COMPATIBILITY DETERMINATION

Project Title: Public Deer Hunting

Station Name: Rappahannock River Valley National Wildlife Refuge

Date Established: May 28, 1996

Establishing Authorities:

The Emergency Wetlands Resources Act of 1986 (100 Stat. 3582-91) for: "...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." (16 U.S.C. §3901(b); 100 Stat. 3583).

The Endangered Species Act of 1973 (16 U.S.C. §1531-1543), as amended: "...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants..." (16 U.S.C. §1534).

The Land and Water Conservation Fund Act (P.L. 88-578; 16 U.S.C. §4601; 78 Stat. 897) for: "...the acquisition of areas needed for conserving endangered or threatened species of fish, wildlife and plants..." (P.L. 94-422; 90 Stat. 1313).

Purpose for which Established:

The purposes for which the Rappahannock River Valley National Wildlife Refuge was established are:

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources...16 U.S.C. 742f(a)(4)... for the benefit of the United States Fish and Wildlife Service, in performing its activities and services. Such acceptance may be subject to the terms of any restrictive or affirmative covenant, or condition of servitude... 16 U.S. C. 742f(b)(1) (Fish and Wildlife Act of 1956);

...for the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ... 16 U.S.C. 3901(b(, 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986); and

...to conserve (A) fish or wildlife which are listed as endangered or threatened species ... or (B) plants ... 16 U.S.C. 1534 (Endangered Species Act of 1973".

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use: We propose to open the Refuge to public deer hunting within the hunting framework established by the Commonwealth of Virginia. All current and future Refuge properties may be opened if the conditions of the hunt conform to the stipulations of this determination. Hunting is one of the six priority public uses of the National Wildlife Refuge System.

We are proposing a deer hunting program for two primary reasons:

1) To maintain the deer population at a level commensurate with available habitat, in order to maintain the health of the herd and prevent habitat degradation that accompanies an overpopulation of deer, and

2) To provide high-quality wildlife-dependent recreational opportunities, in accordance with the National Wildlife Refuge System Administration Act.

As of December 31, 2001, the Refuge consists of 4, 842 acres in 11 tracts, spread over five counties. Habitats include forested riparian zones, fresh and brackish water tidal marsh, upland and bottomland hardwood forest, regenerating pine and mixed hardwood forest, managed grasslands, reverting scrub/shrub fields, and agricultural lands.

Riparian areas are important to roosting and nesting bald eagles. In 2000-2001, 80 active bald eagle nests were observed along the lower Rappahannock River. Eagle concentration areas are located along the River shoreline for approximately 25 miles within the Refuge boundary. The River, adjoining wetlands, and agricultural fields are used by an average of 20,000 ducks, 30,000 geese and 1,000 swans during winter and migration. Over 240 species of birds have been recorded in the Refuge vicinity. The most important wildlife resources found on the Refuge and vicinity during the deer hunting season are bald eagles and migrating and wintering birds.

Hunting could potentially occur from the first week in October to the first week in January. Hunting hours are one-half hour before sunrise to one-half hour after sunset, Monday through Saturday. Sunday hunting is prohibited by State law. Archery season typically extends from the first week in October through the third week in November. Muzzleloading season typically occurs during the second two weeks in November. Firearms season typically extends from the third week in November through the first week in January. The Refuge hunting program may allow hunting during each of these seasons. County firearms regulations prohibit the use of rifles for deer hunting; during the firearms season, only shotguns would be permitted. The Refuge will develop regulations regarding season dates, methods of take, bag limits, open and closed areas, and other program details on an annual basis. These will be included as permit conditions required of each Refuge hunter.

The number of hunters will be determined by the number of acres opened during a given year. A ratio of one hunter, per 25 acres of habitat suitable for hunting, will promote hunter safety and a quality hunting experience. Areas not expected to harbor deer or provide safe hunting opportunities (e.g. tidal marsh and open land) will be excluded from this calculation.

Facilities needed to support hunting will be minimal. We will identify or create several small parking areas, each capable of holding two to ten vehicles. Some of these areas will simply be fields that may be mowed or posted to designate parking areas. Existing roads and pull off areas will be used to the maximum extent possible to avoid any additional loss of habitat. Parking areas will not be located in or near sensitive habitats, such as eagle roosting areas. We will post all Refuge tracts open for hunting, as well as any safety zones or other closed areas.

Availability of Resources: As noted above, development of facilities to support hunting will be minimal. Most of the costs associated with the hunting program will be salary of permanent full time staff. Currently, the staff includes no law enforcement personnel. We will ensure compliance of Federal and State regulations in cooperation with Service special agents, Refuge law enforcement staff brought in on intermittent details, and State game wardens. Some per diem costs, estimated at $320/year will be incurred when employing staff from other refuges.

An analysis of costs associated with the hunting program, included as part of the Deer Hunting Management Plan, is summarized below:

Pre-hunt preparation staff salary:	$3,065 (includes processing applications, conducting stakeholder meetings, parking lot construction, posting, and annual hunt program preparation);
Conducting the hunt staff salary:	$1,612 (includes staffing check station, checking parking areas, opening/closing gates, law enforcement);
Supplies and materials:	$1,800 (includes signs, posts, postage, copying, envelopes, and check station supplies)
Total:	$6,477

We plan to charge a $10.00 permit fee for those selected to hunt. We will request to be included in the recreational fee demonstration program, whereby we will receive 80% of our fee receipts to put back into hunting and other public use programs. Cost estimates are based on 400 applicants and 332 selected hunters for the initial opening (83 hunters per day for four days). Sufficient financial resources exist within the annual Refuge budget to administer this program without significantly impacting other wildlife management responsibilities.

