

JOB COMPLETION REPORT

INVESTIGATIONS PROJECT

ACADIA NATIONAL PARK
RESOURCE MANAGEMENT DIVISIONState of MaineProject No. W-37-R-5 Name State-wide Wildlife SurveyJob No. 4-R Title Winter Deer Yard Inventory and EvaluationPeriod Covered December 1, 1955 to May 31, 1956

Abstract:

State-wide surveys of 423 deer yards over the past three winters indicate that the State's winter range problem area mainly is confined to the 16,000 square mile continuous forest region. Deer in excess of carrying capacity were found in 38 per cent of 260 yards checked in the above area, as compared to an incidence of 5 per cent in the adjoining farm and farm-woodland regions.

Rankings of food and shelter values of yard cover types varied with stand composition, height and density. Hardwood-spruce-fir and cedar-tamarack-spruce types in the yard centers, and those plus northern hardwoods and hemlock in yard peripheries, produced the best browse. In general, food ratings were highest in stands above 35 feet in height and less than 40 per cent crown closure. Shelter values were highest in spruce-fir and cedar-tamarack-spruce types in which height and crown closure exceeded 35 feet and 40 per cent respectively. High food and shelter values generally were not found in the same cover types.

Two broad degrees of winter deer concentrations occur in the State. In the forest region deer generally use a definite, limited area each winter, whereas concentration areas are more poorly defined and cover a larger territory in the southern farm-woodland region. Movements appear to be influenced by the relative degree of interspersion of food and shelter and regulated by snow and weather conditions.

Dead deer searches at eleven over-browsed yards produced 22 carcasses in two square miles of coverage. Starvation was a positive cause of death in six cases, five of which were found in a search on Mount Desert Island. The latter area experienced a deer die-off propagated by a continued closed season, overstocked winter range and a severe winter.

Objectives:

To locate deer yards and evaluate their condition, cover types and use by deer and to determine the pattern of deer activity in various regions of the State.

Techniques Used:

As in the past years, Regional Biologists located deer yards through aerial reconnaissance and from information supplied by local game wardens and woodsmen. Prior to the field work, cover maps delineating the boundaries of softwood, mixed growth and hardwood stands within the yards were prepared from timber company type maps or aerial photos. These broad cover groups were sub-divided during the

course of the field survey into types based on descriptions of the U. S. Forest Service,^{1/} and height and density classes as per the Maine Cooperative Timberland Owner's Code. (Cover type descriptions used are appended to this report.) An additional distinction between the "nucleus" and "periphery" of the yards was made on the basis of cover composition and deer use. The former term applies to the portion of the yard primarily providing shelter within which deer could be expected to be confined during the severest weather and deepest snow depths. In contrast, the periphery refers to the area adjoining the nucleus which, while providing minimum shelter, would be used primarily as a feeding grounds. Each cover type occurring in the nucleus and periphery were rated for food and shelter conditions on the basis of "Good", "Fair" and "Poor". The over-all condition of each yard was rated from the standpoint of the number of deer present relative to the carrying capacity of the yard. Criteria used in the above ratings were food abundance and quality in relation to the current rate of browsing.

Observations of deer activity were continued at nine yards and initiated at two others. Records of snow depths, maximum and minimum temperatures and movements of deer within the yards were maintained throughout the winter. In the southern part of the State where winter deer activity normally is not restricted to specific yards, two biologists carried out observations at study areas on the extent of deer movements and cover use under varying snow and weather conditions.

Searches for dead deer were conducted on eleven areas to obtain a measure of the extent of winter mortality in the more critical yards. Four-man crews spaced at one chain intervals generally obtained complete coverage of ten per cent of the area of the yards checked.

Findings:

Yard Conditions

During the winter of 1955-56, Regional Biologists surveyed 121 new yards (Figure 1). Major emphasis was placed on obtaining information from previously unsurveyed areas in the Intermediate and Northern Climatic Divisions ^{1/} consequently, the findings (Table 1) are not representative of State-wide conditions. However, by combining the current findings with those of the previous two years the State's winter range problem area can be delineated.

In the past three winters 423 yards have been surveyed and rated on the basis of the number of deer relative to carrying capacity of the yards. When the above yards are arranged by climatic divisions (Table 2) conditions appear distinctly different in the Coastal and Central divisions as compared to the Intermediate and Northern divisions. In the former two divisions, deer concentration above carrying capacity were found in 9 per cent of the yards, which contrasts with a 30 per cent incidence in the latter divisions. Thus, it would appear that the State's winter range problem areas could be defined climatically. However, a plot of all surveyed yards by their condition (Figure 2) indicates

^{1/}. Anonymus. Forest survey field manual. Northeastern States. U.S.D.A. Northeastern For. Exp. Sta., Upper Darby, Pa., 122p., 1950.

^{1/}. Fobes, Charles B., Climatic Divisions of Maine, Maine Tech. Exp. Sta., Bul. 40, 44p., 1946.

the problem area is not strictly definable along climatic division lines. While the Coastal and Central divisions show a relatively uniform distribution of the three yard conditions, a similar uniformity is not displayed in the Intermediate and Northern divisions. The western portion of the Intermediate division (southern Somerset, Franklin and Oxford counties) is relatively trouble free while a similar situation exists in the eastern Aroostook County in the Northern division.

The most obvious reason for the nonconformity of the problem area to climatic division lines is land use. The Soil Conservation Service^{1/} recognizes two broad agricultural regions in the State, the Aroostook County potato farm section in the eastern part of that county and a southern farm and woodland region. The remainder of the State is relatively continuous forest land. A comparison of the winter deer range problem area with the land-use regions shows a close "fit" between the problem area and the continuous forest region (Figure 3). A major deviation occurs in southern Piscataquis and central Penobscot counties where the problem area extends into the farm-woodland section. In contrast, the eastern edge of the continuous forest region in Aroostook appears relatively trouble free.

As delineated, the winter deer range problem area extends over approximately 16,000 square miles or 53 per cent of the State. Within this area, surveys of 260 yards indicate that approximately 38 per cent of the yards have deer in excess of carrying capacity, 49 per cent show a balance between food and deer numbers while more deer could be supported in the remaining 12 per cent of the yards. Distribution of the three classes of yards is fairly uniform, consequently, it is difficult to make any comparisons of conditions within the problem area without resorting to some means of sub-division. Drainage systems were decided upon since they have the advantages of forming natural boundaries, are readily delineated and described, and are generally used in descriptions of the region.

The principle drainage systems in the State are shown in Figure 4 with yard conditions of those in the problem area given in Table 3. Nine of the 16 drainage systems appear similar with deer in excess of carrying capacity occurring in 25 to 35 per cent of the yards. The Penobscot drainage appears to be in the poorest condition with over half of the 33 yards examined carrying too many deer relative to the food available. A similar indication of relatively poor range condition is indicated from a smaller sample of yards in the Androscoggin, Dead, Moose, East Branch Penobscot and St. John drainages. Additional surveys are needed in the above drainages.

Yard Forest Cover Types

Information pertaining to cover type occurrence in the yards and food and shelter values of each type was collected preparatory to the deer yard habitat management program. The data were compiled by the Intermediate and Northern climatic divisions, to separate topographic and climatic influences, and for the nucleus and periphery of the yards.

The most frequently occurring and predominant types in the nucleus of yards in both climatic divisions were spruce-fir (Type 18), cedar-tamarack-

^{1/}. Hardesty, J. Stewart, Descriptions of Maine Problem Areas, USDA, SCS, Upper Darby, Pa., 3p., 1953.

spruce (Type 24) and spruce-fir-hardwoods (Type 20) (Table 4). However, spruce-fir is more prevalent in the Northern division, both in occurrence (90 per cent compared to 68 per cent) and in frequency as predominant cover (61 per cent compared to 43 per cent).

