A TECHNIQUE FOR EVALUATING BROWSE UTILIZATION AND RANGE CONDITION ON SITKA BLACK-TAILED DEER HABITAT IN SOUTHEAST ALASKA

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Knowledge of habitat conditions and the changes thereon are essential for the proper management of any big game species. This paper describes a method for evaluating the use of key browse species and determining range conditions on important winter range areas used by the Sitka black-tailed deer in Southeast Alaska. The method is designed to enable personnel with a limited amount of training to provide consistent and accurate information with a minimum of time and effort, and to permit the coverage of large geographical areas by a small number of personnel.

Utilization of key browse species on critical winter ranges and condition and trend information will be derived from:

1. Browse utilization transects.

2. Line intercept transects for condition and trend.

3. Deer exclosures.

Units, consisting of one utilization transect, two condition and trend transects, and a deer exclosure, will be established in selected index areas and assigned a unit number.

Selection of Index Areas

Transects and exclosures will be located in key winter areas used by deer. Index areas, preferably gentle sloping gravel beaches, should be of southerly exposure, of climax spruce-hemlock or hemlock-cedar type and in locations adjacent to protected waters to facilitate access from the water without undue risk to personnel or equipment. Units should be within the beach fringe area (usually within 100 yards of the edge of the beach fringe timber) as this is the area which deer are forced to utilize during critical periods of heavy snowfall.

Unit locations are to be marked with signs which are readily visible from the water. Signs should be 24 inches by 32 inches in size and white in color, with the following information printed on each sign in large black letters:

DEER RANGE UNIT
No. __
U. S. Forest Service
Alaska Dept. of Fish & Game

The location of the unit sign will be described on a permanent record form by general locality and by at least two compass bearings to well defined landmarks, and the location of each unit plotted on a USGS 1:63,360 topographic map.

Numbering of Units

Assuming a unit is designated No. 1, the utilization transect would be Transect No. 1, the condition and trend transects Transects No. 1-a and No. 1-b respectively, and the deer exclosure Exclosure No. 1.

Browse Utilization Transects

Location of Transects: Transects are to be 40 chains in length, with stations at two-chain intervals along the transect. Station No. 0 will be at the point of beginning and Station No. 20 at the end of each transect. Station No. 0 is to be located by a bearing and distance from the unit sign. Utilization readings will commence with Station No. 1 of each transect. Transect routes are to follow the contour of the land and be approximately the same distance from the edge of the beach fringe timber at all points. At each two-chain station along the transect, from Station No. 0 to Station No. 20, a reference stake, which may be cut from native material, is to be driven into the ground. Stakes should project at least three feet above the surface of the ground and the tops blazed and painted with fluorescent orange paint. An aluminum tag with the station number stamped on it should be securely attached to each stake and Station No. 0 marked with an additional aluminum tag stamped with the transect number.

Distances between stations are to be slope chained and the bearings and distances recorded on the permanent record forms. Trees along the transect route should be well blazed and the blazes painted fluorescent orange to facilitate following.

Selection of Key Browse Plants: Utilization will be determined from observations of Vaccinium ovalifolium (blue huckleberry) or, if these aren't available, Vaccinium parvifolium (red huckleberry) may be used. The closest representative plant to the station stake should be marked with both securely placed orange plastic tape to facilitate relocation of the plant and an aluminum tag stamped with the corresponding station number in case the orange flagging should be lost. Bearings and distances from the station stake to selected plants are to be recorded on the permanent record form. Selected plants should be between 12 and 48 inches in height, preferably about 18 to 30 inches and in locations which are available to deer. Plants less than 12 inches in height are not normally available during the critical period of winter use due to snow cover and plants taller than 48 inches are not normally utilized. If a plant less than 18 inches tall is selected, the utilization on the entire plant is determined; however, if the plant is taller than 18 inches, one branch is marked, the flag and tag being placed at a point approximately 18 inches from the distal end of the branch. Utilization readings will only be determined from twigs above the flag.

This means that when a large plant with several branches is tagged, utilization readings will be obtained from only the one tagged branch of that plant. If no plant is available within a 50 link radius of the station stake, a record is made in the field notes that no plants were marked. In such cases, utilization will be determined from the number of stations where plants were actually tagged and the utilization measured.