Anticipated Impacts on Refuge Purpose: We assessed the impacts of a hunting program in a Draft Environmental Assessment prepared in December 2001. Impacts discussed in the EA are as follows:

> Based on a nationwide survey of all states (Krausman 1992), deer were effectively controlled with hunting and habitat manipulation in many areas where they were overpopulated. The remaining overpopulated herds were either not hunted, had an inadequate doe harvest, or an inadequate general harvest. Because the population of deer in the Refuge boundary area is open, with numerous tracts and corridors for movement and contact with other herds, it is unlikely that hunting will reduce the population to such low levels as to place it at risk of becoming genetically bottlenecked. Also, no prevention or control of epizootic hemorrhagic disease exists to date except by keeping populations below the carrying capacity of their habitats. In a 10-year study in northwestern Pennsylvania examining the impacts of varying densities of deer on deer health and habitat, starvation mortality resulted when densities reached higher than 25 deer per square kilometer (247 acres). Species richness and abundance of shrubs and herbaceous vegetation was also shown to decline when deer densities reach between 4-8 deer/km^2 (deCalesta and Stout 1997). At high densities, deer may act as a host reservoir for Lyme-disease bearing ticks (Jones et al. 1998). Reducing the deer population will reduce the potential for Lyme disease transmission. Based on these considerations, it is anticipated that hunting would have a positive impact on deer health and quality and habitat condition. Reducing the deer population will also benefit the surrounding human community by reducing damage on crops and residential landscape vegetation.
>
> No adverse impacts to vegetation from trampling from hunters is likely, as most species will have already undergone senescence or become dormant. Soil and water quality are not expected to experience any negative effects under this alternative. The deer hunt would occur outside of the breeding period of most species, thereby avoiding any potential disturbance. The Refuge will abide by the joint Service-State Bald Eagle Protection Guidelines for Virginia. These guidelines provide distance and time-of-year restrictions for activities that could disturb nesting or roosting eagles. Guidelines in effect as of this Environmental Assessment would dictate a season closure of December 1. A Section 7 Consultation with the USFWS Virginia Field Office determined that there will be no adverse impact on bald eagles. No adverse effects on migratory birds or inter-jurisdictional fishes are anticipated as a result of establishing a hunt program. Wintering or resident birds (such as bobwhite quail, wild turkey and savannah sparrows), small mammals, and reptiles may experience some flushing, but there is ample cover in the form of marsh, hedgerows, shrubland, and tall grasses for flushed wildlife to repair to, therefore it is expected that this disturbance will be temporary and normal use will resume shortly after the hunt closes each day.

A managed hunt would provide the public with a quality wildlife-dependent recreational opportunity, as is consistent with the requirements of the National Wildlife Refuge Improvement Act of 1997. The Refuge will be open to hunting starting from the State season opening (usually first week in October) opening until November 30. The Refuge may close to other public uses during hunt days, unless these uses can be safely sequestered from locations of hunting activity.

Public Review and Comment: A news release announcing the availability of this determination, and the Draft Environmental Assessment, for a 30-day public review and comment period, was issued to the following media outlets and individuals on December 14, 2001:

Daily Press
Northern Neck News
Rappahannock Record
Rappahannock Times
Richmond Times Dispatch
Westmoreland News
WRAR radio
WNNT radio
Office of Senator John Warner
Office of Senator George Allen
Office of Representative Jo Ann Davis

The only comment received regarding compatibility was one phone call from a private citizen who felt that hunting, in general, was incompatible on national wildlife refuges.

Determination (check one below):

_____ Use is Not Compatible

__X__ Use is Compatible With the Following Stipulations

Stipulations Necessary to Ensure Compatibility:

1. All deer hunting will end by December 1 to prevent disturbance to eagle concentration areas and nesting sites. This complies with the Bald Eagle Protection Guidelines for Virginia, jointly developed by the U.S. Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries.

2. Results of the hunt, to include impacts from hunters and hunter success, will be reviewed annually to ensure that the program contributes to Refuge objectives in managing deer numbers and protecting habitats.

3. Expansions of the hunt area will only occur if sufficient staff resources exist to safely and effectively administer the program without detracting substantially from higher priority activities.

Justification: Hunting is one of the six priority public uses of the National Wildlife Refuge System and has been determined to be a compatible activity on hundreds of other refuges nationwide.

In the absence of a deer hunting program, or other removal process, deer impacts on Refuge habitats are expected to be severe. The following discussion from the Draft Environmental Assessment of the deer hunting proposal outlines these impacts:

