HARVARD BLACK ROCK FOREST

W H I T E T A I L D E E R M A N A G E M E N T

1984 - 1988

by

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MICHAEL KITZ

THE BLACK ROCK FOREST

The Black Rock Forest was best described in 1930, by Forest Bulletin No. 1, "The Black Rock Forest" by Henry H. Tryon. The former forest director's introduction and forest history reads as such:

DESCRIPTION

"The Black Rock Forest lies in the upper limits of the Highlands of the Hudson, about 1 1/2 miles West of the Hudson River. It is partly in the town of Cornwall and partly in the town of Highlands. Good woods roads, passable by automobile, enter the tract from the villages of Cornwall and Highland Falls. A network of excellent foot trails covers the entire Forest, making it easily accessible.

Excepting the coves, benches, and swampy areas, the Forest is in the main rough, stony land and rock outcrop. The uneven topography, coupled with the rather uniformly granular quality of the soil results in good surface drainage. The good, black soils are generally limited to the valley bottoms and coves. With these last two exceptions, virtually the entire area may be accurately classified as sub-marginal land. The drainage is all to the Hudson River. Gloucester silt loam and Dutchess stonly loam are frequently.

The topography is rugged and mountainous, with irregular steep-sided valleys running about northeast and southwest. Elevations range from a minimum of 450 feet (at the north end of the Forest) to 1461 feet on the summit of Spy Rock. The slopes vary from gradual to precipitous. Exploitation will be difficult in some areas.

Both the Old West Point Road and the Continental Road were much-used public highways in the days of horse-drawn traffic. The various trails shown were once woods roads used formerly in getting out cordwood. Today they are kept clear of brush and passable only with teams or on foot.

The Forest includes seven ponds. One of these, the Aleck Meadow Reservoir, occupies what was once a small dairy farm, and now serves as the public water supply for the villages of Cornwall and Cornwall-On-Hudson. Of the other six ponds, Sutherland is a natural lake, Jim's, Arthur's, Tamarack and Sphagnum having been built since 1915. During the last two years the beaver have made another pond."

HISTORY

"Settlement began here circa 1694. The Old Continental Road, which practically bisets the Forest from north to south was used by portions of the Continental Army during the campaigns in the Hudson Valley area. Today there are no permanent structures on the forest, although several old cellar-holes and house foundations are still discernible.

It was a community where agriculture and dairying went hand in hand

with the exploitation of various minor forest products. Previous to the Revolution many charcoal pits were operated hereabouts. In fact, this particular industry was well maintained until after the middle of the nineteenth century, when the development of the destructive distillation of hardwoods liberated cheap, high-grade charcoal in such amounts as to render the open-pit process unprofitable. River freight traffic, furnishing an outlet for farm products, wood, hoop poles, bricks and livestock from surrounding hinterland flourished rather extensively until the completion of the Erie railroad in 1837.

Railroad ties have been cut sporadically and in steadily decreasing numbers. In consequence, the old trade of "tie-hacking" is slowly dying out. Cordwood, both for domestic use and for the brickyards along the Hudson was formerly cut in large quantities, but today the few remaining brick plants are turning to coal and fuel oil. The increasing household use of coal, gas, or electricity for cooking and heating combined with the marked tendency to build smaller and more compact dwellings, without fireplaces and equipped with a central heating plan using either coal or fuel oil have served vastly to reduce the comsumption of wood as fuel.

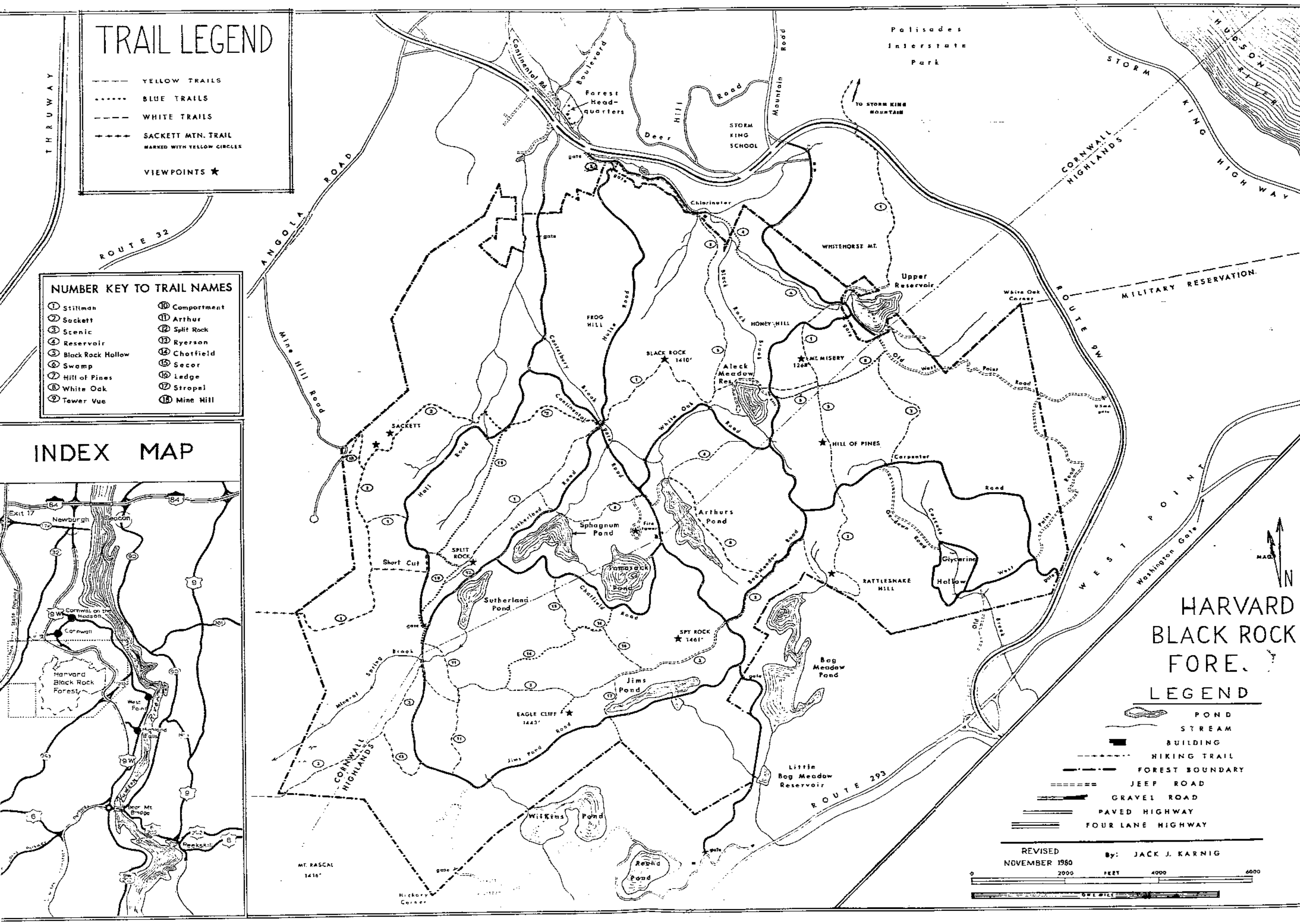
Chestnut posts, poles, and ties were also cut in considerable quantities, but the thorough-going invasion by the Chestnut bark blight has effectively terminated this traffic except for an occasional load of posts. There has been occasional portable mill set, cutting a few thousand feet of rough hardwood plank, timbers or wagon stock, but today these opportunities are rare.