A greater number of cover types was found in the peripheries of yards in the Intermediate division (Table 5). Although the occurrence of northern hardwoods (Type 12), and hardwoods-spruce-fir (Type 2) was similar between divisions, the spruce-fir types (18 and 20) were again more prevalent in the northern division. Early succession types, aspen-gray birch (5) and paper birch (6) occurred more frequently in the Intermediate division.

Ratings of food conditions of cover types occurring in the nucleus of yards is given in Table 6a. To facilitate comparisons the frequency ratings were converted by assigning values of 100, 50 and 0 to "Good", "Fair" and "Poor" respectively with a summary rating obtained by dividing by the number of ratings in each type. Summary food ratings for types occurring in the nucleus (Table 6b) indicate the better food conditions are associated with hardwood-spruce-fir (21) and cedar-tamarack-spruce (24) types. However, food values vary with height and density classes. In general, the more mature, open stands received the highest ratings. An exception occurs in the cedar-tamarack-spruce type in which stands less than 35 feet high of all density classes were rated high. Ratings of the cover types in the two divisions were similar with no practical difference apparent.

Among the peripheral types, food conditions appeared best in the northern hardwoods, hardwood-spruce-fir, hemlock (Type 11) and cedar-tamarack-spruce types. As in the nucleus, height and density influence browse production with the best browse conditions occurring in open, mature stands (Table 7a & b).

Shelter values in the nucleus of the yards were high for all types in which conifers predominated, especially for spruce-fir and cedar-tamarack-spruce. In general the more mature, dense stands provided the best shelter. Stands which were either below 35 feet in height or with crown closure less than 40 per cent rated low as shelter (Table 8a & b).

A similar pattern of shelter values was noted in the periphery cover types. However, all hardwood types as well as coniferous types with less than 40 per cent crown closure lacked protective cover (Table 9a & b).

It is apparent that food and shelter values of deer yard forest cover varies by composition, height and density. Furthermore, high food and shelter values generally do not occur in the same cover types. The primary differences between Intermediate and Northern Climatic division yards lie in cover type occurrence rather than in food or shelter values of the specific types. However, the greater prevalence of spruce-fir types in the Northern division, in conjunction with low food rating of that type, would indicate a lower carrying capacity for the yards of that division.

Weather and Deer Activity

The winter of 1955-56 which began with the coldest December since 1917 developed into a relatively mild one for most of the State. January and February were usually warm with reoccurring thaws limiting snow accumulations.

Snow depths of two to three feet were not common in Northern Maine until mid-February, whereas, that amount was prevalent in early January the previous year. However, March was the snowiest on record and the coldest in 17 years. Snowfall distribution during March was the reverse of normal with Southern Maine receiving up to 30 inches more than the northern portion. Consequently, during the last two weeks of the month snow depths of 30 to 40 inches existed over the entire State.

In comparison to the one previous, the winter of 1955-56 apparently had little adverse effects upon the deer on the range in the Intermediate and Northern Climatic division. With the exception of a four to five week period from mid-March to mid-April snow depths did not seriously restrict deer travel. Consequently, the better feeding grounds in hardwood cuttings and open coniferous cover were used to a greater extent and with less effort expended than during a normal winter.

In contrast to the above, the central and coastal divisions experienced a winter more severe than usual. Snow depths of up to 40 inches accumulated from recurring storms in March resulting in confinement of deer to coniferous cover for a longer and later period than usual.

Observations of deer activity throughout the yarding season at selected study yards for the past three winters indicate that at least two types of concentrations occur. In one type, typical for the forest region, deer concentrate in the same area each winter and remain within the area until spring dispersal. At the other extreme, typical for the southern agricultural-woodland region, deer are more loosely concentrated and apparently roam over a large area appearing in specific sheltering cover only during periods of severe weather and maximum snow depths. However, there is not a distinct line of demarcation between the two types of behavior but rather a transition zone where both behavior patterns are known to occur. The boundaries of these zones are not definite but are delineated in Figure 5 on the basis of present knowledge.

In the forest region deer are usually concentrated in the yards by early January and remain in more or less confinement until a gradual dispersal occurs in April. Exceptions to this pattern have been noticed in which deer concentrate in an area, then move to another in mid-winter. Examples of this occurrence have been reported for several winters from various sections of the State. Severinghaus^{1/} interprets a similar occurrence in the Adirondacks of New York as an experimental process in which deer seek out areas offering the greatest physical comfort. Observations in Maine would substantiate the above, since in three instances deer moved from 1½ to 2 miles to areas offering better shelter. In all cases, the movements occurred immediately before or following heavy snowstorms.

Within the individual yards daily activity of the deer appears to be determined mainly by the relative degree of interspersion of food and shelter. Where feeding grounds and shelter are separated deer travel between the areas in trails, usually following the same course each winter, regardless of snow depths. On

1/. Severinghaus, C.W., "Springtime in New York - Another Angle", New York State Conservationist, 7:5, p.2-4, 1953.

the feeding grounds, or in yards having a high degree of interspersed food and shelter, movements are more random with trails not evident until snow conditions are such that deer sink from 18 to 24 inches. In yards occurring along streams or lakes, the bank and shore lines are extensively used as travel lanes, feeding sites and sunning spots. Daily distances ranged are not easily ascertained, however, round trips of two miles between bedding and feeding grounds have been noted. Evidence would also point to the other extreme in which deer remained relatively stationary, feeding and bedding in a clump of snow-bent cedars. In general, snow in which deer sink over 24 inches, breaking crusts, and high winds limit daily movements.

Shifts in centers of activity commonly occurred through the winter in the yards studied. These varied from 1/8 to 1 mile in a one week period and in part were responses to changes in accessibility to browse which in turn was affected by snow and weather conditions. As an example, heavy, wet snow which made travelling difficult in hardwood cover would increase the availability of cedar browse through breakage and bowing and cause a shift in cover use by deer. In this respect deer have repeatedly exhibited an opportunistic behavior, taking advantage of the most easily reached food supply within the limits of the sheltering cover required at the time.

Deer Mortality

Searches for dead deer were conducted at eleven over-browsed yards during April and May. Twenty-two carcasses were found in complete coverage of approximately two square miles. Of those, 6 mortalities were attributed to malnutrition, 2 to predation while the cause of death was not determined in the remainder (Table 10). A similar more intensive search of four yards in 1955 produced 13 mortalities on the 3 square miles covered. Of those, however, only the Little Black River yard was searched in 1956. No mortalities were found this year as compared to 6 per square mile in 1955.

Five of the 6 mortalities attributable to malnutrition which were found during the searches were located on Mount Desert Island, Hancock County. A report of the die-off which occurred on the island is on file at the Augusta office (C.F. Benesiek and J.W. Peppard, Deer Mortalities on Mount Desert Island During the Winter of 1955-56, May 31, 1956) is summarized for this report.

Mount Desert, an island of 113 square miles, has had a long history of deer eruptions and die-offs under a continual closed season. The current die-off centered about the 1947 "Bar Harbor burn" where small stands of coniferous cover now provide shelter for deer. Normally, winters are mild with average maximum snow depths of 12 inches, consequently, deer usually roam throughout the brush stage hardwoods surrounding the coniferous covers. In contrast, the past winter was unusually severe with continual snow cover of up to 40 inches from mid-January to mid-April. Confinement of deer to the coniferous cover for long periods depleted the browse supply and resulted in starvation. Twenty-nine mortalities were reported by the local game warden, of which 17 were directly attributable to malnutrition. In 4 additional cases malnutrition was contributing cause of death.