> The no-action alternative includes long-term negative effects such as potential for disease epidemic (Demarais et al 2000), increase in automobile accident rates, browsing pressure on vegetation and crops, and severe habitat degradation (Cypher and Cypher 1988). Overbrowsing will eventually affect the abundance and distribution of vegetative species and have continued effects on the composition of forest canopy for a long time after the deer herd is reduced. For grasslands, cover would quickly regenerate (Porter 1991), however, species composition may be permanently altered. The effects on vegetation composition and forest regeneration is of great concern to Refuge management for maintaining bald eagle and other migratory bird habitat. The intensity of grazing on woody browse in forest fragments is inversely proportionate to the availability of field forbs (Augustine and Jordan 1998). Pastures and old fields are vulnerable to overgrazing when deer densities are high because they contain more and higher quality forage, especially in spring and summer (Johnson et al.1995). Cumulative effects of grazing over successive years may result in reduced plant reproduction and growth (Augustine and Frelich 1998) and height (Anderson 1994), which exposes sensitive plants and places them at risk of extirpation (Augustine and Frelich 1998). The Refuge is concerned about the impacts this phenomena may have on breeding and wintering bird populations and on the existing exemplary plant communities found on the Refuge.
>
> One management concern is that ungulate populations generally overshoot the ultimate carrying capacity of the habitat before an equilibrium is reached (McCullough 1982). White-tailed deer are more prone to habitat alteration during this process than many other species due to their high reproductive potential (McCullough 1982; McCullough 1997), with substantial impact on the vegetation. Deer foraging habits and preferences can change plant composition and structure over time (Russell and Fowler 1999, Augustine and Jordan 1998, Brown and Parker 1997, Van Deelen et al. 1996, Porter et al. 1991) and such alterations have subsequent impacts on other wildlife, such as songbird species richness and abundance (DeCalesta 1994). This impact is magnified when other factors, such as mild weather, alternative food sources (such as crops), and reduced annual mortality allow populations to quickly increase in numbers.

In addition to a general decrease in habitat quality, impacts of high deer densities include a decline in overall deer population health as evidenced by decreased body weights, increased occurrence of deformities, increased levels of internal and external parasitism, decreased body fat deposits, and disease transmission (Cypher and Cypher 1988, Fischer et al. 1995, Demarais et al. 2000).

If allowed to progress unchecked by natural predators or management, deer reproductive potential can be very high. For example, just one mating pair can grow to 1,000 in 10 years, including natural mortality (Yarrow and Yarrow 1999). Although a weak correlation exists between density and fertility rates (reproduction declines at high densities), substantial reproduction still occurs when densities exceed 50 deer per square kilometer (247 acres) (Swihart 1998). This is because of higher number of adult does in the population, and even though they have lowered reproduction, collectively they produce a large number of offspring each year. The goal of the Refuge, therefore, is not to only manage the deer herd to protect habitat but also to protect the overall health of the herd.

Finally, local communities have relied on hunting to curb population growth and limit crop damage from deer, and to provide outdoor recreation. Many of the Refuge units were once farms that participated in local hunts or were open to local hunt clubs. To permanently retire these units from hunting or some type of population reduction would in effect undermine and impair local ability to curb deer population growth on Northern Neck and would result in a loss of wildlife-dependent recreational opportunity. This loss is contrary to the goals of the NWR system.

Signature: Refuge Manager: Joseph F. McCauley 1/14/02
Signature and Date

Concurrence: Regional Chief: Anthony D. Tegen 1/28/2002
Signature and Date

Mandatory 10- or 15-year Re-evaluation Date: January 1, 2017

LITERATURE CITED

Allombert, S., A.J. Gaston, and J.-L. Martin. 2005. A natural experiment on the impact of overabundant deer on songbird populations. Biological Conservation 126(1):1-13).

Augustine, D.J. and Jordan, P.A. 1998. Predictors of white-tailed deer grazing intensity in fragmented deciduous forests. *Journal of Wildlife Management*. 62(3); 1076-1085.

Augustine, D.J. and Frelich, L.E. 1998. Effects of white-tailed deer on populations of understory forb in fragmented deciduous forests. *Conservation Biology*. 12(5); 995-1004.

Anderson, R.C. 1994. Height of white-flowered trillium (*Trillium grandiflorum)* as an index of deer browsing intensity. *Ecological Applications*. 4(1); 104-109.

Baird, K. 1994. Unpublished. Rappahannock Area Development Commission, Fredericksburg, VA.

Black, L. 1994. Unpublished. Middle Peninsula Planning District Commission. Saluda, VA.

Berggren, T. J. and J.T. Lieberman. 1977. Relative contributions of Hudson, Chesapeake, and Roanoke striped bass (*Morone saxatilis*) to the Atlantic coast fishery. *Fish Bulletin* 76:335-345.

Brown, S.E. and Parker, G.R. 1997. Impact of white-tailed deer on forest commmunites within Brown County State Park, Indiana. *Proceedings of the Indiana Academy of Sciences* 106(1-2); 39-51.

Brundage, H.M. III and R.E. Meadows. 1982. Occurrence of the endangered shortnose sturgeon (*Acipenser brevirostrum*) in the Delaware River estuary. Estuaries 5:203-208.

Byrd, M. 1994. Unpublished. College of William and Mary, Williamsburg, VA.

Chesapeake Bay Foundation and Rappahannock River Valley Association. 1992. Lower Rappahannock River Valley Project - Natural and Cultural Atlas. Chesapeake Bay Foundation, Richmond, VA. 22 pp.

Commonwealth of Virginia 1988. Rappahannock water supply plan. Virginia State Water Control Board, Richmond, VA. 294 pp.

Connecticut Department of Environmental Protection 1988. Wildlife Bureau Publication DR-11.

Cypher, B.L. and Cypher, E.A. 1988. Ecology and management of white-tailed deer in northeastern coastal habitats: a synthesis of the literature pertinent to National Wildlife Refuges from Maine to Virginia. USFWS Biological Report 88(15).

deCalesta, D.S. 1994. Effect of white-tailed deer on songbirds within managed forests in Pennsylvania. *Journal of Wildlife Management*. 58(4); 711-718.

deCalesta, D.S. and Stout, S. 1997. Relative deer density and sustainability: a conceptual

framework for integrating deer management with ecosystem management. *Wildlife Society Bulletin* 25(2); 252-258.

