DEPARTMENT OF THE INTERIOR

ENVIRONMENTAL ASSESSMENT

PUBLIC DEER HUNTING

ON

JAMES RIVER NATIONAL WILDLIFE REFUGE

Prepared by:

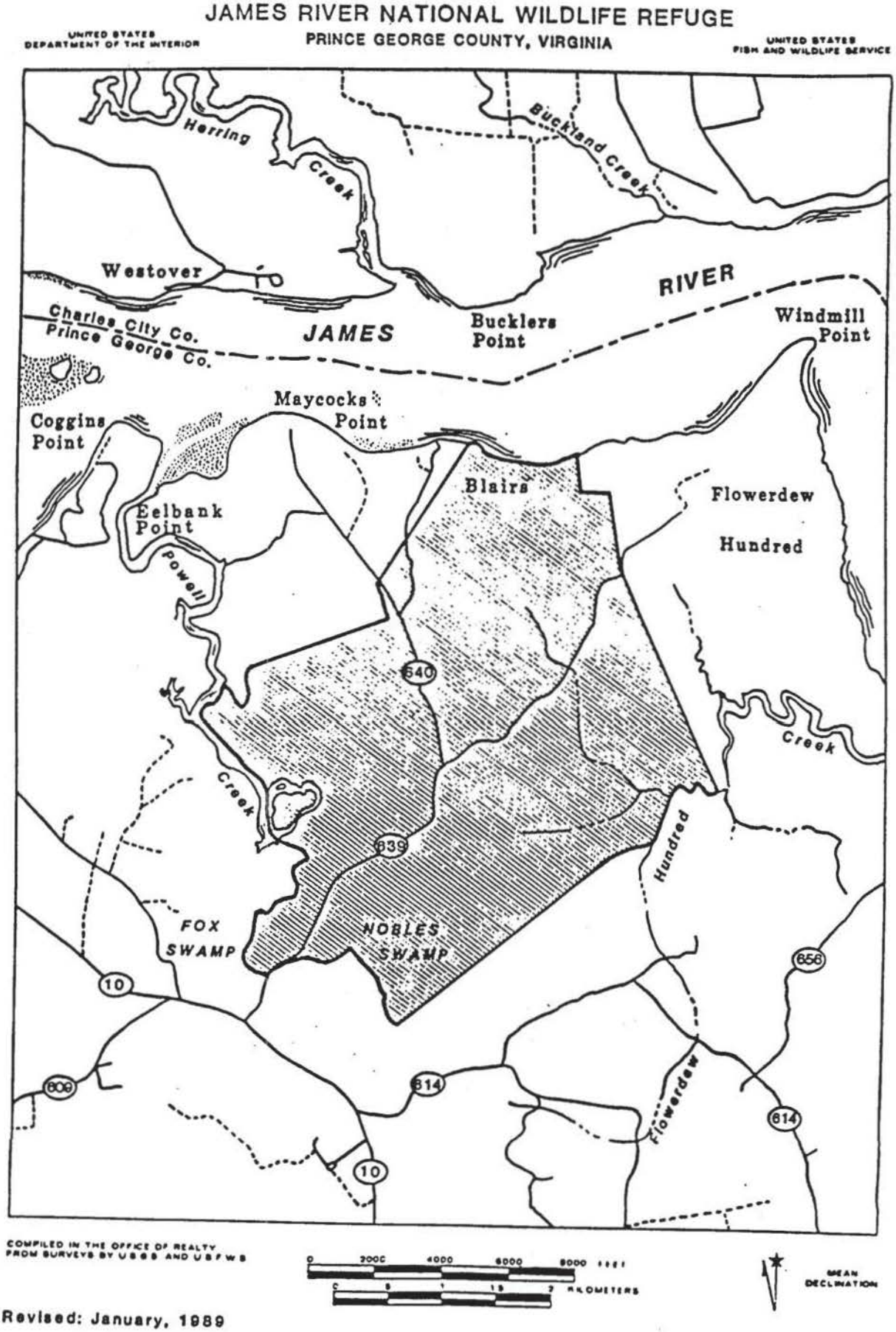
FISH AND WILDLIFE SERVICE

U. S. DEPARTMENT OF THE INTERIOR

James River National Wildlife Refuge

Prince George County, Virginia

November 1991



Revised: January, 1989

Figure 1

The history of the area now known as James River NWR, has shown that white-tailed deer have been harvested for more than forty years. Records from the Virginia Department of Game and Inland Fisheries indicate that approximately 100 white-tailed deer are harvested each year. The James River NWR was established on March 27,1991. Hunting is not authorized on a newly established refuge until that refuge is specifically opened for this activity. As a result, James River NWR was closed to the hunting of white-tailed deer during the 1991-92 hunting season.