Recommendations:

The widespread occurrence of deer in excess of winter range carrying capacity in the delineated problem area demands a herd reduction for the long-range

welfare of both the deer and the range. Although range conditions are not critical at this time, the situation cannot be considered normal or self correcting.

Attaining an increased harvest in the problem area will be difficult since a liberal season is now in effect. However, a realignment of season dates and boundaries is necessary to increase hunting pressure in the problem area. Therefore, it is recommended that the State be sub-divided into three areas (Figure 6) with the following seasons:

Area I - October 15 - November 30

Area II - October 21 - November 30

Area III - November 1-30

Area I which is the most inaccessible portion of the problem region, would thereby be opened prior to the remainder of the State, and should receive the initial influx of hunters. The earlier opening will also provide a longer period during which travel by automobile, canoe and plane is uninhibited by the possibilities of freeze-ups and snow.

Area II includes the remainder of the range problem region and the trouble free broodstock country farming section. The major change from the present season would involve a 10-day shorter season in the farm-woodland portions of Franklin, Somerset and Penobscot counties and correspondingly longer season in the problem area portion of Oxford, Hancock and Washington counties. Transient hunters from the more populated southern farm-woodland section would thereby be channeled into the forest problem area by this manipulation of boundaries.

Area III includes all of the comparatively trouble-free southern farm-woodland region. Land-use trends and relatively high hunting pressure should continue to maintain this region in its present condition during the foreseeable future. The shorter season would not be expected to produce any major change in the kill in southern Franklin, Somerset and Penobscot counties. A similar shortening of the season in southern Oxford county in 1951 did not affect the deer kill trend in that section. Furthermore, continued surveillance of the kill trend and yard condition would detect any adverse effects of the shorter season.

In addition to the above changes, it is recommended that Mount Desert Island be opened to deer hunting to harvest an annual crop showing loss through recurring starvation.

Yard surveys should be continued in the Androscoggin, Dead, Fish, East Branch Penobscot and St. John drainages to supplement the information now on hand. A late spring or early summer check of the latter drainage by canoe should be attempted inasmuch as the area lacks roads or landing facilities for planes. In other parts of the State emphasis should be placed on securing trend information from a selected number of yards. This will necessitate quantitative data secured at three to five year intervals which can be analyzed statistically.

1/. Banasiak, C.F., Job Completion Report, Pittman - Robertson Project 37R, August 11, 1955, Maine Department of Inland Fisheries and Game, Augusta.

TABLE 1. RATINGS OF DEER YARDS SURVEYED IN 1956

Climatic Division	Deer Numbers vs. Carrying Capacity							
	Above		Equal to		Below		Totals	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Coastal			2	100			2	100
Central	2	40	2	40	1	20	5	100
Intermediate	20	40	19	38	11	22	50	100
Northern	17	37	27	42	20	31	64	100
State-wide	39	72	50	43	32	26	121	99

TABLE 2. RATINGS OF YARDS SURVEYED 1954 - 1956

Climatic Division	Deer Numbers vs. Carrying Capacity							
	Above		Equal to		Below		Totals	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Coastal	2	11	13	72	3	17	18	100
Central	6	8	48	66	19	26	73	100
Intermediate	50	29	101	58	24	14	175	100
Northern	50	32	77	49	30	19	157	100
State-wide	108	25	239	57	76	18	423	100

Table 3. Yard Conditions By Drainage Systems In The Problem Area

Drainage System	Deer Numbers vs. Carrying Capacity						Total
	Above		Equal to		Below		
	No.	%	No.	%	No.	%	
Allagash	6	29	12	57	3	14	21
Androscoggin	7	78	2	22	-	-	9
Arcoostook	9	36	12	48	4	16	25
Dead	4	57	3	39	-	-	7
Pen	-	-	-	-	-	-	-
Kennebec	6	32	11	58	2	11	19
Machias & Kennebec	6	35	15	65	-	-	23
Mattawamkeag	4	29	6	57	3	14	13
Moose	3	60	1	20	1	20	5
Panabesset	18	58	14	42	-	-	33
Kennebec, East Branch	5	56	4	44	-	-	9
Panabesset, West Branch	14	31	13	37	11	31	35
Piscataquis	8	28	16	55	5	17	32
St. Croix	3	25	4	38	2	17	12
St. John	2	100	-	-	-	-	2
Union & Narravangeaug	5	29	10	59	2	12	17
	100	38	128	49	32	12	260

TABLE 1. COVER TYPE OCCURRENCE IN THE NUCLEUS OF DEER YARDS BY CLIMATIC DIVISIONS, 1956

Type Name	Type Code	Intermediate				Northern			
		Occurrence		Dominant Cover		Occurrence		Dominant Cover	
		Number Yards	Percent Yards	Number Yards	Percent Yards	Number Yards	Percent Yards	Number Yards	Percent Yards
Asp. Gr. Birch	5								
Paper Birch	6								
N. Hdw. wh. pine	7								
White Pine	10								
Hemlock	11	5	11	1	2	1	2	1	2
Sinep. beech y. birch	12	6	13	-	-	-	-	-	-
Spruce-fir	18	32	68	20	43	53	90	36	61
Sp.-fir-hardwood	20	19	40	9	19	13	22	6	10
Hdw.-sp.-fir	21	4	9	4	8	5	8	2	3
Ced.-tam.-spruce	24	29	62	13	28	39	66	14	24
Tamarack	25	1	2	-	-	1	2	-	-
Birch-maple-elm	26	2	4	-	-	-	-	-	-
Totals				47	100			59	100

TABLE 5. COVER TYPE OCCURRENCE IN THE PERIPHERY OF DEER YARDS BY CLIMATIC DIVISIONS, 1956

Type	Type Code	Intermediate				Northern			
		Occurrence	Predominant	Cover	Occurrence	Predominant	Cover	Predominant	Cover
Name		Number Yards	Percent Yards	Number Yards	Percent Yards	Number Yards	Percent Yards	Number Yards	Percent Yards
Asp. Gr. Birch	5	8	19	5	12	2	4		
Paper Birch	6	7	16	4	9	2	4		
W. Hdw. wh. Pine	7	2	5	1	2				
White Pine	10	1	2	-	-	-	-		
Hemlock	11	2	5	1	2	2	4	1	2
Simp. beech y. birch	12	17	40	9	21	22	40	11	20
Spruce-fir	18	10	23	6	14	21	38	11	20
Sp.-fir-hardwood	20	7	16	1	2	25	45	14	25
Hdw.-sp.-fir	21	15	35	13	30	22	40	17	31
Ced.-tam.-spruce	24	7	16	3	7	4	7	-	-
Birch-maple-elm	26	3	7	-	-	2	4	1	2

43 99

55 100

TABLE 6a. FOOD RATINGS OF FOREST COVER TYPES OCCURRING IN THE NUCLEUS
OF DEER YARDS BY CLIMATIC DIVISIONS

Type Name	Type Code	Height Class	Intermediate Division			Northern Division		
			Density a P, U	Density b P, U	Density c P, U	Density a P, U	Density b P, U	Density c P, U
Whitepine	10	1						1
		2					1	
		3						1
Hemlock	11	1	1					
		2						
		3	2			1		
Sinen, beech y. birch	12	1		1				
		2			3			
		3						
Spruce-fir	18	1	5			5	1	6
		2	2	7	1	2	13	2
		3				2	1	1
Sp. fir-hardwood	20	1		2				
		2	2	1	1	2	2	1
		3						
Hdw. sp. flr	21	1	1	1		1	1	1
		2						
		3						
Ced. tsam. spruce	24	1	2	1	1	1	1	1
		2	1	3	1	1	2	2
		3	5	6	1	1	6	2
Birch-maple-elm	26	1						
		2						
		3						

Height Class Density
 1. 1-35 ft. a. 71-100% crown closure
 2. 35-64 ft. b. 61-70% crown closure
 3. 65 ft. and over c. 11-60% crown closure

*0 = Good
 F = Fair
 P = Poor

TABLE 6b.