Demarais, S., Miller, K.V., and Jacobson, H.A. 2000. White-tailed deer. *In* Ecology and Management of Large Mammals in North America. Demarais, S. and Krausman P.R. (eds.) Prentice-Hall, Inc. New Jersey.

DeNicola, A. J. 1997. Remotely delivered prostaglandin F2a implants terminate pregnancy in white-tailed deer. *The Wildlife Society Bulletin*. 25; 527-531.

DeNicola, A.J., VerCauteren, K.C., Curtis, P.D., Hygnstrom, S.E. 2000. Managing White Tailed Deer: A Technical Guide. Cornell Cooperative Extension, The Wildlife Society, and Northeast Wildlife Damage Research and Outreach Cooperative. Ithaca, NY.

Fischer, J.R., Hansen, L.P., Turk, J.R., Miller, M.A., Fales, W.H., and Gosser, H.S. 1995. An epizootic of hemorraghic disease in white-tailed deer (*Odocoileus virginianus*) in Missour: necropsy findings and population impact. *Journal of Wildlife Diseases.* 31(1); 30-36.

Hobbs, N.T., Bowden, D.C., Baker, D. L. 2000. Effects of fertility control on populations of ungulates: general, stage-structured models. *Journal of Wildlife Management* 64: (2) 473-491.

Hoppe, D.A. 1989. Soil survey of Essex County, Virginia. U.S. Department of Agriculture, Soil Conservation Service. 147 pp.

Johnson, A.S., Hale, P.E., Ford, W.M., Wentworth, J.M. , French, J.R., Anderson, O.F., and Pullen, G.B. 1995. White-tailed deer foraging in relation to successional stage, overstory type and management of southern Appalachian forests. *American Midland Naturalist.* 133(1); 18-35.

Jones, C.G., Ostfeld, R.S. Richard, M.P., Schauber, E.M. and Wolf, J.O. 1998. Chain reactions linking acorns to gypsy moth outbreaks and Lyme disease risk. *Science* 279 (5353); 1023-1026.

Krausman, P.R., Sowls, L.K., Leopold, B.D. 1992. Revisiting overpopulated deer ranges in the United States. *California Fish and Game* 78(1); 1-10.

McCullough, D.R., 1982. The theory and management of Odocoileus populations. *in* Biology and Management of the Cervidae, Wemmer, C. (ed.) 1987; 535-549. Res. Symposium National Zoological Park.

McCullough, D.R. 1997. Irruptive behavior in ungulates. Pages 69-93 *in* W.J. McShea, H.B. Underwood, and J. H. Rappole, eds., The Science of Overabundance: Deer Ecology and Population Management. Smithsonian Institution Press, Washington, D.C.

McShea, W.J., Underwood, H.B., and Rappole, J.H. 1997. Deer management and the concept of overabundance. *In* The Science of Overabundance: Deer Ecology and Population Management. W.J. McShea, H.B. Underwood, and J.H. Rappole (eds.) Smithsonian Institution Press, Washington.

Miller, L.A., Johns, B.E., Elias, D.J. Killian, GJ. 1999a. Oral vaccination of white-tailed deer using a recombinant *Bacillus calmette-guerin* vaccine expressing the *Borrelia burgdorferi* outer surface protein A: prospects for immunocontraception. *American Journal of Reproductive Immunology*. (41)4: 279-285.

Miller, L.A., Johns, B.E., Killian, G.J. 1999b. Long-term effects of PZP immunization on reproduction in white-tailed deer. *Vaccine*. (18)5-6: 568-574.

Mitch, W.J. and Gosselink, J.G. . 1986. Wetlands. Van Nostrand Rheinhold Co., New York. 539 pp.

Mitchell, J.C. 1994. The Reptiles of Virginia. Smithsonian Institution Press. Washington, D.C.
352 pp.

Nelson, M. E. 1979. Home range location of white-tailed deer. U.S. Dep. Agric. For. Serv., Res. Pap. NC-173, 10 p. U.S. Dep. Agric. For. Serv., North Cent. For. Exp. Stn., St. Paul, MN.

Nelson, M.E., and L.D. Mech. 1999. Twenty-year home-range dynamics of a white-tailed deer matriline. Canadian Journal of Zoology 77:1128-1135. Jamestown, ND: Northern Prairie Wildlife Research Center Online. (http://www.npwrc.usgs.gov/resource/mammals/deermat/index.htm)(Version 31May2000).

Nicholson, J.C. 1981. Soil survey of Westmoreland County, Virginia, Virginia. U.S. Department of Agriculture, Soil Conservation Service. 126 pp.

Niering, W.A. and R.S. Warren. 1977. Salt marshes. In Mitsch, W.J. and J.G. Gosselink, eds. 1986. Wetlands. Van Nostrand Rheinhold Company Limited, New York, NY. 539 pp.

Odum, W.E., T.J. Smith, J.K Hoover, and C.C. McIvor. 1984. The ecology of tidal freshwater marshes of the United States east coast: a community profile. U.S. Fish and Wildlife Service. FWS/OBS-83/17. 177 pp.

Porter, W.F. 1991. White-tailed deer in eastern ecosystems: implications for management and research in National Parks. *Natural Resources Report* NPS/NRSSUNY/NRR-91/05.

Porter, W.F., Mathews, N.E., Underwood, H.B. Sage, R.W. Jr., and Behrend, D.F. 1991. Social organization in deer: Implications for localized management. *Environmental Management* 15 (6); 809-814.

