermination of a population in a particular area that was located in such a position that natural immigration would not likely occur. Trapping of wild stock in another area and transplanting them to the new area justifies refuge or sanctuary status until the population is established. After it is established and in balance with range resources, removal of the annual production becomes imperative unless range resources are enhanced, which is costly and ecologically undesirable. Every farmer knows that cattle herds are successfully maintained in good condition only by removal of the annual surplus, keeping the breeding and producing herd in balance with farm resources.

The necessity for removal of an annual surplus is illustrated by the bison herd in Custer State Park, western South Dakota. Once on the brink of extinction, bison herds are now alive and well in many areas. The Custer herd is maintained by selective removal of animals from the herd, thus maintaining the herd and its value to the viewing public, while protecting the rather delicate prairie on which the animals live. Since the animals

cannot roam over the extensive areas used before settlement, both the area and the resources per unit area are limited, which necessitates removal of annual surplus.

This is such a fundamental concept, yet the public as a whole has difficulty grasping it, and often develops a sentiment against removal of the annual surplus (which is an amount equal to the annual production) when a population is in reasonable balance with range resources. The concept may be more readily understood if some basic facts are presented, such as the ecological cost of living, in relation to the resources available, such as forage energy.

It is my opinion that many of the difficulties arise from inadequate and incomplete preparation of the biological foundations. It is too easy to enter the arena of argument at the emotional level, restricting the argument to whether there are too many or too few animals. The public, wanting to provide a "refuge" for wild animals, will almost inevitably argue that there are too few.

LITERATURE CITED

Burroughs, R. D. 1946. Game refuges and public hunting grounds in Michigan. J. Wildld. Manage. 10(4):285-296.

REFERENCES, UNIT 2.2

WILDLIFE REFUGES AND PRESERVES

BOOKS

TYPE	PUBL	CITY	PGES	ANIM	KEY WORDS-----	AUTHORS/EDITORS--	YEAR
aubo	monp	bama	143	wldl	sketches of american wildl	young,sp	1946
aubo	macm	nyny	257	wldl	wildlife refuges	gabrielson,in	1943

SERIALS

CODEN	VO-NU	BEPa	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
JWMAA	2---3	151	161	odvi	trappn, pishgah nat pr, n c	ruff,fj	1938
JWMAA	7---2	203	216	odvi	doca, mngmnt, aransas, tex	halloran,af	1943
JWMAA	9---3	237	242	odvi	great plains regn, dakotas	cook,fw	1945
JWMAA	10--4	285	296	odvi	biga,refug, pbl hntng,mich	burroughs,rd	1946
JWMAA	18--4	482	495	odvi	mgmnt study,mud lake, minn	hunt, rw; mangus,	1954
JWMAA	19--3	346	352	odvi	control hunts, tamarac nat	krefting,lw; eri/	1955
JWMAA	20--3	297	302	odvi	result spec hunt, mud lake	krefting,lw; eric	1956
JWMAA	33--4	791	795	odvi	contr hnt,crab orch nat rf	rodaberry,jl; au/	1969
NAWTA	3----	248	255	odvi	mngmnt, pishgah nat game pr	schilling,ea	1938
NYCOA	6---4	28	29	odvi	adirondack deer problem ny	conservat dept	1952
PCGFA	27---	143	152	odvi	10 yrs mgt, whiter nat ref	wilson,sn; mcmast	1973
PCGFA	29---	466	475	odvi	dynamic aspects, populatns	kammermeyer,ke; m	1975
TISAA	63--2	202	206	odvi	mort factrs, crab orch,ill	hawkins,re; klim/	1970

CODEN	VO-NU	BEPa	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
CAFGA	29--4	180	190	odhe	refuges and the buck law	cronemiller,fp	1943
CAFGA	36--4	343	365	odhe	in chaparral forests,calif	cronemiller,fp; b	1950

CODEN	VO-NU	BEPa	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
POASA	43---	229	232	ceel	history, wichita mt refuge	halloran,af	1963