Agriculturally, this section shifted about 1864 from dairying to the production of small fruits, while a number of acres have been abandoned and permitted to revert to forest cover a various sorts. Fifty years ago the amount of cleared land was far greater than now.

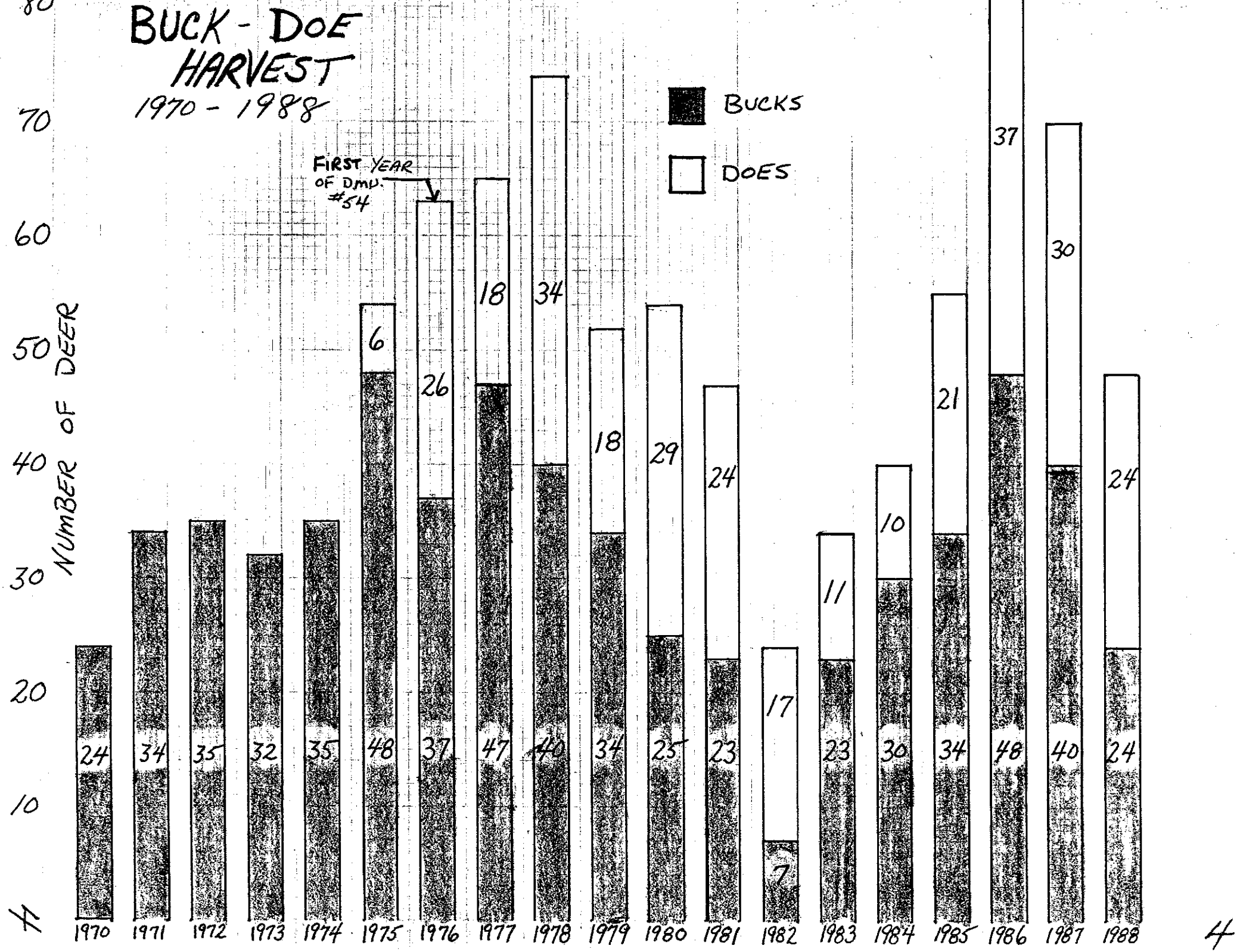
As it now stands, the Black Rock Forest is an excellent example of the mixed hardwood stands of the Hudson Highland portion of the Sprout Hardwood Region."

PRESENT

Since the writings of Henry H. Tryon in 1930 the forest has gone through a constructive transformation. Black Rock Forest has now grown to over 3600 acres. The forest has been compartmentalized into 32 units. Silvicultural treatments intensified since the forest was bequeathed to Harvard University by Dr. Ernest G. Stillman in 1949. (Although Harvard had been involved since the forests establishment in 1927.) Cuttings decreased in the early 1960's and continued to slow through the 1970's. Presently only small logging operations are undertaken with reduced but continuous thinnings. Today, the major forest use is recreational.


HARVARD BLACK ROCK FORE.
LEGEND
POND
STREAM
BUILDING
HIKING TRAIL
FOREST BOUNDARY
JEEP ROAD
GRAVEL ROAD
PAVED HIGHWAY
FOUR LANE HIGHWAY
REVISED NOVEMBER 1980
By: JACK J. KARNIG
0 2000 FEET 4000 6000
TRAIL LEGEND
YELLOW TRAILS
BLUE TRAILS
WHITE TRAILS
SACKETT MTN. TRAIL
MARKED WITH YELLOW CIRCLES
VIEWPOINTS ★
NUMBER KEY TO TRAIL NAMES
① Stillman
② Sackett
③ Scenic
④ Reservoir
⑤ Black Rock Hollow
⑥ Swamp
⑦ Hill of Pines
⑧ White Oak
⑨ Tower Vue
⑩ Compartment
⑪ Arthur
⑫ Split Rock
⑬ Ryerson
⑭ Chatfield
⑮ Secor
⑯ Ledge
⑰ Stropel
⑱ Mine Hill
INDEX MAP
Exit 17
Newburgh
Beacon
Cornwall on the Hudson
Cornwall
Harvard Black Rock Forest
West Point
Highland Falls
Bear Mt Bridge
Peekskill
THRUWAY
ROUTE 32
ANGOLA ROAD
Mine Hill Road
Continental Rd.
Boulevard
Forest Head-quarters
Deer Hill Road
Mountain Road
STORM KING SCHOOL
Palisades Interstate Park
TO STORM KING MOUNTAIN
STORM KING HIGHWAY
HUDSON RIVER
CORNWALL HIGHLANDS
MILITARY RESERVATION
ROUTE 9W
WEST POINT
Washington Gate
ROUTE 293
WHITEHORSE MT.
Upper Reservoir
White Oak Corner
HONEY HILL
Chlorinator
Black Rock Brook
FROG HILL
Hulse Road
Canterbury Brook
Continental Road
BLACK ROCK 1410'
Aleck Meadow Res.
MT. MISERY 1268'
HILL OF PINES
Old West Point Road
Carpenter Road
Cascade
Glycerine Hollow
West Point Road
RATTLESNAKE HILL
White Oak Road
Arthurs Pond
Bog Meadow Road
Sphagnum Pond
Fire Tower
Tamarack Pond
Chatfield Road
Sutherland Road
Sutherland Pond
SPLIT ROCK
Short Cut
SACKETT
Hall Road
SPY ROCK 1461'
Jims Pond
Jims Pond Road
EAGLE CLIFF 1443'
Mineral Spring Brook
Bog Meadow Pond
Little Bog Meadow Reservoir
Wilkins Pond
Round Pond
MT. RASCAL 1416'
Hickory Corner
gate