SUMMARY FOOD RATINGS OF FOREST COVER TYPES OCCURRING IN THE NUCLEUS
OF DEER YARDS BY CLIMATIC DIVISIONS

Type Name	Type Code	Height Class	Intermediate Division			Northern Division		
			Density a	Density b	Density c	Density a	Density b	Density c
White Pine	10	1						0(1)
		2					0(1)	
		3						0(1)
Hemlock	11	1						
		2	0(1)*					
		3		50(2)			0(1)	
Sinep. beech y. birch	12	1						
		2		100(1)	50(3)			
		3						
Spruce-fir	18	1	0(5)			0(6)	25(6)	17(3)
		2	20(5)	28(16)	50(2)	5(29)	17(18)	33(9)
		3				0(2)	25(2)	50(2)
Sp.-fir-hardwood	20	1		50(2)	50(1)		8(1)	
		2	0(1)	50(6)	17(3)	0(2)	22(9)	50(2)
		3			50(1)			
Hdw.-sp.-fir	21	1					100(1)	
		2	50(1)	37(4)	100(1)	0(1)	83(3)	100(1)
		3						
Ced.-tam.-spruce	24	1	83(3)	0(1)	67(3)	62(4)	62(4)	57(7)
		2	28(9)	23(13)	50(1)	10(5)	33(15)	75(8)
		3						
Birch-maple-elm	26	1						
		2						
		3		0(1)				

*(1) Number of ratings

Scale of Ratings

0 - Poor

50 - Fair

100 - Good

TABLE 7a. FOOD RATINGS OF FOREST COVER TYPES OCCURRING IN THE
PERIPHERY OF DEER YARDS BY CLIMATIC DIVISIONS

Type Name	Type Code	Height Class	Intermediate Division									Northern Division								
			Density a			Density b			Density c			Density a			Density b			Density c		
			G*	F	P	G	F	P	G	F	P	G	F	P	G	F	P	G	F	P
Asp. Gr. Birch	5	2								1	3									
		3																		
Paper Birch	6	2			1	2	1	1												
		3																		
N. Hdw. Wh. Pine	7	2																		
		3					1													
		1					1													
White Pine	10	2																		
		3																		
		1																		
Hemlock	11	2				1									1					
		3					1													
		1							1	1										
Simp. beech	12	2		1	1		1		1	2	2		2	2	2	2	1	2		
y. birch		3													1	1	3	3		
		1										1	1	6		1	1	1		
Spruce-fir	18	2				1	5			1			2	6		2			1	
		3																		
		1													1	1				
Sp.-fir-hardwood	20	2					5	2					2	2	5	9	1	2	2	
		3								1			1	1	1			1		
		1							1											
Hdw.-sp.-fir	21	2				1		1		3			2	1	8	3	2	2	2	
		3					1		1					1		1	1	1	2	
		1		1							2						3			
Ced.-tam.-spruce	24	2			1		1	1		1										
		3																		
		1				1												1		
Birch-maple-elm	26	2																		
		3																		

* G - Good
F - Fair
P - Poor

TABLE 7b. SUMMARY FOOD RATINGS OF FOREST COVER TYPES OCCURRING IN THE
PERIPHERY OF DEER YARDS BY CLIMATIC DIVISIONS

Type Name	Type Code	Height Class	Intermediate Division			Northern Division		
			Density a	Density b	Density c	Density a	Density b	Density c
Asp. Gr. Birch	5	1			25(4)			
		2			50(1)			
		3						
Paper Birch	6	1						
		2	0(1)*	62(4)				
		3						
N. Hdw. Wh. Pine	7	1						
		2						
		3			50(1)			
White Pine	10	1			50(1)			
		2						
		3						
Hemlock	11	1				0(1)		
		2		100(1)			50(1)	
		3		50(1)				
Simp. beech y. birch	12	1			75(2)			
		2	25(2)	50(4)	40(5)	25(4)	60(5)	100(2)
		3				0(1)	25(4)	100(3)
Spruce-fir	18	1				19(6)	0(1)	75(2)
		2		58(6)	50(1)	12(8)	0(2)	0(1)
		3						
Sp.-fir-hardwood	20	1					25(2)	
		2		36(7)		0(2)	28(16)	40(5)
		3			0(1)	0(1)	75(2)	50(1)
Hdw.-sp.-fir	21	1		0(1)				
		2		50(2)	50(3)	0(2)	42(12)	50(6)
		3		50(1)	100(1)		50(1)	37(5)
Ced.-tam.-spruce	24	1	100(1)		0(2)			100(3)
		2	0(1)	25(2)	0(1)			
		3						
Birch-maple-alm	26	1		100(1)				50(1)
		2						
		3						

*(1) Number of ratings
Scale of Ratings
0 - Poor
50 - Fair
100 - Good

TABLE 8b. SUMMARY SHELTER RATINGS OF FOREST COVER TYPES OCCURRING IN THE NUCLEUS OF DEER YARDS,
BY CLIMATIC DIVISIONS

Type Name	Type Code	Height Class	Intermediate Division			Northern Division		
			Density 'a'	Density 'b'	Density 'c'	Density 'a'	Density 'b'	Density 'c'
White Pine	10	1 2 3					100(1)	100(1)
Hemlock	11	1 2 3	100(1)*				100(1)	
Simp. beech y. birch	12	1 2 3		100(1)	0(1) 0(2)			
Spruce-fir	18	1 2 3	83(6) 100(6)		79(16) 100(1)	75(8) 98(21) 100(2)	83(6) 83(15) 75(2)	0(2) 67(9) 50(2)
Sp.-fir-hardwood	20	1 2 3		50(1) 75(2) 62(4)		0(2) 0(1) 75(2)		78(9) 75(2)
Hdw.-sp.-fir	21	1 2 3			75(2)	0(1)	50(1) 67(3)	100(1)
Ced.-tan.-spruce	24	1 2 3	50(4) 90(5)	100(1) 86(14)	0(2) 50(1)	50(3) 86(7)	75(6) 62(12)	21(7) 67(6)
Birch-maple-elm	26	1 2 3			0(1)			

*(1) Number of ratings
Scale of Ratings
0 -- Poor
50 -- Fair
100 -- Good

TABLE 9a. SHELTER RATINGS OF FOREST COVER TYPES OCCURRING IN THE PERIPHERY
OF DEER YARDS BY CLIMATIC DIVISIONS

[illegible]