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

NAWTA 1---- 652 655 anam the pronghorn in southwest taylor,wp 1936

XAMPA 355-- 1 26 anam hart mt antelop refuge, or jewett,sg 1939

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

TRVIA 108-2 286 304 bibi ecol and mangmnt, amer bis fuller,wa 1961

XFWLA 95--- 1 20 bibi biga, preserves and ranges ruth,c 1937

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	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
ATRLA	12-19	323	331	bibo	history, bialowieza forest	krysiak,k	1967

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
JWMAA	24--2	191	196	doca	longhorn cattl man, wichit	halloran,af; shra	1960

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
NAWTA	8----	339	346	biga	problems, big game refuges	park,bc	1943
NAWTA	34----	103	115	----	sysrms approach, refug mgt	giles,rh,jr; scot	1969
XFWLA	341--	1	6	biga	surplus anim,natnl refuges	u s fish, wildlif	1952
XFWLA	390--	1	6	biga	avail surpl, anim, nat ref	u s fish, wildlif	1957

CHAPTER 21, Worksheet 2.2a

Exponential population predictions with zero to low mortality

WORKSHEETS 4.2a in CHAPTER 19, UNIT 4.2, page 56a provided an opportunity to make exponential population predictions in a matter of seconds with a scientific calculator. Using the procedures described in that WORKSHEET and the format below from the second page (56aa) of that WORKSHEET demonstrate the growth of wild ruminant populations with zero or low mortality for 10 years, which is a minimum natural life span.

NAIP = _____

MTRT = _____

bMTR = _____

RPRT = _____ PRDN = _____ = _____

bRPR = _____

bPOP =

YAPN =

A blank 10x10 grid of squares for a dot plot. The columns are labeled 0 through 9 at the bottom, and the rows are labeled 0 through 9 on the left side.