BUCK - DOE HARVEST 1970 - 1988



BLACK ROCK FISH AND GAME CLUB

Forest records show written forest use agreements with the Fish and Game Club dating back to 1950.

The Club maintains a patrol system adequate for the purpose of preventing fires and protecting the forest against trespassers. In return Club members are given the priviledge to hunt large and small game in Black Rock Forest. Black Rock Fish and Game Club has also been involved in fish stockings, wildlife habitat treatments and a snowshoe hare stocking.

The Club's membership has grown to well over 1300 members. This growth in membership combined with other factors led to the establishment of a gatekeeper's post in 1970. The gatekeeper is responsible for registering members, entering and exiting the forest. He must also collect daily data such as number of hunters, cars passing through the gate, time of entry and exit from gate, badge numbers, vehicle identification and hunting results.

This method has proven adequate to maintain and regulate hunting activities to club members only.

All hunters must be licensed to hunt in New York State and abide by its laws.

HUNTING SEASONS

Up to the present, all hunting seasons have corresponded with New York State laws, regulations, bag limits and seasonal dates. 1989 hunting regulations will be as follows:

1. All gun hunting is limited to the period, November 1 through December 15.
2. Archery season is limited to the first weekend of each season and resumes on November 1 until December 15. Bowhunters are excluded from that portion of the Forest west of Continental Road.
3. Big game gun season will remain consistant with New York State dates. (3rd Monday in November to 2nd Tuesday in December.

DEER STATION

The Black Rock Forest Deer Station is recognized by the New York State Department of Environmental Conservation and abides by its rules and regulations. The station is located at the main entrance to the forest along side the Fish and Game Club gate keeper trailer. The gatekeeper is present every day of the hunting season during hunting hours. All hunters must sign in and sign out. All deer are aged by John Brady (918) or Tory Faurot (925). The information taken from harvested deer are: sex, age, points, beam diameter, heart girth and weight along with hunter's name, tag number, zip code, date and weather. Adult females 3 1/2 years of age and over we will usually extract one side of the lower jaw for accurate aging. This station is the source of our most accurate data and is treated as such.

RANGE FACTORS

1. Mast Crops

1984 - Excellent
1985 - 3rd Excellent acorn crop in a row
1986 - Very poor
1987 - Poor
1988 - Slight

2. Gypsy Moth

After the total defoliation in 1981 a highly unusual period of three years displayed an excellent acorn crop in both oak groups (red and white), with a crop in 1985 to rival any recent memory of a larger one. A resurgence of Gypsy moth materialized in 1985, heavily defoliating 23 acres. In 1986, 835 acres were defoliated. 1987 and 1988 had little or no defoliation.

The secondary effect of these defoliations was the mortality of many dominate and co-dominate oaks. Thus creating openings for light to pass through to the forest floor, giving rise to mostly grass and fern. The major form of oak reproduction in this forest is from sprouting and suckering, from live cut or damaged trees. This type of mortality, brought on by the Gypsy moth, does not allow for oak regeneration. This problem, if it persists, may eventually alter the forest type here in the Hudson Highlands. Favoring species more tolerant to gypsy moth, such as; Tulip Poplar, Hickory, Maples and Birch.

3. Silvicultural Treatments

1985 -	15 acres logged	33 thinned	48 treated
1986 -	20 acres logged	20 thinned	40 treated
1987 -	20 acres logged	27 thinned	47 treated
1988 -	0 acres logged	18 thinned	18 treated

4. Natural

October 4, 1987 - Black Rock's higher elevations (1/2 of forest) was hit with 6-8 inches of wet snow and ice. Breakage and blowdowns were excessive.

5. Precipitation Norm 48.37

1984 - 53.69
1985 - 44.28
1986 - 47.84
1987 - 50.16
1988 - 43.79

MANAGEMENT TECHNIQUE

At this point the harvest data is the most valuable and accurate data available to manage the Whitetails at Black Rock Forest. The actual condition of the herd is deduced from the harvest data with spotlight and tracking index's as re-enforcing indicators.

Deer management techniques can not be properly applied at this point due to variable and non-existing data. Carrying capacity cannot be calculated through range study due to time and expense, this is also the case why other more reliable censusing is not done.

MORTALITY

Hunting, including crippling losses (death indirectly due to hunting) is the greatest mortality factors. Hunting is responsible for removing 20-25% of the deer population.

Natural Mortality - Order of Magnitude

DOGS & COYOTES: These canines are by far the greatest form of natural mortality. In the spring of '88 a surprising low spotlight count of fawns surely felt the effect of a progressive coyote population. Coyotes are now re-established as a Whitetail preditore in the Hudson Highlands and must be noted in management procedures. Dogs have been a constant predator of deer here for sometime and their legacy of torturous death can be seen in the woodland and ice covered ponds every winter. When victims are found, the location of kill and predatore involved are recorded along with age and sex.

AUTOMOBILES: Easily the second form of natural mortality. Route 9W which borders the eastern part of the forest claims its share of victims. A newly erected concrete median has claimed added amounts of fawns in early summer. These victims are aged and sexed when possible.

STARVATION: Of the deer examined from natural mortality few showed signs of bone marrow degeneration of which usually fawns displaying early stages.

NATURAL MORTALITY such as disease, parasites, abnormalities, etc have not been knowlingly observed.