TABLE 9b. SUMMARY SHELTER RATINGS OF FOREST COVER TYPES OCCURRING IN THE PERIPHERY
OF DEER YARDS BY CLIMATIC DIVISIONS

Type Name	Type Code	Height Class	Intermediate Division			Northern Division		
			Density 'a'	Density 'b'	Density 'c'	Density 'a'	Density 'b'	Density 'c'
Asp. Gr. Birch	5	1			0(4)			
		2			0(1)			
		3						
Paper Birch	6	1						
		2	0(1)*	0(4)				
		3						
N. Hdw. Wh. Pine	7	1						
		2						
		3		0(1)				
White Pine	10	1		50(1)				
		2						
		3						
Hemlock	11	1						
		2						
		3			0(1)	100(1)	50(1)	
Simp. beech Y. Birch	12	1			0(2)			
		2	50(1)	0(4)	0(7)	0(3)	0(4)	0(4)
		3			0(1)	0(1)	0(3)	8(6)
Spruce-fir	18	1				75(8)		0(3)
		2	100(1)	90(5)	0(1)	100(7)	75(2)	0(1)
		3						
Sp.-fir-hardwood	20	1					0(2)	0(1)
		2		70(5)		75(2)	44(16)	50(3)
		3			0(1)	50(1)	75(2)	
Hdw.-sp.-fir	21	1		50(1)				
		2		33(3)	20(5)	50(2)	32(11)	17(6)
		3		0(1)				0(3)
Ced.-tam.-spruce	24	1		0(1)	0(2)			0(3)
		2	100(1)	100(2)	0(1)			
		3						
Birch-maple-elm	26	1		50(1)				0(1)
		2						
		3						0(1)

*(1) Number of ratings
Scale of ratings
0 - Poor
50 - Fair
100 - Good

TABLE 10. MORTALITIES FOUND IN DEAD DEER SEARCHES, 1956

County	Area Searched	Date	Acres Searched	Mortality Causes				Total
				Starvation	Predation	Unknown		
Arroostook	Little Black River	5/22-24	260	—	—	—	—	—
Hancock	*Mt. Desert Island	4/9-10	100	5	—	1	—	6
Oxford	Abbot Brook	4/25-26	210	—	—	2	—	2
Oxford	Beaver Ponds	4/26	56	—	—	—	—	—
	Middle Branch							
Piscataquis	Pleasant River	4/25-26	232	—	—	4	—	4
Piscataquis	Torey Brook	5/18	10	1	1	—	—	2
Somerset	**Little Lane Brook	4/17-18	106	—	—	—	—	—
Somerset	Canada Falls	4/17	33	—	1	1	—	2
Somerset	Holeb Pond	5/29	53	—	—	—	—	—
Somerset	Moose River	5/29+	130	—	—	6	—	6
Somerset	Fish Pond	4/23	75	—	—	—	—	—
Totals			1264	6	2	14	—	22

*Twenty-three additional mortalities reported of which 12 showed symptoms of malnutrition.

**Four mortalities reported by Warden of which 3 showed symptoms of malnutrition.

FIGURE 1. DEER YARDS SURVEYED, 1956

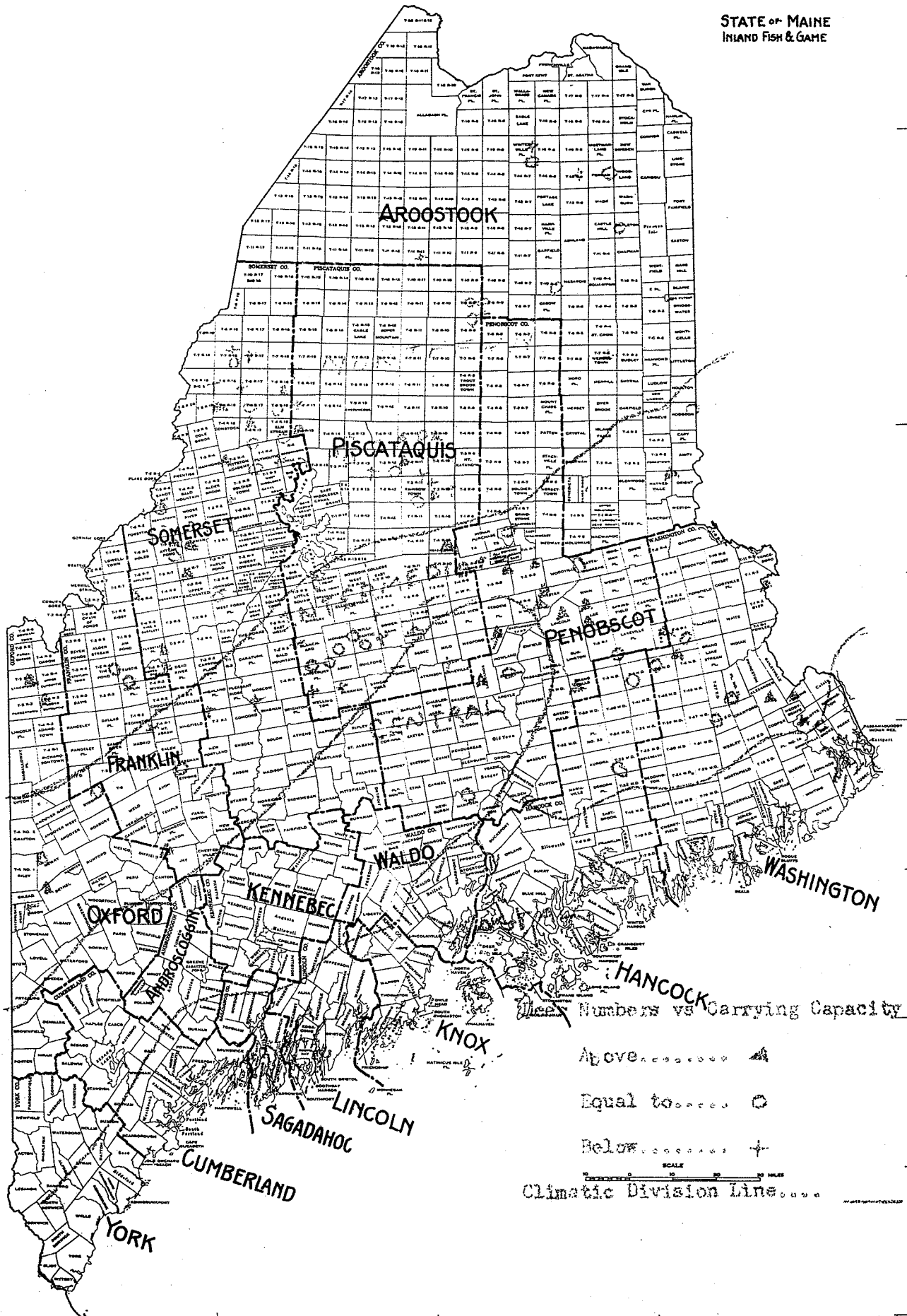
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FIGURE 2. YEARS RUNNYED 1951-56