A computer model of deer herd population dynamics developed by the Service demonstrates the balance between annual reproduction and various mortality factors. In the first model (Figure 4) depicted below, the basic assumptions are made that the current population of deer is stable, and that an average of 100 deer are harvested annually. Based on these assumptions, the model shows that the current white-tailed deer population for James River NWR is approximately 275 deer. This is equivalent to one deer per thirteen acres. Using the same parameters, the second model (Figure 5) demonstrates the dramatic increase that would occur in the white-tailed deer population in the absence of a deer hunting program. The second model shows that the herd size can be expected to double in two years, and will increase ten fold in less than ten years. When this occurs, over-browsing leading to habitat degradation, disease, and starvation will occur. An excessively high deer population will conflict with any forest management program conducted on the refuge. The increase in herd size may be buffeted to an extent by an increase in emigration and after several years, a probable decline in the reproductive rate.The herd will continue to grow however, only at a slightly slower rate.

II. ALTERNATIVES

To accomplish the objective of maintaining the refuge deer population commensurate with the biological carrying capacity of the available refuge habitat, and to provide a high quality wildlife oriented experience, a total of four alternatives were considered. Five other approaches were also considered, and dismissed. The approaches and alternatives are discussed below.

1. The use of fencing as a means of regulating the James River NWR white-tailed deer herd was considered, and rejected, because of the potential hazard to the bald eagle. The standard deer exclosure fence 12 feet high and made of woven wire. Another effective barrier for deer is an electric galvanized fence, with a recommended current of 35 milliamps, and a recommended 3,000 to 4,500 volts (Matschke 1984:652-653). The use of fencing to control the refuge deer population would be a hazard to the bald eagle and the other species of wildlife that inhabit the refuge.

2. The use of scare devices, including acetylene guns and electric noises, to regulate the James River NWR white-tailed deer population was considered and dismissed. Scare devices do not