NAIP = _____

MTRT = _____

bMTR = _____

RPRT = _____ PRDN = _____ = _____

bRPR = _____

bPOP = _____

YAPN = _____

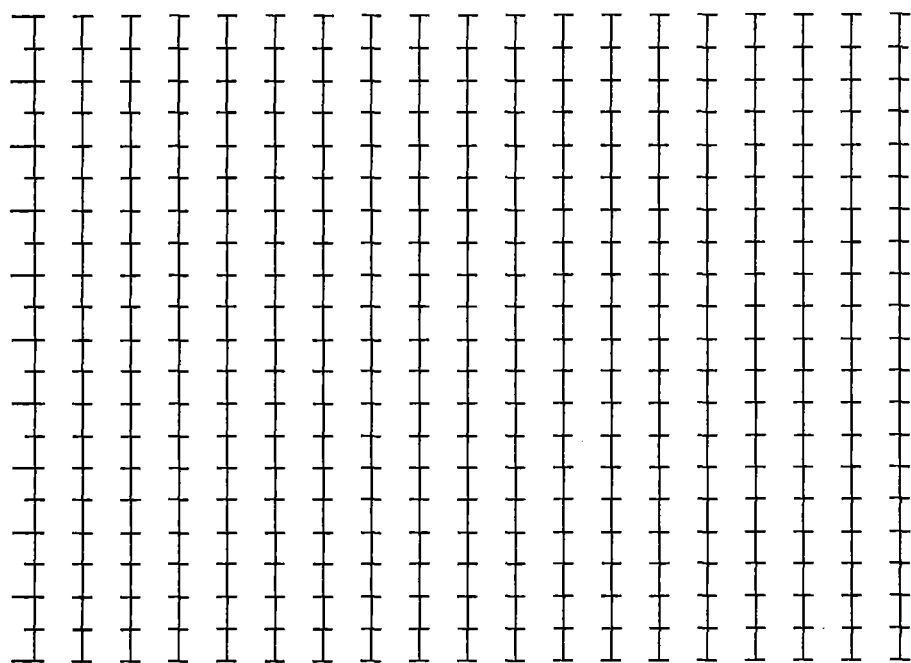
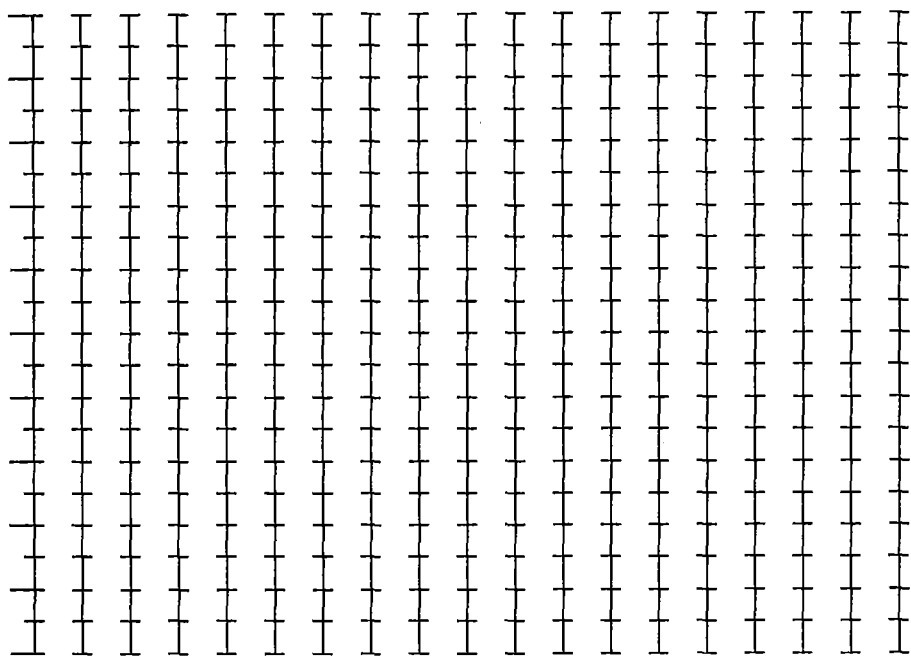
A blank 10x10 grid of squares for a 10x10 multiplication table. The columns are labeled 0 through 10 at the bottom, and the rows are labeled 0 through 10 on the left side.

CHAPTER 21, WORKSHEET 2.2b

Forage requirement calculations for increasing populations

Calculations of forage required were discussed in PART IV, CHAPTER 12, TOPIC 3. Metabolic population structures were discussed in PART VI, CHAPTER 18, TOPIC 2. Population predictions were discussed in PART VI, CHAPTER 19, TOPIC 4. Review the UNITS and WORKSHEETS in these three TOPICS, choose the WORKSHEETS that are most appropriate for your data format, and calculate forage requirements for increasing populations.

Summarize your calculations in the space below, and use the grids on the next page to plot the increase in numbers and forage required.



UNIT 2.3: WILDERNESS AREAS

Wilderness predates settlement, but designation of "wilderness areas" is a modern phenomenon. Faced with the possibility of losing the last original and unsettled natural areas to the unrelenting encroachment by man, environmentalists and politicians have taken steps to preserve these remnants. It is a controversial issue, and will remain so as long as there is a desire for continued economic growth.

The idea of wilderness areas in national forests was proposed by Aldo Leopold in 1921. Leopold recommended that tracts of a minimum of 500,000 acres each be set aside in each western state. Such areas would be large enough for a two-week hunting or fishing trip on horseback, and would not be subject to road-building and artificial developments.

What is a wilderness area? There are legal guidelines to follow, but they are subject to change by political action. Ecologically, a wilderness area has characteristics similar to presettlement times, is large enough to remain "wilderness" by virtue of its own perimeter buffer zone, and contains fauna representative of presettlement times. Thus a wilderness area should contain not only the wild ruminants characteristic of its ecological history, but also their predators.

True wilderness areas are difficult to find, of course, especially in the lower 48 states. One example is the Boundary Waters Canoe Area in northeastern Minnesota (2 million acres) and adjacent Quetico Park in Canada. This large wilderness area contains deer, moose, and woodland caribou, and their predators, primarily wolves.