NATURAL MORTALITY

	1986	1987	1988
ROAD KILLS	1 Doe-5 1/2yrs	6 Doe-3 1/2 yrs Doe-Fawn (3) Buck-2 1/2yrs Buck - Fawn	7 Doe - Fawn Doe - Adult Buck- Fawn Buck - 2 1/2 yrs (3) Unknown
CANINE KILLS (Dogs-Coyote)	1 Doe-5 1/2yrs	7 (3) Doe-Fawn Doe-8 1/2 yrs Doe-2 1/2 yrs Doe-Adult Buck-Fawn	5 Doe-8 1/2 yrs Doe-2 1/2 yrs Doe-6 1/2 yrs (2) Unknown
UNKNOWN NATURAL MORTALITY	-	5 (2) Doe-Fawn Buck-Fawn (2) Unknown	2 Doe-1 1/2 yrs Unknown

D E E R H U N T I N G R E P O R T
H A R V A R D B L A C K R O C K F O R E S T

(Approximate 3600 acres - 6 sq.miles)

YEAR	1984	1985	1986	1987	1988
MALE HARVEST BY AGE CLASS					
FAWN	0	6	8	7	2
YEARLING	22	32	37	22	14
ADULT	7	7	11	11	8
TOTAL	29	45	56	40	24
FEMALE HARVEST BY AGE CLASS					
FAWN	1	3	4	4	3
YEARLING	5	2	5	1	3
ADULT	4	9	20	24	18
TOTAL	10	14	29	29	24
AVERAGE WEIGHT (lbs.) BY AGE CLASS - MALES (1)					
FAWN	-	56	45	40	44
YEARLING	89	85	84	82	84
ADULT	116	116	118	104	96
AVERAGE WEIGHT (lbs.) BY AGE CLASS - FEMALE (2)					
FAWN	50	48	33	44	49
YEARLING	92	75	74	62	76
ADULT	106	81	83	78	88
AVERAGE BEAM DIAMETER (mm) (2)					
YEARLING	17.0	17.8	16.1	15.0	15.0
ADULT	24.7	25.1	24.8	20.2	18.7
AVERAGE ANTLER POINTS					
YEARLING	2.5	3.3	3.2	2.4	3.0
ADULT	6.9	6.9	6.5	4.8	4.5
YEARLING MALE FREQUENCY					
NUMBER	22	32	37	22	14
%	76	82	77	66	64
FEMALES 3 1/2 AND OLDER IN TOTAL AGED FEMALE HARVEST (4)					
NUMBER	3	4	13	16	12
%	30	28	45	55	50
ADULT FEMALE TO ADULT MALE HARVEST RATIO (3)					
AF/AM	.34	.28	.52	.76	.95
MALE HARVEST PER SQUARE MILE (3)					
AM/SM	4.8	6.5	8.0	5.5	3.7

(1) ALL INTERNAL ORGANS REMOVED
(2) MEASURED ONE INCH ABOVE BURR
(3) FAWNS AND UNKNOWN AGED DEER NOT INCLUDED IN CALCULATIONS
(4) UNKNOWN AGED DEER NOT INCLUDED

HARVEST DATA

AGE STRUCTURE

1984

	AGE	BUCKS		DOES		TOTAL	
ADULT	5 mos.	-		-		0	
	5-6 mos.	-		-		0	
	6 mos.	-		1		1	
YEARLING	1yr. 5mos.	7		3		10	
	1yr. 6mos.	4	22	0	5	4	27
	1yr. 7mos.	11		2		13	
ADULT	2 1/2 yrs.	5		1		6	
	3 1/2 yrs.	2		0		2	
	4 1/2 yrs.	0		1		1	
	5 1/2 yrs.	0	7	0	4	0	11
	6 1/2 yrs.	0		0		0	
	7 1/2 yrs.	0		1		1	
	8 1/2-9 1/2yrs	0		1		1	
	10 1/2 +	0		0		0	
	TOTALS	29		10		39	

1985

	AGE	BUCKS		DOES		TOTAL	
FAWN	5 mos.	3		0		3	
	5-6 mos.	0		0		0	
	6 mos.	3		3		6	
YEARLING	1yr. 5mos.	8		0		8	
	1yr. 6mos.	14	32	1	2	15	34
	1yr. 7mos.	10		1		11	
ADULT	2 1/2 yrs.	3		5		8	
	3 1/2 yrs.	4		3		7	
	4 1/2 yrs.	0	7	1	9	1	16
	5 1/2 yrs.	0		0		0	
	6 1/2 yrs.	0		0		0	
	7 1/2 yrs.	0		0		0	
	TOTALS	45		14		59	

H A R V E S T D A T A

A G E S T R U C T U R E

1 9 8 6

	AGE	BUCKS		DOES		TOTAL	
FAWN	5 mos.	2		1		3	
	5-6 mos.	2		1		3	
	6 mos.	4		2		6	
YEARLING	1yr. 5mos.	11)		0)		11)	
	1yr. 6mos.	18)	37	2)	5	20)	42
	1yr. 7mos.	8)		3)		11)	
ADULT	2 1/2 yrs.	9)		7)		16)	
	3 1/2 yrs.	2)		4)		6)	
	4 1/2 yrs.	0)		1)		1)	
	5 1/2 yrs.	0)	11	3)	20	3)	31
	6 1/2 yrs.	0)		2)		2)	
	7 1/2 yrs.	0)		2)		2)	
	8 1/2-9 1/2yrs	0)		-)		-)	
	10 1/2 +	0)		1)		1)	
	TOTALS	56		29		85	

1 9 8 7

	AGE	BUCKS		DOES		TOTAL	
FAWN	5 mos.	4		1		5	
	5-6 mos.	1		0		1	
	6 mos.	2		3		5	
YEARLING	1yr. 5mos.	10)		1)		11)	
	1yr. 6mos.	9)	22	0)	1	9)	23
	1yr. 7mos.	3)		0)		3)	
ADULT	2 1/2 yrs.	10)		8)		18)	
	3 1/2 yrs.	1)		6)		7)	
	4 1/2 yrs.	0)		5)		5)	
	5 1/2 yrs.	0)	11	1)	24	1)	35
	6 1/2 yrs.	0)		2)		2)	
	7 1/2 yrs.	0)		2)		2)	
	8 1/2-9 1/2yrs	0)		0)		0)	
	10 1/2 +	0)		0)		0)	
	TOTALS	40		29		69	

H A R V E S T D A T A

A G E S T R U C T U R E

1 9 8 8

	AGE	BUCKS		DOES		TOTAL	
FAWN	5 mos.	2		2		4	
	5-6 mos.	0		0		0	
	6 mos.	0		1		1	
YEARLING	1yr. 5mos.	8		2		8	
	1yr. 6mos.	2	13	0	3	2	16
	1yr. 7mos.	5		1		6	
ADULT	2 1/2 yrs.	8		6		14	
	3 1/2 yrs.	0		4		4	
	4 1/2 yrs.	0		5		5	
	5 1/2 yrs.	0	8	0	18	0	26
	6 1/2 yrs.	0		2		2	
	7 1/2 yrs.	0		1		1	
	8 1/2-9 1/2yrs	0		0		0	
	10 1/2 +	0		0		0	
	TOTALS	23		24		47	