Measuring Browse Utilization: Browse utilization will be determined from the percentage of total leaders (twigs) above the flag on the tagged branch which have been clipped by deer during the current period of winter use. Measurements should be made in late March and April each year, after winter utilization has ceased but before new growth has commenced. First, the total number of browsed leaders are counted, disregarding twigs having 1/4 inch or more dead wood at the tip as these are considered to be the previous year's utilization. Unbrowsed twigs over two inches in length are next counted. Total utilization is then determined, to the closest 10 percent, by dividing the number of browsed leaders by the total number of browsed and unbrowsed leaders. The average utilization for the transect is determined by dividing the sum of the utilization figures for all stations on the transect by the number of stations where tagged plants were observed.

Condition of Browse Plants: The general plant condition and height are also to be recorded at the same time that utilization is determined. A condition index will be assigned to each plant on a scale of three as follows:

1 = good, vigorous plant, leader growth 4 to 6 inches in length, very little dead wood.

2 = average plant, leader growth averages less than 4 inches in length, less than 25 per cent dead wood.

3 = decadent plant, leaders spindly, sparse and less than 4 inches in length, 25 per cent or more dead wood.

Plant height will be measured in inches. Measurements should be on a vertical plane from the base of the plant to the highest leader, not including the leaves.

Condition and Trend Transects

Two condition and trend transects, each 50 feet in length, will be established in each range unit with the utilization transect. These transects will be read during the months of July through September at five year intervals. Long term changes in the habitat will be measured by reference to the density of forbs and woody plants, the per cent ground cover of woody plants, and the condition and age of key browse species, Vaccinium ovalifolium and Vaccinium parvifolium.

Location of Transects: Condition and trend transects will be referenced by bearings and distances from Station No. 0 of each utilization transect. The beginning point of each condition and trend transect will be within 50 feet of the reference stake. The two condition and trend transects will form an included angle of at least 45 degrees when they are extended to a point of interception. Transects are to be located so that a stretched tape would be approximately equidistant from the ground at all points. No correction will be made for slope distances; however, the grade along the transect should not be greater than 15 per cent.

A 50 foot steel tape is to be stretched taut, under about 20 pounds tension, between two steel rods which have been driven firmly into the ground. The tape should be parallel and as close as possible to the ground, but should not touch at any point. Using a plumb bob, permanent iron pipes (1-1/2 inches ID, 36 inches in length, with iron caps) are to be driven into the ground directly beneath the 0 and 50 foot markers leaving about six inches of the pipe exposed. The portion of the pipe above the ground is painted fluorescent orange and punch marks placed on the iron caps. Transect numbers will be stamped on the cap of the pipe marking the end of the transect. The bearing between the 0 and 50 foot markers will be recorded on the permanent record form. A reference stake approximately 4 feet in height will be placed beside the 0 marker to facilitate relocation.

Measuring Condition and Trend Transects: A steel tape is stretched between two steel rods so that the 0 and 50 foot marks are directly over the punch marks on the iron pipes. Height of the tape at each end is recorded and the same height used for each successive reading. Moving the plumb line along the tape, hits occurring directly above or below the stretched tape on all types of vegetation are recorded as follows:

1. Woody plants

   Key browse species V. ovalifolium and V. parvifolium--record the total ground cover, height, condition and age of the plant.

   Other woody plants (except conifer seedlings)--record only the total ground cover for each species. Coverage for trees above 6 feet in height will not be included.

2. Conifer seedlings (less than 6 inches in height)

   Record only number of plant hits (only one hit per plant).

3. Forbs

   Record number of plant hits (only one hit per plant).

Beginning at the 0 end of the transect, the plumb line is moved along the tape until a plant is encountered. If any portion of a forb or conifer seedling is

encountered, including the leaves, a hit is recorded under the appropriate species. When a woody plant is encountered, record the points, including leaves, of first and last contact, even though there may be open spaces between the branches, under "From" and "To" on the field form. The plumb line is held above the tape to determine coverage for plants which have branches extending above the tape. Non-productive ground--bare ground, rock, litter or moss--reflected by an absence of plant species is not recorded.

Height, condition and age of key browse species, V. ovalifolium and V. parvifolium, are recorded by the following standards:

1. Height--measured in inches on a vertical plane from the base of the plant to the uppermost leaves.

2. Condition

   1 = good, vigorous plant, leader growth 4 to 6 inches in length, very little dead wood.

   2 = average plant, leader growth averages less than 4 inches in length, less than 25 per cent dead wood.

   3 = decadent plant, leaders spindly, sparse and less than 4 inches in length, 25 per cent or more dead wood.

3. Age

   Seedling = stem diameter at 2 inches above the ground
   less than 1/8 inch

   Young = stem diameter at 2 inches above the ground
   1/8 to 1/4 inches

   Mature = stem diameter at 2 inches above the ground
   more than 1/4 inch

In many cases more than one story of vegetation will be measured. In the case of forbs, the over-story of woody plants must be held aside to enable the plumb to reach the ground level. In places where plants overlap, the ground coverage of each plant will be determined separately.