Gilligan (1954) questions whether national forest wilderness reservations are feasible, noting that primitive or virgin conditions are not to be found in designated wilderness areas, and that dams, logging operations, and other activities impinge on wilderness areas directly or indirectly. Further, the by-products of man's activities, such as acid rain from industrial operation, also impinge on wilderness areas. Some of these indirect effects are very insidious.

It is impossible to find completely pristine conditions anywhere in North America, but we must begin with what we have, enacting laws and management practices that will designate and allow certain areas of land to be as much like pre-settlement wilderness as possible.

Wilderness areas with a high level of ecological integrity must be left not only to nature's natural provisions but also its ravages. Thus, fires of natural origin should be left to burn. One might also argue that limited acreages of wilderness areas that would take hundreds of years to recover should be protected from such a perturbation as fire, simply because advanced stages in succession are too limited to lose. Such a wilderness area then becomes a protected and managed area, not allowed to be set back in succession by even a major natural perturbation because of its relict status.

Wilderness areas, by definition, cannot be subjected to anything more than minimal human impact. This is hard for persons interested in promoting equal rights and accessibility for all to accept, yet the concept must be defended. Certain habitats--wilderness, rugged mountainous topography, the moon . . . --simply do not fall within the realm of day-to-day activities. Personally, I am as content knowing the city is "there" without having to visit it as I would hope city dwellers would be concerning wilderness.

LITERATURE CITED

- Gilligan, J. P. 1954. Wildlife values in western wilderness area management. J. Wildl. Manage. 18(4):425-432.
- Leopold, A. 1921. The wilderness and its place in forest recreational policy. J. Forestry 19(7):718-721.

REFERENCES, UNIT 2.3

WILDERNESS AREAS

SERIALS

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
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JFUSA	68-11	692	694	odvi	habitat mngmnt, eastn for jordan,js		1970
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NYCOA	7---	5	5	odvi	mngmnt, wldrness, adironda cheatum,el		1953
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CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
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odhe

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

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

CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
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JWMAA	18--	4	521	526	rata fire, declin, grey wells p edwards,ry		1954
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CODEN	VO-NU	BEPA	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
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anam

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

EXJOA 127 133 ---- refuge in a wilderness simmons,nm 1967

JFUSA 19--7 718 721 ---- wilderness, nat for policy leopold,a 1921

JWMAA 18--4 425 432 wldl wildlif values,west wilder gilligan,jp 1954

CHAPTER 21, Worksheet 2.3a

Wilderness area sizes in relation to animal movements

Sizes of national forest wilderness areas in western states are given by Gilligan (1954. Some examples are (640 acres = 1 square mile):

5,000 acres =	7.8 sq. miles
47,000 acres =	73.4 sq. miles
100,000 acres =	156.3 sq. miles
300,000 acres =	468.8 sq. miles
1,000,000 acres =	1562.5 sq. miles

Determine the radii of circles with the areas in square miles listed above. Plot those as concentric circles below. Then go back to PART II, CHAPTER 3, UNIT 3.2 and look up the distances of seasonal movements of deer, elk, and other ruminants. Plot one-half the total distances as radii below, comparing distances travelled with radii of wilderness areas of different sizes.

.....●.....

These radii of circles represent perfectly circular geometries; actual shapes of wilderness areas result in lesser distances from one border to another.

How do sizes of wilderness areas compare to sizes of ranges used throughout the year? How large must wilderness areas be to be permanent for the different species of wild ruminants?

Additional reference radii are given on the next page.

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UNIT 2.4: PARKS, NATIONAL MONUMENTS, AND RECREATION AREAS

Parks, whether they be federal, state, provincial, or county units, are usually set aside for scenic and recreational values, and for non-consumptive uses. They have traditionally been game sanctuaries, not open to public hunting. There are exceptions, of course, and these exceptions have often triggered large-scale controversies.