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF GAME & INLAND FISHERIES

WHITE-TAIL DEER HARVEST DATA 1947-1990

PRINCE GEORGE COUNTY

PGEORGE5.WK1 (A1..M67) 16.495K (JVG)
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Pt	X AXIS YEAR	TOTAL DEER HARVEST	TOTAL DOE HARVEST	TOTAL MALE HARVEST	ANTLERED BUCK HARVEST	ANTLERLESS DEER HARVEST	PERCENT FEMALES IN TOTAL HARVEST	NUMBER OF SQ.MILES OF FOREST RANGE	ANTLERED BUCK KILL PER SQ.MI. OF FOREST RANGE	NUMBER OF ANTLERLESS DEER DAYS IN HUNTING SEASON	EITHER-SEX DAYS AT FRONT OR END OF THE SEASON	BAG LIMIT	NUMBER OF WEEKS IN SEASON
1	47	144	4	140	139	5	2.8%	193	0.72	00		2 DEER	7 WEEKS
2	48	298	76	222	199	99	25.5%	193	1.03	15	END	2 DEER	7 WEEKS
3	49	623	288	335	249	374	46.2%	193	1.29	15	END	2 DEER	7 WEEKS
4	50	143	0	143	143	0	0.0%	193	0.74	00		2 DEER	7 WEEKS
5	51	143	0	143	143	0	0.0%	193	0.74	00		2 DEER	7 WEEKS
6	52	229	0	229	229	0	0.0%	193	1.19	00 & 15	END	2 DEER	7 WEEKS
7	53	544	0	544	544	0	0.0%	193	2.82	00 & 15	END	2 DEER	7 WEEKS
8	54	511	190	321	264	247	37.2%	193	1.37	00 & 15	END	2 DEER	7 WEEKS
9	55	345	128	217	179	166	37.1%	193	0.93	00		2 DEER	7 WEEKS
10	56	444	155	289	243	202	34.9%	193	1.26	05	END	2 DEER	7 WEEKS
11	57*	426	121	305	269	157	28.4%	193	1.39	05	END	2 DEER	7 WEEKS
12	58	280	0	280	280	0	0.0%	193	1.45	00		2 DEER	7 WEEKS
13	59	765	301	464	374	391	39.3%	193	1.94	15	END	2 DEER	7 WEEKS
14	60	527	125	402	365	163	23.7%	193	1.89	03	END	2 DEER	7 WEEKS
15	61	639	187	452	396	243	29.3%	193	2.05	05	END	2 DEER	7 WEEKS
16	62-	1256	606	650	468	788	48.2%	200	2.34	42		2 DEER	7 WEEKS
17	63	878	409	469	346	532	46.6%	200	1.73	42		2 DEER	7 WEEKS
18	64	420	124	296	259	161	29.5%	200	1.29	05	END	2 DEER	7 WEEKS
19	65	210	0	210	210	0	0.0%	200	1.05	00		2 DEER	7 WEEKS
20	66*	253	0	253	253	0	0.0%	200	1.27	00		2 DEER	7 WEEKS
21	67	293	0	293	293	0	0.0%	200	1.47	00		2 DEER	7 WEEKS
22	68	354	1	353	353	1	0.3%	200	1.76	00		2 DEER	7 WEEKS
23	69	392	0	392	392	0	0.0%	200	1.96	00		2 DEER	7 WEEKS
24	70	803	174	629	577	226	21.7%	200	2.88	02	END	2 DEER	7 WEEKS
25	71	867	216	651	586	281	24.9%	200	2.93	03	END	2 DEER	7 WEEKS
26	72-	1084	275	809	727	358	25.4%	188	3.86	03	END	2 DEER	7 WEEKS
27	73	1668	687	981	775	893	41.2%	188	4.12	12	END	2 DEER	7 WEEKS
28	74	1259	0	1259	1259	0	0.0%	188	6.70	06	END	2 DEER	7 WEEKS
29	75	955	294	661	573	382	30.8%	188	3.05	06	END	2 DEER	7 WEEKS
30	76	825	197	628	569	256	23.9%	188	3.03	03	END	2 DEER	7 WEEKS
31	77*	962	271	691	610	352	28.2%	188	3.24	03	END	2 DEER	7 WEEKS
32	78	1321	485	836	691	631	36.7%	188	3.67	06	END	2 DEER	7 WEEKS
33	79	839	231	608	539	300	27.5%	188	2.87	06	END	2 DEER	7 WEEKS
34	80	988	310	678	585	403	31.4%	188	3.11	03	END	2 DEER	7 WEEKS
35	81	850	259	591	513	337	30.5%	188	2.73	03	END	2 DEER	7 WEEKS
36	82	719	148	571	527	192	20.6%	188	2.80	02	END	2 DEER	7 WEEKS
37	83-	832	195	637	579	254	23.4%	186	3.11	01	END	2 DEER	7 WEEKS
38	84	916	234	682	612	304	25.5%	186	3.29	01	END	2 DEER	7 WEEKS
39	85	1017	267	750	670	347	26.3%	186	3.60	03	END	2 DEER	7 WEEKS
40	86*	1261	361	900	792	469	28.6%	186	4.26	03	END	2 DEER	7 WEEKS
41	87	1442	477	965	822	620	33.1%	186	4.42	06	END	2 DEER	7 WEEKS
42	88	1209	422	787	660	549	34.9%	186	3.55	06	END	2 DEER	7 WEEKS
43	89	1350	445	905	772	579	33.0%	186	4.15	06	END	3 DEER	7 WEEKS
44	90	1530	573	957	785	745	37.5%	186	4.22	06	END	3 DEER	7 WEEKS
	TOTALS	32814	9236	23578	20807	12007	28.1%						