Photographs: A photograph will be made of each transect at the time of each reading. The camera will be placed on a tripod directly over the pipe at the 0 end of the transect. Height of the camera lens will vary with topography, but should be recorded and the same height used in future photographs. The camera will be focused at the 20 foot mark, using the tape as the center of the photograph. Frame size will be at least 2 1/4 by 2 1/4 inches and Kodak "Ektachrome" or equivalent film will be used. A blackboard showing the transect number, location and date of exposure will be included in the photograph.

Deer Exclosures

Location: Deer exclosures are to be constructed in the immediate area of each utilization transect on relatively level ground, usually within 100 feet of Station No. 0 of the transect. The exclosure should be readily visible from the initial station of the utilization transect, but should not interfere with the utilization or condition and trend transects. The primary purpose of the exclosures is to provide immediate visual comparison between used and unused deer range.

Construction Techniques: Exclosures shall be rectangular in shape and 12.6 feet by 19.2 feet in size. The fence will be of one inch, 18 gauge, galvanized wire mesh or equivalent and 6 feet in height. Ten posts, 4 by 4 cedar or equivalent, and 8 feet in length shall be implanted to a depth of approximately 2 feet and guyed with #6 gauge galvanized wire or equivalent. Three posts will be placed on each end of the exclosure and four on each side. Spaces at bottom caused by uneven ground will be blocked with debris. Within the actual exclosure, a two milacre plot (6.6 feet by 13.2 feet) shall be established and each corner marked with an iron rod painted orange. This will allow for a 3 foot buffer zone on all sides between the exclosure fence and the actual plot.

One of the iron rods, designating the plot corners within the exclosure, shall be designated as a photo point. Camera height is to be 24 inches and point of focus, the midpoint of the plot. Photographs will be taken at five-year intervals at the time when condition and trend transects are read. Frame size will be at least 2 1/4 by 2 1/4 inches and Kodak Ektachrome or equivalent film will be used.

Equipment and Materials Needed for Each Unit

General Equipment

Axe
Hammer
Compass
Shovel
Locality maps (USGS, 1:63,360)
Clipboard
Recording forms (permanent record, utilization and condition and trend)

Materials for Utilization Transects

21 stakes, 4 feet in length (may be cut on location)
Orange plastic tape for flagging
Two sets aluminum tags stamped from 0 to 20
One aluminum tag stamped with transect number
Two-chain steel tape
Orange fluorescent paint

Materials for Condition and Trend Transects (two transects)

Two 6 foot steel rods
50 foot steel tape
Plumb line
Six foot steel tape
Four sections iron pipe, 1-1/2" ID by 36" long
Four caps for iron pipes
Center punch
Punch for transect number
Orange fluorescent paint
Camera and film
Tripod
Exposure meter

Materials for Deer Exclosures

Ten 4 by 4 cedar posts or angle iron posts 8 feet long
70 lineal feet, one inch mesh, 18 gauge galvanized wire 6 feet high
1/4# hog rings and pliers for fastening wire
1 1/2# 1-1/2 inch staples
Four 3/8 inch steel rods, 36 inches long
50 foot tape measure
Orange fluorescent paint
80 ft. (±) No. 6 gauge galvanized wire for guys
Aluminum tag, 3 by 5 inches in size, stamped with the exclosure number and the date established

Permanent Record Form For Deer Range Units

Unit No. .....

Browse Utilization Transect No. ..... Established .....

Condition and Trend Transect No. ..... Established .....

Condition and Trend Transect No. ..... Established .....

Location of Range Unit

General Description: .....

.....

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Bearings to Local Landmarks:

..... bears ..... degrees from unit sign

..... bears ..... degrees from unit sign

..... bears ..... degrees from unit sign

Sta. No. 0 of Browse Utilization Transect No. ..... bears ..... degrees and is ..... links from the unit sign.

Sta. 0.0 of Condition and Trend transect No. ..... bears ..... degrees and is ..... feet from Sta. No. 0 of Browse Utilization Transect No. ..... Transit bears ..... degrees from sta. 0.0. Camera height is ..... inches.

Sta. 0.0 of Condition and Trend Transect No. ..... bears ..... degrees and is ..... feet from Sta. No. 0 of Browse Utilization Transect No. ..... Transit bears ..... degrees from sta. 0.0. Camera height is ..... inches.

Deer Exclosure No. ..... bears ..... degrees and is ..... feet from Sta. 0 of Browse Transect No. .....