Prugh, B.J., P.E. Herman, and D.L. Belval. 1993. Water resources data, Virginia - water year 1992, vol. 1. Surface water discharge and surface water quality records. Rpt. #USGS/WRD/HD-93/243. U.S. Geological Survey, Richmond, VA 564 pp.

Rhodes, R. 1994. Unpublished. Northern Neck Planning District Commission, Callao, VA.

Robinette, C.E. and .S. Hoppe. 1982. Soil survey of Richmond County, Virginia. U.S. Department of Agriculture, Soil Conservation Service. 126 pp.

Russell, F.L., Fowler, N.L. 1999. Rarity of oak saplings in savannas and woodlands of the eastern Edwards Plateau, TX. *Southwestern Naturalist*. 44(1); 31-41.

Shaw, S.P. and C.G. Fredine. 1956. Wetlands of the United States, their extent and their value to waterfowl and other wildlife. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C., Circular 39. 67 pp.

Seagle, S.W. and Close, J.D. 1996. Modeling white-tailed deer (Odocoileus virginianus) population control by contraception. *Biological Conservation* (76)1; 87-91.

Swihart, R.K., Weeks, H.P. Jr., Easter-Pilcher, A.L., DeNicola, A.J. 1998. Nutritional condition and fertility of white-tailed deer (Odocoileus virginianus) from areas with contrasting histories of hunting. *Canadian Journal of Zoology*. 76(10); 1932-1941.

U.S. Department of the Interior, Fish and Wildlife Service and U.S. Department of Commerce, Bureau of the Census. 1996 National Survey of Fishing, Hunting, and Wildlife-Associated Recreation.

Van Deelen, T.R., Pregitzer, K.S., Haufler, J.B. 1996. A comparison of presettlement and present-day forests in two northern Michigan deer yards. *American Midland Naturalist*. 135(2); 181-194.

Virginia Department of Game and Inland Fisheries. 1999. Virginia Deer Management Plan. *Wildlife Information Publication* 99-1.

Virginia Department of Conservation and Recreation, Division of Natural Heritage. 2001. Data files, unpub=d.

Virginia Department of Game and Inland Fisheries. 2001. Fish and Wildlife Information Service, Endangered and Threatened Species.

Yarrow, G.K. and Yarrow, D.T. 1999 Managing Wildlife (Managing Wildlife on Private Land in Alabama and the Southeast. Sweetwater Press, Birmingham, Alabama.

COMPATIBILITY DETERMINATION

Project Title: Recreational Fishing

Station Name: Rappahannock River Valley National Wildlife Refuge

Date Established: May 28, 1996

Establishing Authorities:

The Emergency Wetlands Resources Act of 1986 (100 Stat. 3582-91) for: "...the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions..." (16 U.S.C. §3901(b); 100 Stat. 3583).

The Endangered Species Act of 1973 (16 U.S.C. §1531-1543), as amended: "...to conserve (A) fish or wildlife which are listed as endangered species or threatened species...or (B) plants..." (16 U.S.C. §1534).

The Land and Water Conservation Fund Act (P.L. 88-578; 16 U.S.C. §4601; 78 Stat. 897) for: "...the acquisition of areas needed for conserving endangered or threatened species of fish, wildlife and plants..." (P.L. 94-422; 90 Stat. 1313).

Purpose for which Established:

The purposes for which the Rappahannock River Valley National Wildlife Refuge was established are:

"...for use as an inviolate sanctuary, or for any other management purpose, for migratory birds … 16 U.S.C. § 715d (Migratory Bird Conservation Act," and

"... to conserve (A) fish or wildlife which are listed as endangered species or threatened species .... or (B) plants ... 16 U.S.C. § 1534 (Endangered Species Act of 1973)," and

"... the conservation of the wetlands of the Nation in order to maintain the public benefits they provide and to help fulfill international obligations contained in various migratory bird treaties and conventions ... 16 U.S.C. § 3901(b), 100 Stat. 3583 (Emergency Wetlands Resources Act of 1986)," and

"...for the development, advancement, management, conservation, and protection of fish and wildlife resources ... 16 U.S.C. § 742f(a)(4) (Fish and Wildlife Act of 1956)."

National Wildlife Refuge System Mission: To administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Description of Proposed Use: The following questions and answers provide a concise description of the proposed use.

1. What is the use? Is the use a priority public use? The use is recreational fishing, which is a priority public use of the Refuge System.

2. Where would the use be conducted? We would allow this use on the Hutchinson Tract, the Laurel Grove Tract, the Toby's Point Tract, and the Wilna Tract (see attached Rappahannock River Valley National Wildlife Refuge map). The Wilna Tract is also the site of the Refuge headquarters. We may also allow these uses on other tracts on a case-by-case basis. If they are allowed on other tracts, special use permits would be issued to ensure that the activities follow the stipulations and general compatibility standards set forth in this determination.

General description of the affected areas:

Wilna Tract

The Wilna Tract is approximately 974 acres, and as noted above, is the current location of the refuge headquarters, and the 35-acre freshwater Wilna Pond. Of the 7,711 acres currently under refuge ownership, this is the largest freshwater pond habitat on the refuge. It represents 0.45% of the total refuge ownership. It has an average depth of 5 to 6 feet and sustains a healthy, productive fishery (Galvez and Swihart 2000). Additional facilities that enhance this recreational fishing opportunity include an accessible comfort station and fishing pier. Fishing is conducted from the fishing pier, levee shoreline, and by hand-launch boat, as was approved in the Public Sport Fishing Plan and Compatibility Determination in 1996.