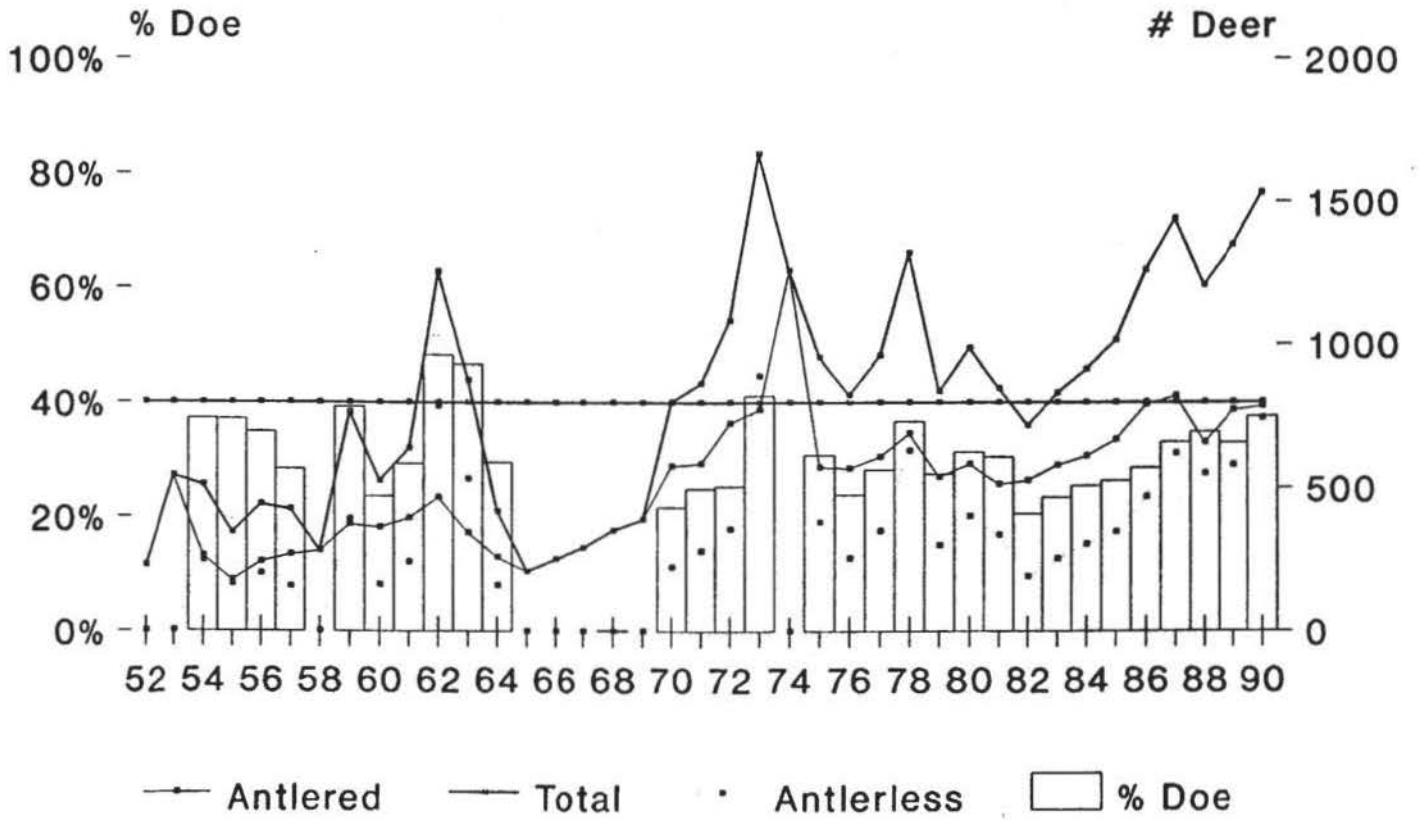
* The Virginia deer harvest data has been a cooperative project utilizing Law Enforcement and Game Division personnel and volunteer citizen checking station operators since 1947.
The Southeastern Forest Experiment Station & the VA Department of Forestry conducted forest inventories in 1940, 1957, 1966, 1977 and 1986.

VA Deer Status Study (7/90) JVG

Figure 2

W-T DEER HARVESTS

Prince George County



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VDGIF 2-14-91 JVG

Figure 3

White-Tailed Deer Population Estimates

Winter	Post Hunt Population	Spring Mortality	Pre-Fawn Pop. Est.	Repro Factor	Fawn Crop	Post-Fawn Pop. Est.	Summer Mortality	Total Harvest	Next Winter Pop. Est.
1991	275	13	262	0.53088	133	395	19	100	276
1992	276	13	263	0.53088	133	396	19	100	277
1993	277	13	264	0.53088	133	397	19	100	278
1994	278	13	265	0.53088	133	398	19	100	279
1995	279	13	266	0.53088	134	400	20	100	280
1996	280	14	266	0.53088	134	400	20	100	280
1997	280	14	266	0.53088	134	400	20	100	280
1998	280	14	266	0.53088	134	400	20	100	280
1999	280	14	266	0.53088	134	400	20	100	280
2000	280	14	266	0.53088	134	400	20	100	280

Spring Mortality Factor Used = 0.05
Fawn Mortality Factor Used = 0.05
Summer Mortality Factor Used = 0.05

NOTES:

1. Spring Mortality has been estimated to be approx. 5.7 % of post hunt pop. size for some herds, where incidence of roadkills are high.
2. Reproduction Factor takes into consideration, age structure of herd, sex ratio, and age specific reproductive rates of does.
3. Fawn Crop is automatically reduce by 10% as per literature, which identifies that approx. this number of fawns will die at time of birth or shortly thereafter.
4. Summer Mortality has been computed to be approx. 6.3 % of Post-Fawning Herd Size, again where incidence of roadkills are high. (This also includes early fall mortality from both roadkills and some poaching losses.)
5. Harvest includes both on and off refuge harvest along with an estimate of Cripple Loss. Crippling loss for a firearms hunt is generally between 10-20% of the harvest.