Photo point for deer exclosure is rod which marks the ..... corner of plot

Site Description

Forest Composition: .....

.....

Beach Type: .....

.....

Slope ..... Aspect .....

Remarks:

Location of Stations and Tagged Plants

Bearings and Distances Between Stations

Station	Bearing	Distance (chains)
0		
	.....	.....
1		
	.....	.....
2		
	.....	.....
3		
	.....	.....
4		
	.....	.....
5		
	.....	.....
6		
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7		
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8		
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10		
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11		
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12		
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14		
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15		
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16		
	.....	.....
17		
	.....	.....
18		
	.....	.....
19		
	.....	.....
20		

Bearings and Distances From Stations to Tagged Plants

Station	Bearing	Distance (links)
1	.....	.....
2	.....	.....
3	.....	.....
4	.....	.....
5	.....	.....
6	.....	.....
7	.....	.....
8	.....	.....
9	.....	.....
10	.....	.....
11	.....	.....
12	.....	.....
13	.....	.....
14	.....	.....
15	.....	.....
16	.....	.....
17	.....	.....
18	.....	.....
19	.....	.....
20	.....	.....

Deer Browse Utilization Transect Field Form

Transect No. ..... **Location of Transect** ..... **Observers** .....

Date Checked ....

Station Number	Plant Species		No. Twigs Browsed	No. Twigs Unbrowsed	Percent Utilization	Cond. Index	Plant Height
	V.O.	V.P.					
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							
15							
16							
17							
18							
19							
20							
Totals							

Ave. Percent Utilization ..... Ave. Condition Index ..... Ave. Plant Height .....

Deer Mortality

No.	Sex	Condition of Bone Marrow	Check if Collected	
			Pelvic Bone	Jaw
1				
2				
3				
4				
5				

Remarks:

Aids For Reading Browse Utilization Transects

Condition Index of Browse Plants

1 — good, vigorous plant, leader growth 4 to 6 inches in length, very little dead wood.

2 — average plant, leader growth averages less than 4 inches in length, less than 25 percent dead wood.

3 — decadent plant, leaders spindly, sparse and less than 4 inches in length, less than 25 percent dead wood.

Plant Height

Measurements are in inches on a vertical plane from the base of the plant to the highest leader and should not include the leaves.

Utilization

Leaders (twigs) must be at least 2 inches in length to be counted.

All twigs above plant tag showing current utilization counted.

Utilized leaders with ¼ inch or more dead wood on tip are considered previous year's utilization.

Aids For Checking Deer Mortality

Age

Collect jaw and attach tag. Record number and location on tag.

Condition

Break femur (uppermost bone of hind leg) and record color and consistency of marrow as: white-solid, grey-solid, pink-solid, pink-semisolid, pink jellatinous, pink-watery, pink-string or empty.

Sex

Determine by presence or absence of antler pedicels on skull. If no skull present, collect and tag pelvic bone. Record number and location on tag.

DEER RANGE CONDITION AND TREND TRANSECT FIELD FORM

Transect No. ______________ Location of Transect ______________________________ Observers ______________

Date Checked ______________ ______________________________ ______________

Tape Height at 0 ________ Tape Height at 50 ________

Bearing of Transect from 0 to 50 ______________

Vaccinium spp.						Other Woody Plants												Conifer Seedlings					Forbs								
om	To	Total	Height	Condition	Age	From	To	Total	From	To	Total	From	To	Total	From	To	Total	Hemlock	Spruce	Cedar											
tals																															

Remarks:

Photo Data

Camera Size ______________

Film Name ______________

Film Index ______________

Camera Height ______________

Aids For Reading Condition And Trend Transects

Condition Index for Vaccinium spp.

1—good, vigorous plant, leader growth 4 to 6 inches in length, very little dead wood.

2—average plant, leader growth averages less than 4 inches in length, less than 25 per cent dead wood.

3—decadent plant, leaders spindly, sparse and less than 4 inches in length, 25 per cent or more dead wood.

Age Classes for Vaccinium spp.

Seedling—stem diameter at 2 inches above the ground less than ⅛ inch.

Young—stem diameter at 2 inches above the ground ⅛ to ¼ inches.

Mature—stem diameter at 2 inches above the ground more than ¼ inches.

Plant Height

Measurements are in inches on a vertical plane from the base of the plant to the highest leader and should include the leaves.

Conifer Seedlings

If less than 6 inches in height, record only as a hit: if more than 6 inches in height, record as a woody plant.

Forbs

Record only number of hits (one hit per plant).

Method of Recording Hits