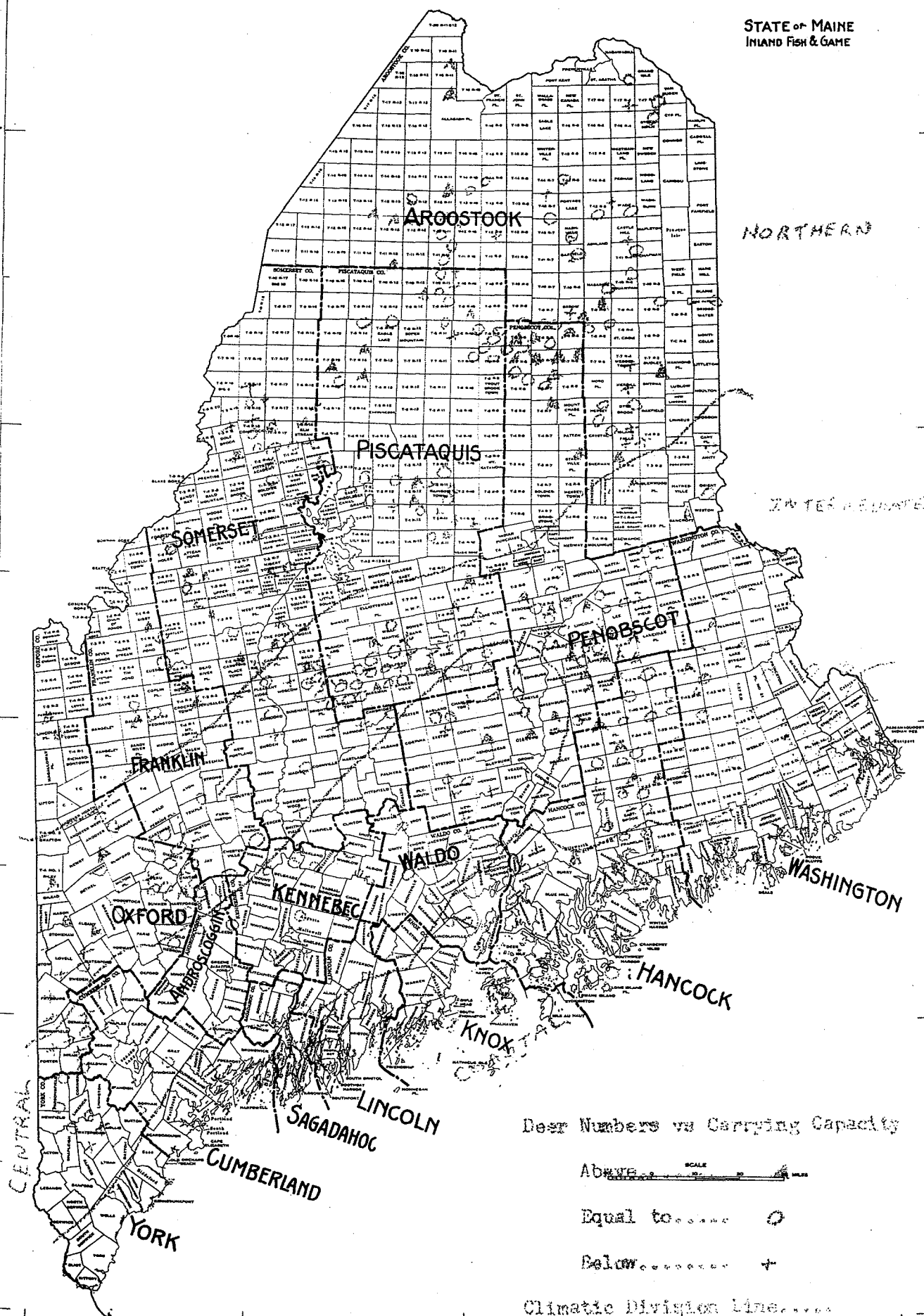
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FIGURE 3. COMPARISON OF WINTER RANGE PROBLEM AREA AND LAND-USE REGIONS

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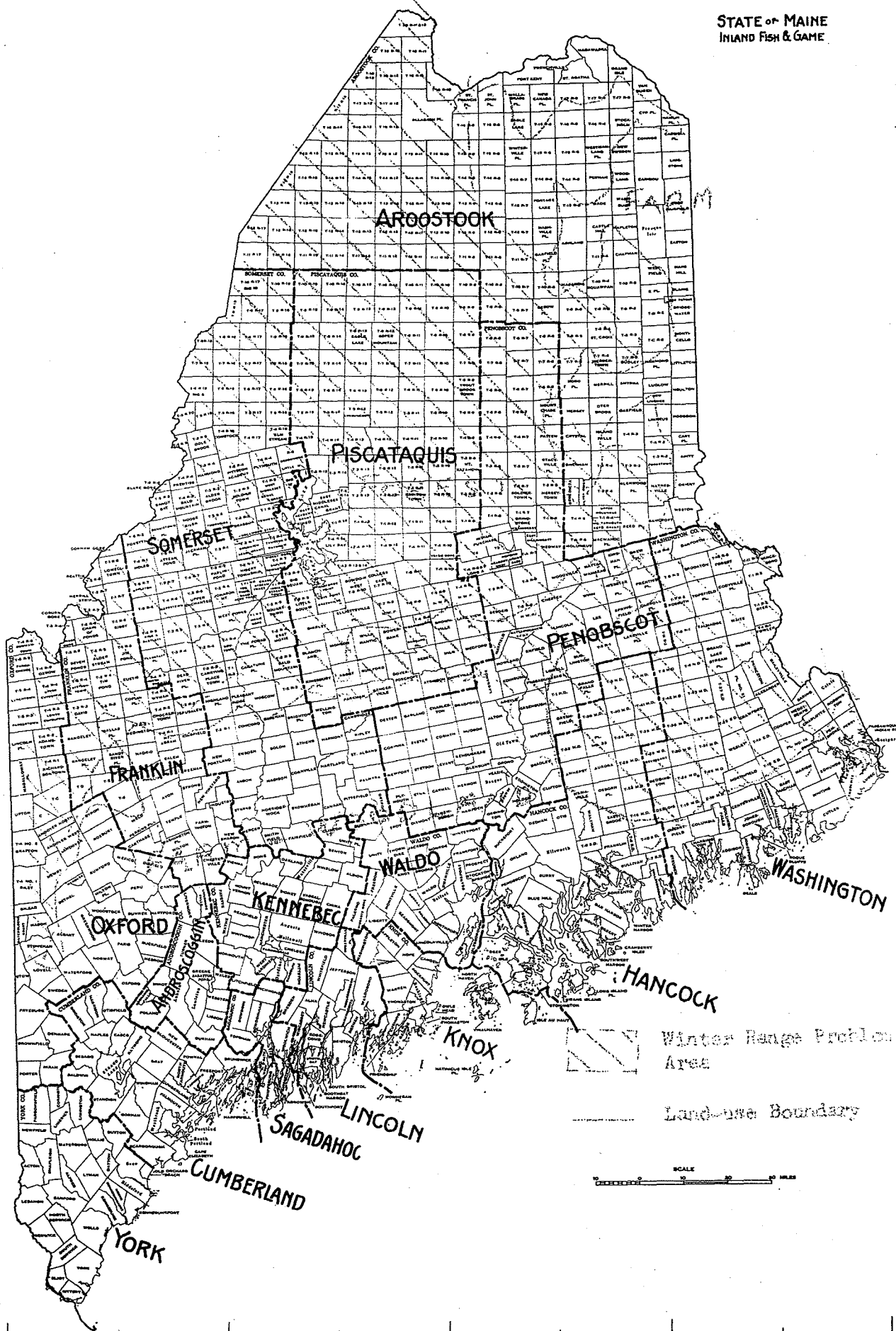
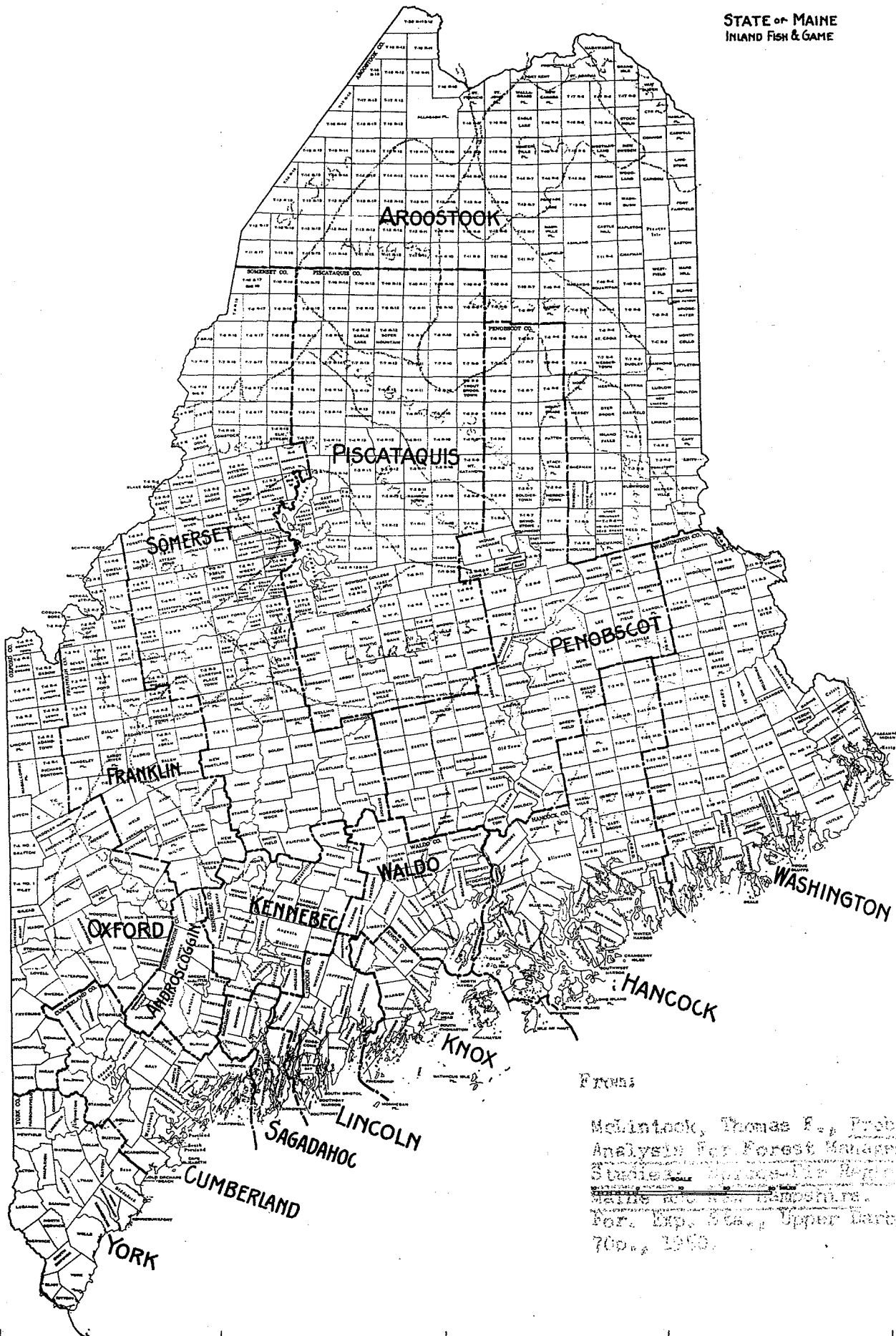