The pier serves both environmental education and fishing uses, but environmental education activities have priority over fishing use. In the event that an environmental education visit is planned, the pier would be closed to fishing for its duration.

There are a variety of habitats including 507 acres of wooded swamp and upland forest, 388 acres of grassland and other early successional habitats, 52 acres of freshwater tidal marsh and open water, nine acres of wet meadow, 2 acres of beachfront on the Rappahannock River, and 16 acres of roads and other administrative areas. The Wilna Tract has nearly one mile of frontage on the Rappahannock River and is accessible from State Route 640 (Sandy Lane).

There is considerable habitat management occurring on the Wilna Tract, including burning and mowing of warm season grasslands, invasive species control, riparian restoration and management, and erosion control (planned). A wide variety of birds use grasslands, shrub lands, and forests year round, as do many resident wildlife species. Bald eagles use the Wilna Tract extensively and bald eagle management guidelines will be followed.

Hutchinson Tract

The Hutchinson Tract is 727 acres located in Essex County along Mt. Landing Creek, a tributary of the Rappahannock River. Fishing at this tract would be facilitated by replacing the existing pier with an accessible fishing pier and floating canoe/kayak launch on Mt. Landing Creek. We

would provide an accessible comfort station, up to two parking areas, and informational signs and brochures containing refuge-specific and state fishing regulations to facilitate this use. Boat access will be provided for hand-launched canoes/kayaks only. A proposed site plan for visitor facilities is attached.

Habitats include 197 acres of planted warm season grasses, 145 acres of planted hardwoods, 240 acres of mixed upland and wet forest types, 134 acres of tidal marsh and open water, and 11 acres of roads and administrative areas. Gravel and dirt roads bisect the tract, one of which extends from Route 17 to Mt. Landing Road (State Route 627). Another road ends at the proposed boat launch and fishing pier on Mt. Landing Creek.

We manage this property primarily for breeding, migrating and wintering birds. Most of our active management (mowing, prescribed burning, invasive species control) is directed toward maintaining approximately 200 acres of grassland habitat. We also monitor and control invasive populations of phragmites in the tidal marshes to maintain the high quality of that habitat for waterfowl, marsh birds, and wading birds.

Laurel Grove Tract

The Laurel Grove Tract is 463 acres located in southern Richmond County. It contains approximately 1.8 miles along Farnham Creek and the 10-acre freshwater Laurel Grove Pond. This pond is relatively deep, averaging over six feet throughout, with abrupt changes in water depth occurring just a few feet from the shoreline (Moss 2007). Marshall Dam, an embankment dam, separates the lake from Farnham Creek.

We propose to allow fishing from the pond shoreline and hand-launched non-motorized boats, canoes, or kayaks. We would provide a small (no more than 10 vehicles) parking lot to facilitate this use, which would be located on the site where three grain silos now stand. The silos have been declared excess property and will be removed. In addition, an interpretive kiosk would be installed adjacent to the parking lot to provide visitors with refuge-specific and state fishing regulations.

The remainder of the tract consists of mixed hardwood and pine forest encompassing 240 acres, 7 acres of tidal marsh, and 1 acre of developed administrative land. In 2003, we worked with partners to restore 205 acres from cropland to forest by planting over 60,000 hardwood saplings on this tract. Within that area, hydrology was restored on 50 acres by ditch plugging and breaking drainage tiles. The tract is bisected by a dirt road.

Management at Laurel Grove is primarily aimed at reducing occurrences of invasive plants. Planted trees are currently providing early successional shrub habitat for nesting, migrating and wintering birds, while mature woodlands are providing habitat needs for a variety of wildlife including forest birds, reptiles and amphibians.

Toby's Point Tract

The Toby's Point Tract is 365 acres located in King George County, near its border with Westmoreland County. This tract adjoins with Wilmont Landing, a county-owned and maintained landing which includes a fishing pier, informational kiosk, boat ramp, and parking

lot. To complement to the existing county pier fishing, we would offer fishing opportunities on approximately 100 feet of refuge shoreline along the Rappahannock River. The existing fishing pier is small, allowing for only one or two anglers at a time. Bank fishing has historically occurred in this area. In cooperation with the county, we would provide informational signs and brochures containing refuge-specific and state fishing regulations.

The remainder of the tract consists of 291 acres of mixed hardwood forest, 66 acres of loblolly forest, and 75 acres of tidal marsh and swamp, with over 2 miles of river frontage. With the exception of invasive species control, this tract is not currently in need of active habitat management, aside from protection and annual white-tailed deer hunts.

As additional lands are acquired, fishing may be considered for other areas.

3. When would the use be conducted? Eventually, we plan to allow public access for recreational fishing on these tracts from official sunrise to sunset. The process of opening each tract will be phased-in as we install appropriate signs, gates, and other measures to control access and ensure safety, quality, and compatibility. If law enforcement problems arise, we may limit hours or otherwise restrict access on a tract by tract basis.

Hunting is permitted on several refuge tracts, including those listed above. During the hunting season, we will either close areas to fishing and other activities not related to hunting, or segregate users to ensure public safety.

4. How would the use be conducted? We are proposing to open the refuge to recreational fishing on these tracts according to State regulations, with some additional restrictions to protect fish and wildlife using the refuge, including the pond areas. We would permit fishing by rod and reel or hook and line only. Angler access will be different at each tract and is detailed above in section 2. No lead sinkers will be permitted on refuge ponds. We will not require lead-free gear in the refuge's tidal waters until such gear is reasonably available. Fishing for largemouth bass will be catch-and-release only in the Wilna and Laurel Grove ponds to maintain the existing health and productivity of the fisheries.