WHITETAIL DEER HARVEST

BY AGE CLASS

--1984--

AGE CLASS	NUMBER HARVESTED	AVERAGE WEIGHT (lbs.)	BEAM DIAMETER
BUCKS			
Fawns	-	-	-
Yearlings			
1 yr.5mo.	7	87	16
1 yr.6mo.	4	89	17.5
1 yr.7mo.	11	92	17.2
Totals	22		
Averages		89	16.1
Adults			
2 1/2yrs.	7	115	24.7
DOES			
Fawns	1	50	
Yearlings	5	92	
Adults	4	106	

--1985--

AGE CLASS	NUMBER HARVESTED	AVERAGE WEIGHT (lbs.)	BEAM DIAMETER
BUCKS			
Fawns	6	56	-
Yearlings			
1 yr.5mo.	7	88	19.2
1 yr.6mo.	13	91	17.5
1 yr.7mo.	9	85	17.1
Totals	29		
Averages		85	17.8
Adults			
2 1/2yrs.	7	116	25.1
DOES			
Fawns	3	48	
Yearlings	1	75	
Adults	8	81	

--1986--

AGE CLASS	NUMBER HARVESTED	AVERAGE WEIGHT (lbs.)	BEAM DIAMETER
BUCKS			
Fawns	8	45	
Yearlings			
1 yr.5mo.	11	81	15.3
1 yr.6mo.	18	83	16.0
1 yr.7mo.	8	90	17.5
Totals	37		
Averages		84	16.1
Adults			
2 1/2 yrs +	11	118	24.8
DOES			
Fawns	4	33	
Yearlings	5	74	
Adults	18	83	

--1987--

AGE CLASS	NUMBER HARVESTED	AVERAGE WEIGHT (lbs.)	BEAM DIAMETER
BUCKS			
Fawns	7	40	
Yearlings			
1 yr.5mo.	9	75	13.8
1 yr.6mo.	9	90	16.6
1 yr.7mo.	3	80	14.0
Totals	21		
Averages		82	15.0
Adults			
2 1/2 yrs +	11	106	20.8
DOES			
Fawns	4	44	
Yearlings	1	62	
Adults	24	79	

WHITETAIL DEER HARVEST

BY AGE CLASS

-- 1988 --

AGE CLASS	NUMBER HARVESTED	AVERAGE WEIGHT (lbs.)	BEAM DIAMETER
BUCKS			
Fawns	1	44	
Yearlings			
1 yr.5mo.	6	76	13.4
1 yr.6mo.	2	74	13.0
1 yr.7mo.	5	98	17.4
Totals	13		
Averages		84	15.0
Adults			
2 1/2yrs.	8	96	18.7
DOES			
Fawns	3	49	
Yearlings	3	76	
Adults	16	88	

SEX FREQUENCY DISTRIBUTION BY YEAR CLASS FOR DEER KNOWN TO HAVE BEEN REMOVED*

	1984		1985		1986		1987		1988		KNOWN MORTALITY MISCELLANEOUS		MIN. POP KNOWN		TOTAL
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
1973													0	0	0
1974													0	0	0
1975													0	0	0
1976		1				1							0	2	2
1977		1											0	1	1
1978												1	0	1	1
1979						2							0	2	2
1980		1				2		2				1	0	6	6
1981	2			1		3		2		1			2	7	9
1982	5	1	4	3		1		1		2		1	9	9	18
1983	22	5	3	5	2	4		5					27	19	46
1984		1	32	2	9	7	1	6		5		1	42	22	64
1985			6	3	37	5	10	8		4	3	2	56	22	78
1986					8	4	22	1	8	6	3	6	41	17	58
1987							7	4	13	3	1	2	21	9	30
1988									2	3			2	3	5
TOTAL	29	10	45	14	56	29	40	29	23	24	7	14	200	120	320

*The data represent the population composition each year at the time fawns were born.

H A R V E S T D A T A

A V E R A G E W E I G H T B Y A G E C L A S S

1 9 8 4 TO 1 9 8 8

B U C K S

	AGE		NUMBER		AVERAGE WEIGHT (HOG DRESSED IN LBS.)
FAWN	5 mos.		10		41.0
	5-6 mos.		3		44.0
	6 mos.		9		53.0
		TOTAL	22	FAWN AVG	46
YEARLING	1yr 5mos.		40		81.5
	1yr 6mos.		46		86.6
	1yr 7mos.		36		89.8
		TOTAL	122	YEARLING AVG	85.9
ADULT	2 1/2 yrs.		35		105.9
	3 1/2 yrs.		9		128.3

D O E S

	AGE		NUMBER		AVERAGE WEIGHT (HOG DRESSED IN LBS.)
FAWNS	5 mos.		3		32.3
	5-6 mos.		1		45.0
	6 mos.		10		46.4
		TOTAL	14	FAWN AVG	43.3
YEARLING	1yr 5mos.		6		78.5
	1yr 6mos.		2		69.0
	1yr 7mos.		7		83.7
		TOTAL	15	YEARLING AVG	79.6
ADULTS	2 1/2 yrs.		26		83.3
	3 1/2 yrs.		17		79.2
	4 1/2 yrs.		11		84.8
	5 1/2 yrs.		2		82.5
	6 1/2 yrs.		6		85.8
	7 1/2 yrs.		6		88.8
	8 1/2 to 9 1/2 yrs.		1		105.0
	10 1/2 +		1		97.0