FIGURE 1. PRINCIPLE DRAINAGES OF THE DEER RANGE PROBLEM AREA

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From:

McIntock, Thomas F., Problem
Analysis for Forest Management
Studies. Bureau of Forest
Service, U.S. Department of
Agriculture, Washington, D.C.
For. Exp. Sta., Upper Mersey, Pa.
70p., 1940.

FIGURE 5. TYPE OF WINTER DEER CONCENTRATIONS

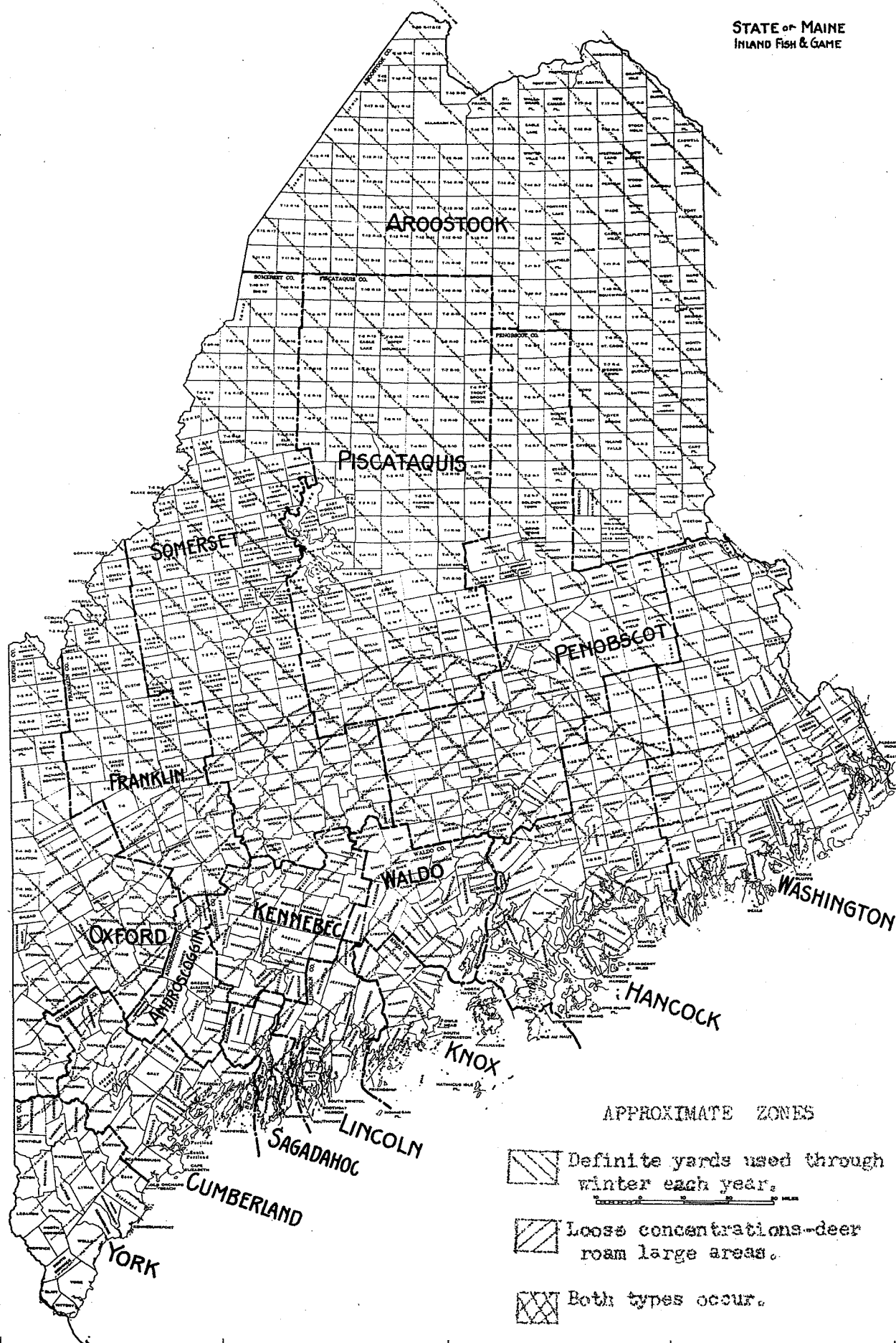
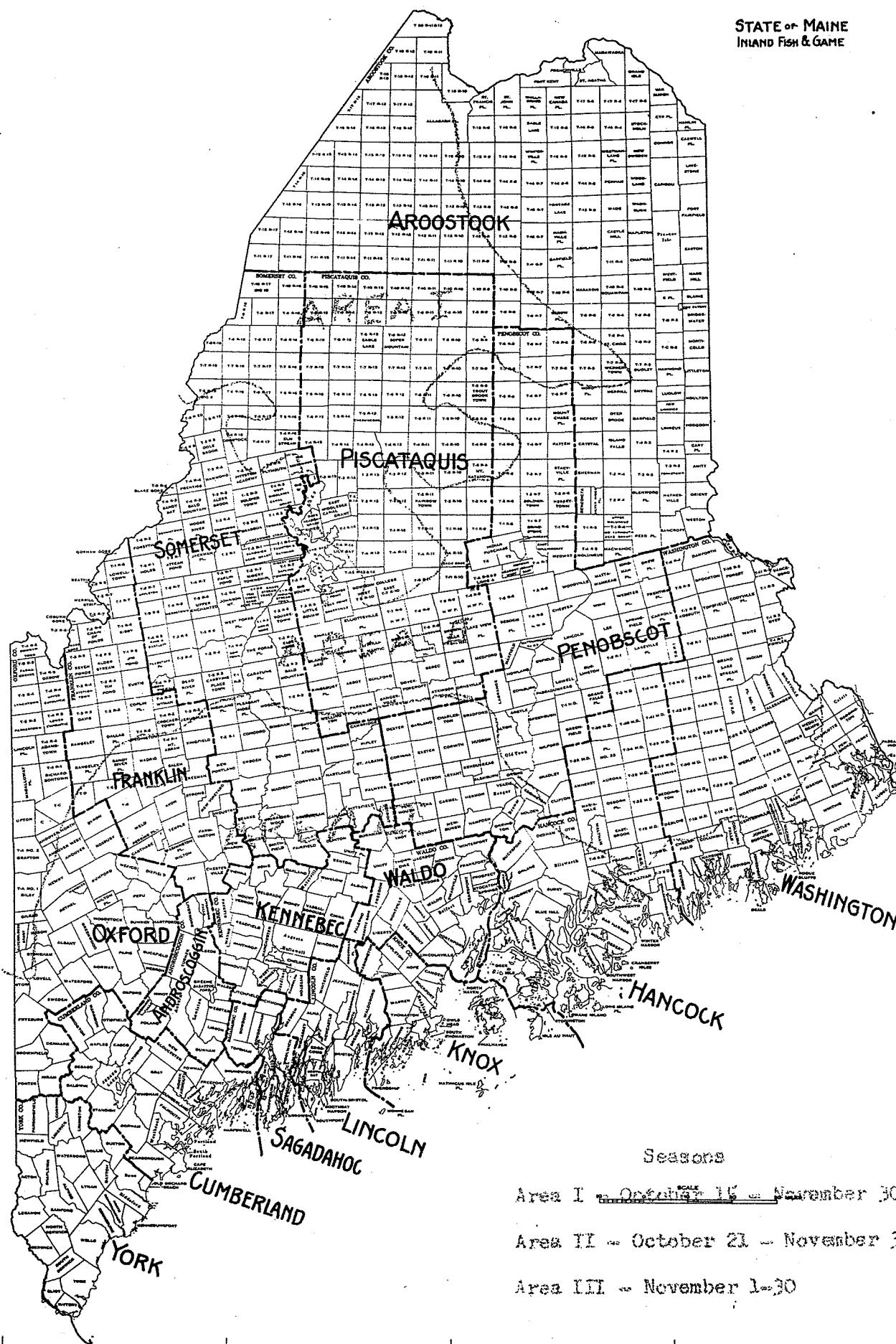
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FIGURE 6. PROPOSED DEER HUNTING SEASON AREAS