Columns may not actually calculate out correctly by a factor of several deer. This is because integer values are used for all calculations thus avoiding the use of fractional deer. All figures are thus rounded to the lower number.

Figure 4

White-Tailed Deer Population Estimates

Winter	Post Hunt Population	Spring Mortality	Pre-Fawn Pop. Est.	Repro Factor	Fawn Crop	Post-Fawn Pop. Est.	Summer Mortality	Total Harvest	Next Winter Pop. Est.
1991	275	13	262	0.53088	133	395	19	0	376
1992	376	18	358	0.53088	181	539	26	0	513
1993	513	25	488	0.53088	247	735	36	0	699
1994	699	52	647	0.5	299	946	70	0	876
1995	876	65	811	0.5	375	1186	88	0	1098
1996	1098	82	1016	0.5	470	1486	111	0	1375
1997	1375	137	1238	0.475	530	1768	176	0	1592
1998	1592	159	1433	0.475	612	2045	204	0	1841
1999	1841	184	1657	0.475	709	2366	236	0	2130
2000	2130	266	1864	0.45	734	2598	324	0	2274

Reproductive factor for this trial run has been reduced every 3 years to take into consideration declining herd health as the population continues to grow.

Spring and Summer Mortality rates have been increased every 3 years to take into consideration that as the herd size increases, a greater number of deer will emigrate from the refuge. (Emigration has the same affect on the herd as mortality)

NOTES:

1. Spring Mortality has been estimated to be approx. 5.7 % of post hunt pop. size for some herds, where incidence of roadkills are high.
2. Reproduction Factor takes into consideration, age structure of herd, sex ratio, and age specific reproductive rates of does.
3. Fawn Crop is automatically reduce by 10% as per literature, which identifies that approx. this number of fawns will die at time of birth or shortly thereafter.
4. Summer Mortality has been computed to be approx. 6.3 % of Post-Fawning Herd Size, again where incidence of roadkills are high. (This also includes early fall mortality from both roadkills and some poaching losses.)
5. Harvest includes both on and off refuge harvest along with an estimate of Cripple Loss. Crippling loss for a firearms hunt is generally between 10-20% of the harvest.

Columns may not actually calculate out correctly by a factor of several deer. This is because integer values are used for all calculations thus avoiding the use of fractional deer. All figures are thus rounded to the lower number.

Figure 5

regulate a deer population because the deer are known to habituate to the scare services in a short period of time, rendering them ineffective. (Matschke 1984:651).

3. The use of nontoxic repellents to regulate the white-tailed deer population would not be effective when used on a long term basis. Repellents are not effective during warm weather, need multiple applications per year, will not deter starving deer, is effective only on small areas,and would be cost prohibitive on the 3538 acre James River NWR (Matschke 1984:651). The cumulative effect of these repellents on the bald eagle is not known.

4. The use of live trapping and translocation as a means to regulate the James River NWR white-tailed deer population was dismissed because it is not cost effective, deer are difficult to trap, the operation is very time consuming, trapping must occur annually, and release sites within Virginia are not available.

5. Population reduction by refuge staff would require refuge personnel to take responsibility for reducing the population of white-tailed deer and would require excessive staff time. The refuge uplands are very dense and the cropping of white-tailed deer would be difficult under these conditions. This approach would reduce crippling rates and allow a better sex and age ratio in the take than would be expected in a controlled public hunt. This approach is contrary to Service policy to conduct a reduction of surplus game animals staff when recreational hunters could be utilized to reduce the population.

A. No Action Alternative

The James River NWR was closed to hunting of white-tailed deer in 1991 because of administrative constraints involved in opening this National Wildlife Refuge to hunting. The no action alternative would mean that James River NWR will remain closed to the hunting of white-tailed deer. This alternative would also mean that the refuge deer population will increase until the population exceeds the carrying capacity of the refuge and degradation of the available habitat occurs. Once the refuge becomes overpopulated with deer, disease and starvation will regulate the population. As the refuge deer population increases, crop depredation on adjoining farmland will occur, leading to complaints, and potential claims for financial compensation. This alternative is contrary to service policy on the management of renewable resources.

B. Limited Hunt, Proposed Action Alternative

James River NWR will be opened to the general public for the taking of white-tailed deer on a limited season, permit only basis. The refuge will be open to shotgun hunting only. The white-tailed deer hunt will occur annually during the state deer hunting season. Daily hunt permits will be issued on a lottery system and a fee

will be charged to the public for each permit issued, including standby permits. The exact amount of the fee and the method of collection will be decided at a later date. In the event that permitted hunters do not hunt on the day assigned, standby hunters will be issued permits. The refuge will be open from the opening day for shotgun in Prince George County Virginia, historically the third monday in November, until December 14th of each hunt year.