It is difficult to manipulate park habitats when they are expected to be the least disturbed and most scenic areas around. People are disappointed and upset if they arrive at a park to find visible effects of logging or fire.

A sign in a stand of red pine in Ithaca State Park, Minnesota read for many years, "It took nature 200 years to grow this timber. Fire could destroy it in 2 days." Most of the trees bore fire scars, and people reading the sign felt a protective instinct swelling within them as they inwardly sheltered these monarchs of the forest from further damage and destruction. The park, in fact, was established because of the red pine stands as well as the source of the Mississippi River being there in Lake Itasca. The red pine stands, however, are dependent on fire for their perpetuation! In the absence of fires, regeneration does not take place at a rate sufficient to replace the trees, having instead a heavy shrub layer, primarily Corylus, developing. Thus fire suppression in the park would ultimately lead to the demise of the species for which the park was established. Now that the ecological truth is understood, the sign has been replaced with one declaring the role of fire in certain plant communities, which may be accepted by the general public within a generation or so.

The reason why it is difficult for the public to understand the ecological rationale is that promotion of and protection from fires in different areas may be going on at the same time. Caribou in Wells Grey Park, British Columbia, for example, were declining as a result of fires (Edwards 1954). The role of fire must be evaluated in relation to species being managed for; caribou and red pine react differently to the effects of fire.

State and national parks are an important part of our natural areas, and important ranges for many species of wild ruminants. Management practices necessary for the perpetuation of populations of native species should be implemented on the basis of a thorough understanding of the basic biological relationships involved.

LITERATURE CITED

- Edwards, R. Y. 1954. Fire and the decline of a mountain caribou herd. J. Wildl. Manage. 18(4):521-526.

REFERENCES, UNIT 2.4

PARKS, NATIONAL MONUMENTS, AND RECREATION AREAS

SERIALS

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
JWMAA	5---	1	95	102	odvi method increas browse,minn krefting,lw		1941
JWMAA	6---	1	27	30	odvi deer of allegany st pk, ny shadle,ar; stullk		1942
NFGJA	3---	1	80	87	odvi hstry,mgmnt,allegany st pk severinghaus,cw		1956

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
CAFGA	23--	4	286	289	odhe notes, calif redwood st pk orr,rt		1937
WLSBA	4---	2	69	73	odhe odvi, prsc burn, wind cave lovaas,al		1976

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
ANKIA	51...	2		7	ceel olympic natl primeval park ordway,sh,jr		1948
CNJMA	19...	184	192		ceel mngmnt, elk islnd pk,alber love,bi		1955
JOMAA	28--	1	4	12	ceel odhe, study,rcky mt nat pk packard,fm		1947
NAWTA	8----	95	100		ceel mgmnt, herd reg, yellowsto cahalane,vh;		1943
NAWTA	27----	191	201		ceel jcksn hl herd, tetn, yellw bendt,rh		1962
NPKMA	25----	119,	150		ceel elk, grand teton natnl prk murie,oj		1951

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
ORYXA	7---	6	301	304	alal domesticat, russian nat pk yazan,y; knorre,y		1964

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
CZOOA	27...	20	24		rata cons project in laurentide desmeules,p		1967
JWMAA	18--	4	521	526	rata fire, decline mt car, b.c. edwards,ry		1954

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

anam

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

NAWTA 9----	135	143	bibi restor, wild bis, yellowst	cahalane,vh	1944
TRVIA 108-2	286	304	bibi ecol and mangmnt, amer bis	fuller,wa	1961
WMBAA 16---	1	52	bibi mgmnt, wood buffalo nat pk	fuller,wa	1962