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APPENDIX I. FOREST COVER TYPES^{1/}

Code No.	Forest type or group name	Species included
5	Aspen - gray birch	Composition: Aspen, pin cherry, gray birch, red maple. Associates: Paper birch, balsam fir, red oak, yellow birch, white pine, white ash, sugar maple, and white oak.
6	Paper birch	Composition: Paper birch pure or predominating. Associates: Aspen, Balsam fir, red spruce, white pine, yellow birch, hemlock, red oak, red maple, and basswood.
7	Northern hardwood-white pine	Composition: White pine 25-49 percent of stand with sugar maple, yellow birch, and beech.
8	White pine - hardwood	Composition: White pine 50-74 percent of stand, with red oak, white ash, sugar maple, yellow birch, beech.
9	Oak - white pine	Composition: White pine 25-49 percent of stand, with white oak, red oak, and white ash. Associates: Chiefly red maple, others are basswood, yellow birch, large tooth aspen, sugar maple, beech, paper birch, black cherry, hemlock, and black birch.
10	White pine	Composition: White pine making up 75 percent or more of stand. Associates: Norway pine, pitch pine, gray birch, aspen, red maple, pin cherry, white oak, paper birch, black birch, yellow birch, black cherry, white ash, red oak, sugar maple, basswood, hemlock, red spruce, beech, chestnut oak, and yellow poplar.
11	Hemlock	Composition: Hemlock making up 50 percent or more of stand. Associates: Basswood, red maple, black cherry, white ash, balsam fir, red spruce, white pine, paper birch, black birch, red oak, and white oak.

1/. Anonymous. Forest Survey Field Manual. Northeastern States. U.S.D.A., Northeastern For. Exp. Sta., Upper Darby, Pa., 122p., 1949.

Code No.	Forest type or group name	Species included
12	Sugar maple - beech - yellow birch	Composition: Sugar maple, beech, yellow birch and basswood predominating. Associates: Red maple, hemlock, red oak, white ash, white pine, balsam fir, black cherry, paper birch, black birch, American elm, red spruce, and white oak.
18	Spruce - fir	Composition: Red spruce and balsam fir making up 75 percent or more of the stand. Associates: Paper birch, yellow birch, sugar maple, beech, red maple, hemlock, white ash, and in swamps; black spruce, tamarack, black ash, and northern white cedar.
20	Spruce - fir - hardwood	Composition: Spruce and fir being 50-74 percent of the stand, in mixture with hardwoods and other softwoods.
21	Hardwood - spruce - fir	Composition: Spruce and fir being 25-49 percent of the stand, in mixture with hardwoods and other softwoods. Associates: Yellow birch, red maple, paper birch, northern white cedar, sugar maple, beech, hemlock, jack pine, aspen and white pine.
24	Cedar - tamarack - spruce	Composition: Black spruce, northern white cedar, and tamarack predominating. Associates: Balsam fir, black ash, red maple, paper birch, yellow birch, white pine, hemlock, and aspen.
25	Tamarack	Composition: Tamarack, pure or predominating.
26	Black ash - maple - elm	Composition: Black ash, American elm, and red maple predominating. Associates: Yellow birch, black gum, sycamore, tamarack, black spruce, white ash, hemlock, burr oak, swamp white oak, and silver maple.
35	Scrub oak	Composition: Bear oak, pure or predominating. Associates: Pitch pine, white pine, short-leaf pine, other oaks, black locust, red maple, sassafras, and black gum.

APPENDIX II. DEER STAG BRIGHT AND DENSITY CLASS

Height

Class 1 - up to 35 feet

2 - 35 to 60 feet

3 - over 65 feet

Density

Class a - 71-100 per cent crown closure

b - 41-70 per cent crown closure

c - 11-40 per cent crown closure

Prepared by _____
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Approved by _____
Roland H. Cobb

Title _____
Deer Research Leader

Title _____
Commissioner

Date _____
August 27, 1956