H E A R T G I R T H VS W E I G H T

1984 TO 1988
278 HARVESTED DEER MEASURED

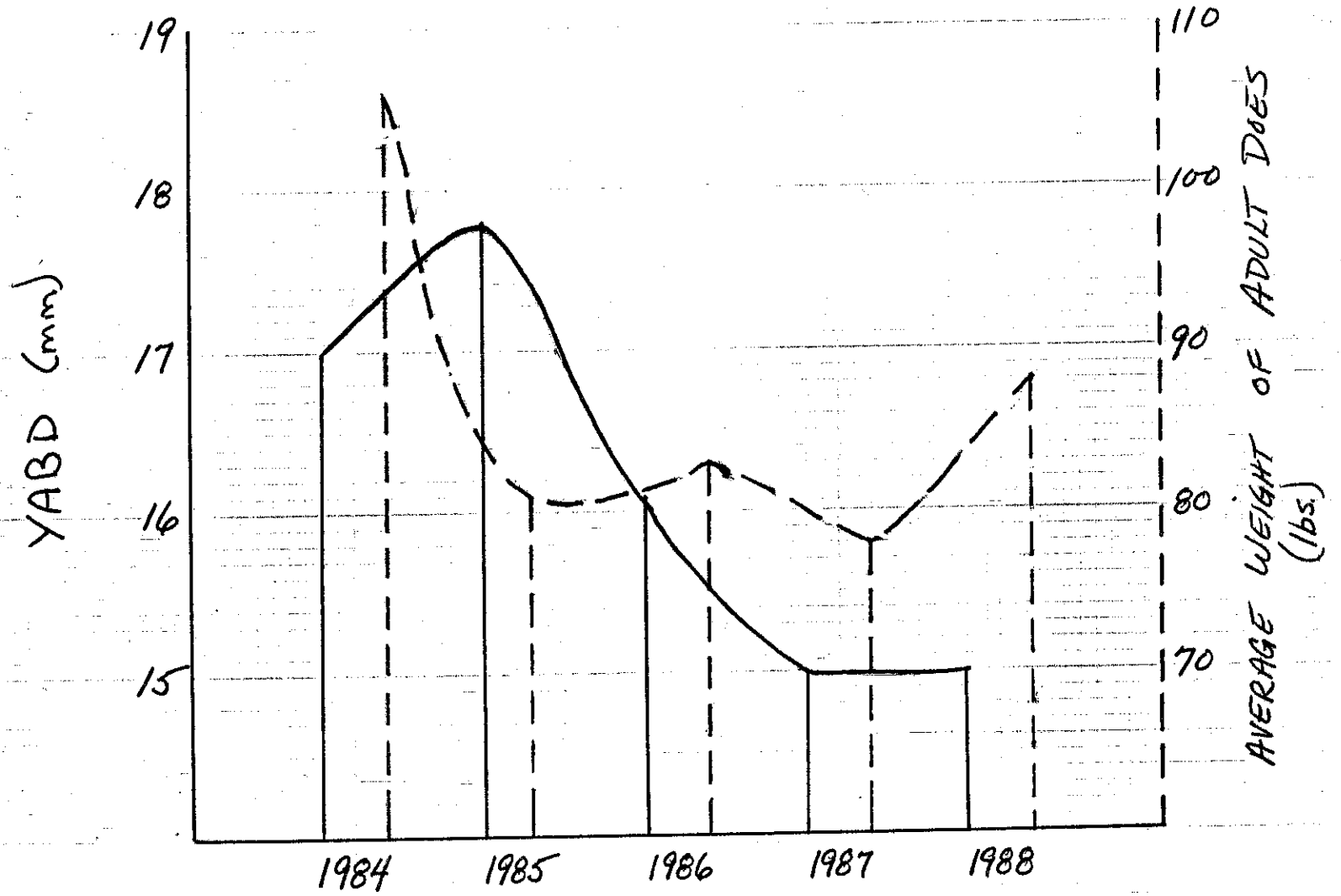
HEART GIRTH (IN)*	NO. OF DEER	AVG WT (LBS) (HOG DRESSED)**	LIVE WT (X 1.25)	EDIBLE WT (X.75)
20	1	22	28	16
22	2	33	41	24
23	3	37	46	27
24	4	39	49	29
25	2	40	50	30
26	5	49	61	37
27	9	56	70	43
28	10	61	76	46
29	11	65	81	49
30	29	78	97	58
31	51	81	101	60
32	54	86	108	65
33	36	89	111	67
34	26	97	121	73
35	21	107	134	80
36	8	123	154	92
37-38	6	129	161	97
LARGEST DEER				
38	1	157	196	118

*CIRCUMFERENCE OF CHEST CAVITY AT GREATEST DIAMETER
** ALL INTERNAL ORGANS ARE REMOVED

LARGEST BUCKS HARVESTED

YEAR	AGE	WEIGHT (lbs)	POINTS	BEAM DIAMETER (mm)
YEARLING				
1984	1yr-6mos	105	6	22
1985	1yr-7mos	117	4	20
1986	1yr-7mos	110	6	21
1987	1yr-6mos	94	8	21
1988	1yr-7mos	114	5	19
ADULTS				
1984	2 1/2yrs	126	8	29
1985	2 1/2yrs	130	10	27
1986	3 1/2yrs	157	10	31
1987	3 1/2yrs	152	8	35
1988	2 1/2yrs	138	7	25

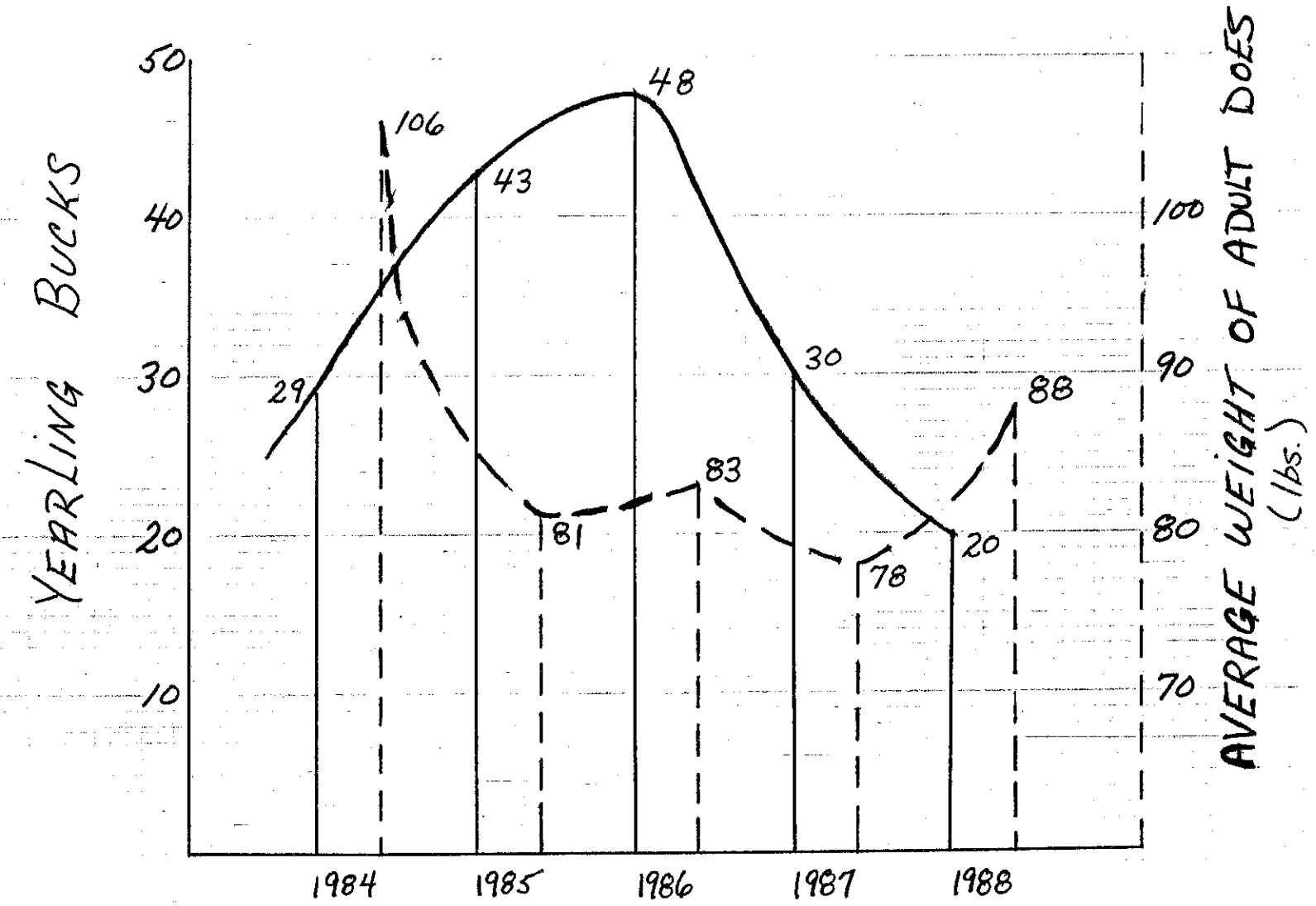
YEARLING ANTLER BEAM DIAMETER[1] VS. AVERAGE WEIGHT OF ADULT DOES[2] 1984 - 1988