In accordance with the guidelines set forth in the 1985 National Wildlife Federation publication, Bald Eagles in the Chesapeake: A Management Guide For Landowners, hunting will not occur after December 14th. This action will decrease the disturbance and increase the protection of the nesting bald eagles that inhabit the refuge. The closed area around each nest tree during the hunt will equal or exceed the required 200 yard radius. All refuge lands except safety zones, administrative areas, public roads, and those areas that are closed for the protection of the bald eagle, will be open for hunting.

A Virginia State deer check station will be maintained on site during the refuge deer hunt. The check station will obtain needed biological information on refuge deer health and population dynamics. An assessment will be made at some future date whether to continue the refuge operated check station, or to allow the deer to be taken off station to be checked.

At least one refuge staff member would be on site each day that the refuge was open for hunting to ensure permit compliance, perform law enforcement, and operate the big game check station.

This alternative is consistent with Service policy on the management of renewable populations. Under this alternative, refuge staff time would be limited to organizing the hunt, incidental law enforcement presence to ensure hunt permit compliance, and check station operation. This alternative would provide adequate controls to protect the bald eagle, prevent access into safety and other closed areas, control the number of hunters that would enter the area, increase the level of hunter safety, and ensure that the deer are checked at the appropriate check station.

C. Open Season Alternative

James River NWR will be opened to the general public on an unlimited permitted basis for the taking of white-tailed deer. The white-tailed deer hunt will occur annually during the state deer hunting season. The refuge will be open for shotgun hunting only. The refuge will be open for the entire shotgun season for Prince George County, Virginia. All refuge lands except safety zones, administrative areas, public roads, and those areas closed for the protection of the bald eagle, will be open for hunting. Daily hunt permits will be issued on a lottery system, and a fee will be charged to the public for each permit. The exact amount of the fee

and the method of collection will be decided at a later date. Permitted hunters would be allowed to access the refuge the refuge hunt areas without the supervision of the refuge staff. Refuge areas that are closed to deer hunting would be posted prior to the hunt, and each hunter would be informed of these areas. Each hunter would be on "honor system" to stay within the designated refuge hunt areas. Successful hunters would be required to check their deer at the Virginia Deer Check Station operated by the James River NWR staff.

This alternative is consistent with the service policy on the management of renewable populations, but would not provide adequate controls to protect the bald eagle, prevent access into safety, and other closed area zones, no controls on the number of hunters that would access the area, reducing the level of hunter safety, and no control to ensure that the deer are checked at the appropriate check station.

D. Hunt Club Alternative

James River NWR will be open to the taking of white-tailed deer for the entire state deer hunting season. The white-tailed deer hunt will occur annually, and will be hunted exclusively by the five hunt clubs that hunted the land before it became a refuge. The refuge will be open to shotgun hunting only. The five hunt clubs will be allowed to use dogs as a method of hunting deer. The use of dogs by the hunt clubs will be limited to only those days that the refuge is open to white-tailed deer hunting. All refuge lands except safety zones, public roads, and those areas of the refuge that are closed for the protection of the bald eagle, will be open for hunting. Under this alternative, each hunt club would be assigned a designated area within the refuge to hunt. Each hunt club would be issued a special use permit outlining the refuge hunting regulations, and special conditions that are to be enforced. One hunt permit will be issued to each hunt club, and a fee will be charged to the hunt club for each permit issued. The exact amount of the fee and the method of collection will be decided at a later date. This type of hunt would mean that refuge staff time needed to administer the refuge hunt would be limited. Each hunt club would be required to comply with the conditions of the special use permit, including keeping records of all deer taken, condition of deer taken, respecting closed area restrictions, and ensuring that the bald eagle is protected. Deer hunting as described under this alternative has occurred on this property for over forty years, with no documented disturbance to the bald eagle. The existing hunt clubs were under leases by the previous landowners to hunt deer in designated sections of what is now James River NWR. Each hunt club paid for the lease, and were made to abide the conditions of the lease. This alternative proposes the same type of arrangement would be set up with the hunt clubs, with major emphasis put on conditions that would enhance and protect the bald eagle. Violation of any condition of the special

use permit by any hunt club member would mean immediate revocation of the hunt club permit.

This alternative is not consistent with the Service policy on the management of renewable populations. Allowing the hunt clubs to exclusively hunt white-tailed deer on James River NWR conflicts with the regional policy of providing fair, equitable, and consistent access to the general public.