5. Why is the use being proposed? This use is being proposed by the refuge to accommodate one of the priority public uses of the Refuge System. There is a scarcity of public fishing opportunities in the Northern Neck and Middle Peninsula of Virginia, and this is coupled with an increasing demand for access to recreational waters. For those citizens without access to boats, fishing opportunities are limited. According to the 2006 Virginia Outdoor Survey, the second biggest need for outdoor recreation in the next five years is increased public access to recreational waters (VDCR 2007). This is supported by the U. S. Geological Survey's Community Survey that was conducted for the refuge's Comprehensive Conservation Plan (CCP). When asked which additional recreational opportunities community members desired on the refuge, the second highest mean desirability was for fishing (USGS 2007). Additionally, according to the 2002 Virginia Outdoors Plan, there continues to be a lack of opportunity in the region for lake fishing. When compared to the demand, this is projected to be in deficit by 2010 in both the Northern Neck and Middle Peninsula. We have the opportunity to provide public recreational fishing opportunities in manners and locations that will offer high quality wildlife-dependent recreation, and maintain the level of current fish and wildlife values.

Availability of Resources: Facilities or materials needed to support this use include upgrading and maintaining access roads; creating and maintaining parking areas; providing fishing brochures and maintaining our web site to explain fishing regulations and describe permitted activities; constructing a non-motorized boat launch, restroom, and fishing pier at the Hutchinson Tract; purchasing and installing kiosks at the Hutchinson and Laurel Grove tracts; designing and producing panels to provide fishing regulations; and monitoring of the fisheries at the Wilna and Laurel Grove ponds.

Funding for visitor improvements comes from a variety of sources including general management capability funds, challenge cost share projects, grant funds, contributions, and special project funds. We will complete and maintain projects and facilities as funds become available and will use volunteers and partners to help in construction and maintenance.

Over the past five years, approximately $275,000 has been allocated from special project funds to create infrastructure at the Wilna Pond site. We have $1 million available from Federal Highway Administration funding to upgrade refuge roads in 2008, including roads at the Hutchinson, Wilna, and Tayloe tracts. In 2007, $310,000 was allocated for visitor enhancements at the Hutchinson Tract. An additional $10,000 for portions of the Hutchinson Tract project was received from donations and a Chesapeake Gateways grant. Sufficient staff and maintenance funding within our base budget of nearly $850,000 is available to make annual progress toward completion of all the projects described above and to maintain those already completed.

Anticipated Impacts on Refuge Purpose: The activities proposed herein are supported by the goals and objectives of the refuge's Draft CCP. Providing compatible wildlife-dependent recreation and education is common to all alternatives listed in the CCP. The Service's preferred alternative lists the following goal related to visitor use of the refuge:

> Goal 4: Promote enjoyment and stewardship of our Nation's natural resources by providing quality, wildlife-dependent recreation and education opportunities on refuge lands and waters.

Alternative B, Goal 4, Objective 4.4, Recreational Fishing, relates to this determination.

As noted on page one of this compatibility determination, there are four purposes for establishment and management of this refuge. In general, they relate to four primary conservation and management responsibilities:

1. Migratory birds,
2. Threatened and endangered plant and animal species,
3. Wetlands, and
4. Other fish and wildlife resources.

Following is a discussion on the anticipated impacts of the proposed uses related to the resources listed within refuge purposes.

***Potential impacts to birds*:** An indirect benefit to upland habitats and associated species would derive from careful, strategic management of this fishing program. Public awareness and appreciation of the refuge, its habitats, and resources would inspire some to volunteer or in other ways support the refuge needs and conservation of resources on the landscape in general.

Increases in annual visitor numbers during the daytime (public use sites would be open only from official sunrise to sunset) will surely result from replacing the fishing pier at Hutchinson, constructing parking areas, installing informational kiosks, and other planned activities described herein, although it is difficult to predict a frequency or rate. Visitors at these sites may flush rafting waterfowl or eagles hunting the marshes within view of a trail, launch or pier, although we anticipate that in the winter public use at these locations would be moderate, at least in the early years after opening. Higher rates of public use would occur during the warmer months, when most waterfowl are on northern breeding grounds. Wetland species likely to be disturbed and flushed during the warmer months include bald eagle (fewer than in winter), belted kingfisher, mallard, great blue heron, and basking turtles. The sites are not particularly sensitive, rare, or in close proximity to nest areas, and there are protected and secluded areas nearby where disturbed wildlife can repair to. Disturbance is therefore anticipated to be minor, temporary, and infrequent.

Paths from parking areas to fishing access have the potential to disturb forest interior dwelling bird species at the Laurel Grove and Hutchinson tracts. Direct impacts on wildlife in the form of disturbance can be expected wherever humans have access to an area, and the degree may vary depending on the habitat type. In general, human presence disturbs most wildlife, which typically results in a temporary displacement without long-term effects on individuals or populations. Some species, such as wood thrush, will avoid areas frequented by people, such as developed trails and structures, while other species, particularly highly social species such as eastern tufted titmouse, Carolina chickadee, or Carolina wren, seem unaffected or even drawn to a human presence. When visitors approach too closely to nests, they may cause the adult bird to flush exposing the eggs to weather events or predators. Provided that visitor use is confined to designated areas, disturbance during the breeding season will be limited to those areas. Overall, direct impacts from access to fishing areas would be greatly reduced if facilities avoid area-sensitive habitats (interiors of grasslands and forests) and are confined to a 300-foot edge zone, which is what we plan to implement.