1 - ANTLER BEAM DIAMETER IS THAT DIAMETER, IN MILLIMETERS, WHICH IS ONE INCH ABOVE THE BURR.

2 - ADULT DOES ARE THOSE FEMALES OF AGE 2½ YRS. AND OLDER

Minimum Known Population of Yearling Bucks, vs. Average Weight of Adult Does (lbs.)[2] 1984 - 1988



1- Minimum Population figures taken from Population Reconstruction chart of harvested deer.

2- Adult does are those females of age 2½ yrs and older.

SPOTLIGHT INDEX

In 1986 a spotlight census was undertaken with a grant from the Black Rock Fish and Game Club. The Club donated close to $300.00 as a start up cost for the study, with which two deep-cell marine batteries and three 400,000 candle power spotlights were purchased. Black Rock Forest lends itself nicely to this type of census as there is an extensive road system located within.

1. Spotlighting will take place in late August, for ten consecutive nights (weather permitting). At this time of year fawns still have their spots and are still attentive to their female parent. Distinguishing between the two is comparitively easier at this period.

2. Routes have been developed to cover as much of the forest as possible without increasing the risk of double counting, (by geographic and time reasoning).

3. Field notes: Date, weather, time in, time out, sunset, name of spotters, deer identification (antlerless, buck, fawn and unknown) and location.

4. Field procedures: Two spotters equipped with binoculars will meet with a driver at dusk. The pick-up truck is then equipped with spotlights, batteries and back-up equipment. The spotlighting begins approximately 1/2 hour after sunset. Each spotter is responsible for one side of the truck while the driver proceeds at a speed of 5-7 mph. Upon sighting a deer the spotter lightly taps the cab of the truck signaling the driver to stop. The spotter than gets accurate identification of the deer he has spotted as the other spotter scans the area for others. Both spotters and driver must communicate as to what they are spotting and checking one another while the truck is in position to get the best view. If time allows all members will view all deer to agree on identification.

5. Route averages nine (9) miles which takes approximately 3 1/2 hours.

INTENT: To develop a comparable index of fawn to doe ratio from previous years. The index of deer per mile can also be used as a comparative indicator.

VARIABLES: Relatively low fawn to doe ratios (.4 to .6) have been noted. This can only be explained by the limited sight distance due to the forest's nature. Occasional dense understory and abrupt terrain limits consistant spotting distance. Not be be overlooked is the constant variable of deer movement, which I might add is constantly variable.

OBSERVATIONS: Although the variable factors can not be regulated, the resultant ratios have to a certain extent agreed with other known growth indicators such as yearling beam diameter and harvest numbers.

Deer movement as related to weather have been noted. We have learned that clear full moon nights are very unproductive nights, with most deer sighted are bedded down.

SPOTLIGHT INDEX

YEAR	TOTAL DEER SIGHTED	# OF NIGHTS	AVG. PER NIGHT	TOTAL MILES	DEER PER MILE
1986	220	10	22	104	2.1
1987	195	8	24	62	3.1
1988	125	10	12.5	90.9	1.4

NIGHTLY HIGHS

YEAR	ANTLERLESS	FAWNS	BUCKS	TOTAL
1986	18	9	6	34
1987	19	11	3	39
1988	12	5	3	20

DOE TO FAWN RATIO

1986	1 : .5
1987	1 : .6
1988	1 : .4

SPOTLIGHT INDEX

-1986-

DATE	8/8	8/9	8/10	8/11	8/12	8/13	8/14	8/27	8/30	11/1
MILEAGE (MILES)	10	10	10	10	10	14	14	14	12	9
ANTLERLESS	16	10	8	9	6	14	13	18	10	73
BUCK	1	1	0	0	1	1	4	2	3	6
FAWNS	3	7	6	9	5	5	6	9	5	0
UNKNOWN	4	8	8	4	6	6	3	5	4	19
TOTAL	24	26	22	22	18	26	26	34	22	98
DEER PER MILE	2.2	2.6	2.2	2.2	1.8	1.9	1.9	2.5	1.8	11
DOE:FAWN	.2	.7	.75	1	.8	.4	.5	.5	.5	-

-1987-

DATE	9/29	8/30	8/31	9/1	9/3	9/9	9/10	9/11	11/4	11/5	11/6
MILEAGE (MILES)	7.6	7.8	6.4	8.7	8.1	7	8.2	8.2	8.2	8.4	4.4
ANTLERLESS	14	7	11	12	13	17	19	19	12	14	9
BUCK	0	1	2	1	0	0	2	3	3	1	1
FAWNS	3	1	7	5	0	4	10	11	-	-	-
UNKNOWN	6	0	2	3	2	9	5	6	14	8	5
TOTAL	23	9	22	21	15	30	36	39	29	23	15
DEER PER MILE	3	1.2	3.4	2.4	1.8	4.3	4.4	4.6	3.5	3	3.4
DOE:FAWN	.2	.2	.6	.4	0	.2	.5	.6	-	-	-

-1988-

DATE	8/12	8/13	8/14	8/17	8/19	8/20	8/21	8/22	8/24	8/25
MILEAGE (MILES)	8.6	8.7	8.9	8.1	9.9	8.9	8.7	11.1	9.1	8.9
ANTLERLESS	11	4	2	3	10	9	4	12	11	9
BUCKS	1	0	0	0	1	1	1	3	3	4
FAWNS	3	1	0	1	5	3	0	3	5	2
UNKNOWN	2	1	3	2	2	1	0	2	1	1
TOTAL	17	6	5	6	18	14	5	20	20	14
DEER PER MILE	2.0	.7	.6	.7	1.8	1.6	.6	1.8	2.2	1.6
DOE:FAWN	.3	.25	-	.3	.5	.3	-	.25	.5	.2

DEER TRACK INDEX

A deer track census was started in the winter of 1988. The intent is to monitor a post hunt over wintering population. The census is not used to determine a population number but to indicate increases and decreases in the deer population.