III. AFFECTED ENVIRONMENT

James River NWR totaling 3538 acres consists of the following habitat types: 3168 acres in forest, 50 acres of open wetland, 20 acres of administrative property, and 5 miles of state maintained road. The entire James River NWR will be open to the taking of White-tailed deer, except safety zones, administrative areas, public roads, and those areas of the refuge closed for the protection of the bald eagle, including all known nesting, and roosting areas. Because the known roost sites are dynamic, the areas of the refuge that will be closed to hunting, will be determined on a yearly basis.

A. Refuge Objectives

Legal direction for the management of James River NWR is provided through the Endangered Species Act. The Act authorized expenditure of funds to acquire this land "... to conserve (A) fish and wildlife which are listed as endangered species or threatened species... or (B) plants..." 16 U.S.C. Sections 1534 (Endangered Species Act of 1973, 16 U.S.C. Sections 1531-1543, as amended.

The primary objective of James River National Wildlife Refuge is to provide suitable habitat for the protection, and enhancement of the roosting and nesting bald eagles that utilize the refuge. Secondarily, the objectives of the refuge are to provide an opportunity to view wildlife in its natural environment, so that the public may better appreciate the refuge role in the conservation of the wildlife resources.

B. Physical Features

1. Description Of The Refuge

James River NWR consists of 3538 acres of predominantly hardwood and cut over loblolly pine. Two state roads cross the property. The roads are maintained by the state and are good condition. The site has numerous dirt roads that traverse the property and serve as fire lanes. There are several old structures on the refuge, including a picnic pavilion, one house site, two dog kennels, and a skeet range.

2. Climate

James River NWR is situated in the southern portion of Virginia's Piedmont Plateau. The area is characterized by mild winters and warm humid summers. The average yearly temperature for the Hopewell Petersburg area is 59.9 degrees F., with the average daily maximum temperature of 50.2 degrees F in January, to 90 degrees F in July. Precipitation averages 44.5 inches in a typical year, with the highest monthly rainfall recorded in July and August at 5.07 inches and 4.71 inches respectively. Average annual snowfall totals 8.8 inches. Summer thunderstorms and hurricanes occur in late summer and fall and produce heavy rainfall, which results in peak discharge from the tidal creeks, and flooding of the James River.

3. Geology, Soils, and Topography

James River NWR is composed of silty or sandy loams. The refuge has good soils for timber production. Soils are dominated by Peawick-Emporia-Wickham types formed primarily in clayey fluvial sediments on uplands. These soils as described by the USDA Soil Conservation Service (1983) are "deep, moderately well-drained and well-drained soils that have clayey or loamy subsoil".

James River NWR is located in the coastal plain physiologic province of southeastern Virginia. The area is drained to the west by Powells Creek, to the east by Flowerdew Hundred Creek, and to the south Nobles Swamp. The geology of the site is classified according to two formation types: The Charles City Formation, and The Shirley Formation. The Shirley Formation consists of basal gravel overlain by sand and capped by silt and clay. This formation extends from the floodplain to the 40 foot contour elevation. The Charles City Formation is similar in depositional characteristics and stratigraphy, but is found at higher upland elevations. Holocene alluvial deposits of sand, silt, clay, and organic detris 20 to 40 feet in thickness comprise the wetland areas of Powells and Flowerdew creeks (USGS Bulletin 1567, unpublished). The topography of James River NWR is described as gently forested rolling forested upland, which drops off rather sharply near Powells and Flowerdew Hundred creeks. Maximum elevation is 70 feet above mean sea level.

C. Biological Features

James River NWR supports a diverse, and dynamic variety of flora and fauna. The property has been identified as the largest summer juvenile bald eagle roost east of the Mississippi River. The refuge has also been identified as having the suitable location and habitat for several endangered plant species.

1. Vegetation

The majority of James River NWR is cut over loblolly pine plantations. The property has a mixture of mature, middle-aged, and

young pine stands. Mixed hardwood stands consisting primarily of oak, hickory, maple, gum, and poplar characterize the James River NWR shoreline. The undergrowth in the Loblolly pine stands is extremely thick, and is a deterrent to pedestrian access. Powells Creek and Flowerdew Hundred Creek are tidal freshwater systems supporting a mixture of emergent, scrub-shrub, and forested wetlands. Wet areas, stream bottoms, and steep slopes remain in hardwoods. Tree species other than Loblolly pine that are known to occur on James River NWR; include Southern Red Oak, White Oak, Water Oak, Willow Oak, Red Maple, Yellow Poplar, Sweetgum, and Scrub Pine.