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

CAFGA 25--2	72	95	ovca surv, death valley nat mon	dixon,js; sumner,	1939
JOMAA 18--2	205	212	ovca prelim stud, yellowston pk	mills,hb	1937
NPKMA 33---	7	9	ovca bighorns of rocky mountain	contor,r	1959
SCBUB 20...	28	31	ovca way to bring back,yosemite	grinnell,j	1935
tdbc 1----	20	21	ovca nat park serv, wldl progrm	fredine,g	1957
tdbc 3----	30	32	ovca status in calif state park	merkel,de	1959
tdbc 7----	58	60	ovca of lake mead nat recr area	sleznick,j,jr	1963
tdbc 7----	167	168	ovca in anza borrego desert par	merkel,de	1963
tdbc 8----	1	4	ovca at san diego zoolog garden	pournelle,gh	1964
tdbc 9----	49	52	ovca prog rep,josh tree, resrch	welles,re	1965
tdbc 11---	77	79	ovca curr policy aff man,josh t	dengler,wf	1967
tdbc 12---	38	39	ovca sprng improv, death vally	leach,hp	1968
tdbc 12---	50	53	ovca wldl res, man, josh tree n	dengler,wf	1968
tdbc 13---	86	90	ovca resrch supp, nat park serv	sumner,l	1969

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

NAWTA 28--- 28 45 wldl study, wildl prob,nat prks leopold,as 1963

OTHER PUBLICATIONS

Carpenter, L. H. and D. L. Baker. 1975. Middle Park cooperative deer study - deer habitat evaluation. In Game Res. Report, July Part 2. Colorado Div. Wildl., Denver. pp. 243-263.

U. S. National Park Service. 1964. 1964-65 pronghorn (antelope) and habitat management plan for Yellowstone National Park. Yellowstone National Park, Wyo. 4 p.

UNIT 2.5: NATIONAL FORESTS

National forests are another designated land area that is subject to different kinds of habitat manipulation practices. Owned by the federal government and managed for timber production, they are not park or wilderness areas. They are also managed with consideration for wildlife values, and hunting is allowed, except in forests or parts of forests where special regulations apply.

The multiple use concept has been applied to national forests, promoting not only tree growth and harvest but also recreation. Thus camping is permitted on national forests, with more primitive campsites available than those found in commercial or park campgrounds. The primitive sites are usually available during the hunting season, and hunters in their pick-up campers and other self-contained recreation vehicles use them.

Habitat management on national forest land is usually a by-product of timber harvest. Questions of clear-cutting compared to selective cutting should take wildlife use into consideration.

REFERENCES, UNIT 2.5

NATIONAL FORESTS

SERIALS

CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
JFUSA	34--5	472	474	odvi	for mgt,dee requir,alleghe	ehrhart,eo	1936
JFUSA	52--6	419	422	odvi	correl man with other uses	morriiss,dj	1954
JWMAA	5---1	95	102	odvi	meth, increas browse, minn	krefting,lw	1941
JWMAA	35--3	520	532	odvi	mgt criter, oaks, nat fors	goodrum,pd; reid/	1971
VIWIA	9---1	16	18	odvi	new wldl era,virg natl for	mead,cp	1948
CODEN	VO-NU	BEP	ENPA	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
CAFGA	36--4	343	365	odhe	in chaparral forests,calif	cronemiller,fp; b	1950
JWMAA	15--2	129	157	odhe	in nebraska national fores	mohler,ll; wampo/	1951

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

CAFGA 17--2 167 168 anam on the shasta national for johnson,fw 1931

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

bibi

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

AMFOA 48... 250 253 ovca history, hab, pike nat for spencer,c 1942

tdbca 4---- 72 75 ovca status, angeles nat forest lewis,a 1960

tdbca 7---- 126 32 ovca of the angeles natl forest kennedy,ce 1963

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	BEP	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
JOMAA	25--2	149	151	oram habts, mngmnt, black hills	harmon,w	1944
NAWTA	5----	441	443	oram rcky mt goats, black hills	swift,lw	1941

CODEN	VO-NU	BEP	ANIM	KEY WORDS-----	AUTHORS-----	YEAR
FOSCA	2....	7	17	biga popu, nat forests 1921-50	schantz,hl	1956
NAWTA	1----	255	259	wldl managmnt, national forests	silcox,fa	1936

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34-37