Tracking Procedures:

1. Field Notes
   a. Date, Current weather
   b. Amount of snowfall new and accumulated
   c. Time (hours) since snow stopped
   d. Start - Finish times

2. Only fresh tracks are counted, prints made during snowfall are not.

3. Double counting (counting the same track repeatedly) Direction of track, if shortly a track crosses the trail in the opposite direction, further investigation is necessary.

4. Multiple deer prints crossing the route are followed until they split and a count can be made.

5. Route have been geographically chosen to prevent the least amount of possible long range double counts.

It is intended, that comparing track numbers and groups from year to year, a general assumption can be made as to the rise or fall of the population.

Deer tracking here at Black Rock is feasible since Whitetails here do form groups, in December, January and February while condensing their range. This makes tracking easier, compared to the actually true yarding of many deer in a much smaller range, making tracking too inaccurate as compared to actually counting bodies. Deer here in the Hudson Highlands have been known to yard up on southern slopes, late in severe winters. But this is not known if it is true yarding or the meeting of many smaller groups sharing the same overlapping southern slopes of the respective ranges.

Presently, only general assumptions can be made from this census. There are many variables, therefore the results must be kept in perspective. The major variables are; the amount of snowfall and the time after which the tracking is started. Also variable, is the degree of winter severity and the Whitetail itself as their movements are quite variable.

In partaking in this study other important aspects have developed. Not only are other species of animals observed but, the effects of coyotes and ferel dogs on Whitetails have been noted. Dogs have made a great impression on the deer population, as told by their tracks and dead deer. Whereas, the coyote, although abundant, seems to prefer other prey (rodent & grouse) this time of year. This is not to say coyotes do not feed on deer carcasses. It is to say that dogs kill more deer than coyotes in the winter at Black Rock Forest. Although this abundance of coyotes most certainly must take its toll on fawns in the spring. These predatory factors are quite influential to deer numbers and can not be overlooked. It is difficult to put a numerical figure on their effect at this point.

DEER TRACK CENSUS

DATE	ROUTE	DISTANCE (MILES)	NO. OF DEER	DEER PER MILE	SNOW NEW-ACCUM	HOURS AFTER SNOW
12-29-87	BLUE	5.5	55	10.0	4" - 4"	3
1-09-88	BLUE	5.5	58	10.5	8" - 12"	10 1/2
1-27-88	BLUE	5.5	20	3.6	9" - 12"	1/2
2-05-88	RED	4.5	41	9.1	2" - 4"	20
2-24-88	RED	4.5	23	5.1	1" - 8"	6
2-28-88	RED	4.5	13	2.9	2" - 8"	17
3-06-88	RED	4.5	31	7.0	1" - 6"	38
12-14-88	GREEN	5.0	42	8.4	1" - 1"	15
1-07-89	GREEN	5.0	35	7.0	3" - 3"	13
3-13-89	GREEN	5.0	39	7.8	1" - 1"	18

DEER TRACK GROUPS

WINTER OF 1988

DEER GROUPS	NUMBER OF GROUPS	TOTAL DEER TRACKS
1 DEER	24	24
2 DEER	31	62
3 DEER	19	57
4 DEER	6	24
5 DEER	1	5
6 DEER	1	6
TOTAL	82	TOTAL 178

AVERAGE 2.2 DEER PER GROUP

WINTER OF 1989
(incomplete)

DEER GROUP	NUMBER OF GROUPS	TOTAL DEER TRACKS
1 DEER	14	14
2 DEER	13	26
3 DEER	8	24
4 DEER	4	16
5 DEER	1	5
6 DEER	1	6
7 DEER	1	7
8 DEER	1	8
10 DEER	1	10
TOTAL	44	TOTAL 116

AVERAGE 2.6 DEER PER GROUP

HUNTING PRESSURE

Opening day, over the past five years, 1984 to 1988, has seen 51% of the harvest taken on that day with an average of 162 hunters (27 hunters per square mile). Compared to the previous 10 years 1973 to 1983, 39% of the harvest was taken opening day by an average of 209 hunters (35 hunters per square mile). Since the establishment of D.M.U. 54 in 1976 to 1982, 38% of the annual kill was taken by an average of 194 hunters on opening day (32 hunters per square mile).

The first weekend of the big game season is the second most productive period with 20-25% of the harvest being taken.

All harvest figures are subject to change annually due to weather conditions.

OPENING DAY HUNTING PRESSURE

YEAR	HUNTERS	HOURS	SUCCESS RATE*	HOURS/HUNTER	HARVEST BUCK/DOE	% OF TOTAL HARVEST
1988	139	667	5	4.8	17-10	56
1987	171	817	4.7	4.8	23-13	51

YEAR	HUNTERS	SUCCESS RATE*	HARVEST BUCK/DOE	% OF TOTAL HARVEST
1986	200	4.8	29-12	48
1985	NA	NA	23-8	55
1984	139	8.2	11-6	43
1983	148	NA	NA	NA
1982	164	18.2	3-6	38
1981	162	12.5	7-6	27
1980	198	9.4	14-7	39
1979	257	8.9	25-4	56
1978	185	14.2	10-3	18
1977	193	6.0	23-9	49
1976	199	7.6	18-8	41
1975	186	9.8	19-0	35
1974	201	14.4	14-0	40
1973	195	9.8	20-0	62

SEASONAL HUNTING PRESSURE

YEAR	HUNTERS	SUCCESS RATE*	HARVEST BUCK/DOE
1988	704	14.7	24-24
1987	777	11.1	40-30
1986	905	10.6	48-37
1985	NA	NA	34-21
1984	797	19.9	30-10
1983	720	21.2	23-11
1982	908	37.8	7-17
1981	1197	25.5	23-24
1980	1230	23.2	25-28
1979	1305	24.6	33-20
1978	1171	15.8	40-34
1977	1302	20.0	47-18
1976	1211	20.2	37-23
1975	1301	27.1	48-0
1974	1556	44.5	35-0
1973	1210	37.8	32-0

*NUMBER OF HUNTERS PER HARVEST DEER

FUTURE

Added time, money and experience are needed in developing accurate censusing methods of reproductive rates, natural mortality and carrying capacity. Due to the size of the herd, more precise data is needed in these areas.

The greatest ally to the success of the present management techniques will be time. Accurate calculation, inferred by harvest data, such as population reconstruction, age structure's, etc., will prove to be increasingly valuable in the years ahead.

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B I B L I O G R A P H Y

Halls, Lowell K.., 1984, WHITE-TAILED DEER: ECOLOGY AND MANAGEMENT, published by Stackpole Books, Cameron and Kelker Streets, Harrisburg, Pennsylvania 17105.

Rue, L.L. III, 1978, THE DEER OF NORTH AMERICA, New York; Crown publisher.

Tryon, Henry H., 1930, THE BLACK ROCK FOREST - BULLETIN NO. 1, printed by the Cornwall Press, Cornwall, New York.