A. Federal Endangered and Threatened Plants

The Department of Conservation and Historic Resources conducted a rare plant inventory along Powells Creek to investigate the potential for rare freshwater tidal marsh plants. The Prairie Senna, Cassia fasciculata var. macrosperma, a globally rare plant species and a category two candidate for federal listing was documented. The largest population of this plant currently documented in the state is located along Powells Creek on refuge land. Extant occurrences of Sensitive Joint Vetch, Aeschynomeme Virginica, and Longs Bittercress, Cardamine longii, are found in similar habitat near the refuge, but were not found within the refuge boundaries. Both of these species are globally rare and are category two candidates for federal listing as threatened or endangered plants. No rare or exemplary natural communities were documented within James River NWR.

2. Wildlife Populations

A. Federal Endangered and Threatened Species

James River NWR, the lands surrounding the refuge, and that portion of the James River is identified as the largest bald eagle roost east of the Mississippi River. The refuge currently supports two known roosting site, and two active bald eagle nests. Bald eagle surveys conducted by Dr. Mitchell Byrd, College of William and Mary, and a member of the bald eagle recovery team, indicates that the eagles have a well defined territory that extends along the James River from Hopewell downstream to Wards Creek. A peak of 125 eagles were documented using the refuge in 1990, and 135 in 1991. It has been estimated by Dr. Byrd that as many as 1000 individual bald eagles visit the refuge over the course of a summer. The population is composed equally of immature and mature birds. Most of the adult eagles are thought to be post breeding birds from southeastern states and juvenile birds from the entire east coast.

B. Mammals

A biological inventory of James River NWR has been ongoing since the establishment of the refuge on March 27, 1991. To date, the following species of mammals are known to occur on the refuge; racoon, red fox, cottontail rabbit, gray squirrel, muskrat, and white-tailed Deer. The number of species of mammals known to occur on the refuge will increase, as more time is devoted to the inventory.

C. Birds

A biological inventory of James River NWR has been ongoing since the establishment of the refuge on March 27, 1991. To date, a total of 63 species of birds have been identified within the boundary of James River NWR. Of the 63 species, 54 species are known to be breeding birds. One of the more important species that nest on the refuge is the Coopers Hawk. The number of species of birds known to occur on the refuge will increase as more time is devoted to the inventory.

Waterfowl concentrations are fairly high in the river along the wooded swamps and tidal marshes of Powells and Flowerdew Hundred Creeks. These wetland areas are used by migrating and nesting mallards, black ducks, and wood ducks. There is a high potential for wood duck production along the creeks.

Egrets, herons, and geese are also common in the marshes and along the rivers edge. Colonies of double-crested cormorants and cattle egrets frequent the numerous sunken barges in the river. These sites represent the only known nesting colony of cormorants in Virginia, and the only known colony of cattle egrets west of the Chesapeake Bay in Virginia. Wild turkeys are common in the upland hardwood and mixed forested areas of the refuge.

IV. ENVIRONMENTAL CONSEQUENCES

A. Impacts of No Action Alternative

Without a refuge hunt to regulate the refuge deer population the herd size can be expected to double in two years, and will increase ten fold in less than ten years (Figure 5). When this occurs, over-browsing normally results in habitat degradation not only for the deer, but also for numerous other wildlife species. An excessively high deer population will conflict with any forest management program conducted on the refuge.

It is critical to maintain control of deer population levels. White-tailed deer have the capacity, when at high population numbers, to affect density and species composition of the forest community(Casey 1983, Curtis 1958, Leopold 1950, Moore 1967, Ross 1970). Stone Container Corporation recognized this fact and allowed

white-tailed deer hunting to take place on the property. This alternative would also mean that the existing refuge deer population will exceed the carrying capacity of the refuge and that degradation of the available habitat will occur. Disease and starvation will then regulate the refuge population.

B. Impacts of the Limited Hunt Proposed Action Alternative

The white-tailed deer population would remain stable and commensurate with the carrying capacity of the area. The refuge will continue to support an estimated population of 275 deer. White-tailed deer hunting with the use of shotguns has occurred on this property for over forty years, with no documented disturbance or impact to the bald eagle, indigenous wildlife, or to the habitat. No adverse impacts are expected as a result of continuing this level of hunting. Those areas of the refuge that will be closed to hunting for the protection of the bald eagle, are limited to the area around two nest trees. In accordance with the guidelines set forth in the 1985 National Wildlife Foundation publication Bald Eagles in the Chesapeake: A Management Guide For Landowners, The closed area around each nest tree will equal or exceed the required 200 yard radius.

V. CONSULTATIONS AND COORDINATION

The James River NWR staff consulted with several representatives of the Virginia Department of Game and Inland Fisheries, Dr. Mitchell Byrd, several members of the hunt clubs that traditionally hunted the area, and Service biologists.

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