A potential direct negative impact exists for wetland and open waterbird species (such as osprey, herons, and waterfowl) from lost fishing gear; specifically, hooks, lures, and litter, or becoming entangled in fishing line or hooks. Ingestion of lead sinkers is another source of concern throughout the region, but use of lead sinkers is not permitted on refuge ponds. The extent to which these bird species are impacted by fishing tackle currently is unknown. We will continue to work with our fisheries assistance office and the State in implementing a public education and outreach program on these issues. Increased law enforcement is also planned.

***Potential impacts to threatened and endangered species*:** Despite their removal in 2006 from the Federal List of Endangered and Threatened Species, we included bald eagles in this section due to the fact they were a focal species during refuge establishment and because of the extra protection they are afforded under the Bald and Golden Eagle Protection and Migratory Bird Acts. The only federal-threatened species confirmed to exist on the refuge is the sensitive joint-vetch.

Permitting public access to any waterfront or marsh managed by the refuge holds the possibility of impacting bald eagles or sensitive joint vetch. Impacts may either be displacement or

temporary disturbance depending extent of use of a given site by visitors and eagles. The improvements planned for the fishing program will not impact sensitive joint vetch. However, bald eagles use the trees along Mount Landing Creek (Hutchinson Tract), Laurel Grove Pond, and Wilna Pond, but not in high concentrations. The shoreline at Toby's Point is located in a concentration area. As trees mature and forest riparian buffers are improved, sites with low concentrations will likely increase in importance to bald eagles.

We will avoid potential adverse impacts to bald eagles by strictly following the management guidelines developed in consultation with the Virginia Department of Game and Inland Fisheries and the Center for Conservation Biology. These include sight and distance setbacks from nests and concentration areas, and time-of-year restrictions.

***Potential impacts to wetlands*:** Potential adverse impacts to wetlands could arise if facilities were improperly placed in wetland habitats, if public use were allowed to occur directly in wetlands, or if erosion of sediments into wetlands was allowed to occur during facility construction.

The only facilities proposed for construction in wetlands are the pier and canoe/kayak launch at the Hutchinson Tract. Together, construction of these facilities will cause temporary and minimal (less than 0.01 acre) impacts to wetlands. We will employ silt fencing and other best management practices during construction of any facilities in proximity of wetlands to avoid runoff of sediments.

Many of our interpretive messages included on kiosk panels remind visitors of the importance of wetlands and the many beneficial functions they provide to society, including wildlife habitat, flood protection, groundwater recharge and nutrient uptake.

Potential impacts to other fish and wildlife: Direct impacts on wildlife in the form of disturbance can be expected wherever humans have access to an area, and the degree may vary depending on the habitat type. In general, human presence disturbs most wildlife, which typically results in a temporary displacement without long-term effects on individuals or populations.

Major concerns of any refuge fishing program are accidental or deliberate introductions of non-native fish (used for bait), accidental introduction of invasive plants, pathogens, or exotic invertebrates attached to fishing boats, and over-harvesting. The refuge does not permit use of live minnows in order to prevent the likelihood of introductions of non-native fish. Another common concern is the reduction or alteration of prey base important to fish-eating wildlife. Refuge-specific regulations address this concern by limiting bass fishing to catch and release only at Wilna and Laurel Grove ponds. The current fishing program of the refuge follows the Virginia state regulations and would adopt any State harvest limits that should become applicable to the fish species in these ponds. These limits are set to ensure that harvest levels do not cumulatively impact native fish resources to the point they are no longer self-sustainable. We also follow recommendations of Service fisheries biologists who conduct periodic sampling of refuge ponds. We plan to continue to work with State conservation officers in implementing a public education and outreach program, and increased law enforcement is also planned to address the above concerns.

Mammals in Virginia occupy a diverse array of habitat types, ecological niches and food webs and play an important role in the ecosystems in the refuge boundary. As a taxonomic group, mammals will also benefit from the refuge land protection and management actions relative to riparian habitats, forests, grasslands, shrub, and wetlands proposed for listed species, waterfowl, and migratory birds. Likewise, the refuge will benefit from careful attention to the impacts to mammals resulting from any of its activities. We evaluated the management actions proposed for this use for their potential to benefit or adversely affect large and small, aerial, terrestrial, and wetland mammals and believe that they should have no long-term impact on mammal use of the refuge.

Protection and good stewardship of the area's herpetofauna is another priority of the refuge, and fits into nearly all the goals for wetlands, uplands, and riparian habitats. We evaluated the public uses described herein for their potential to benefit or adversely affect amphibians and reptiles or their habitats used for mating, reproduction, over-wintering, and foraging. Although most species that occur on the refuge are very common and widespread, there is concern for two species of turtle: eastern box and spotted turtles. In addition, amphibians everywhere are considered to be experiencing a general decline. Some areas are experiencing loss of mixed mature forest due to development or high rates of conversion to timber farms. This impacts vernal pools needed by amphibians for over-wintering and reproduction. No vernal pools will be impacted by these proposed activities. Public outreach and education efforts by the refuge that emphasize buffering of wetlands, connectivity and easy access between forest, grassland, and wetlands, protection of vernal pools, and augmentation of patch size will benefit amphibians and reptiles on an even larger scale where embraced by other landowners.

Sometimes maintenance actions for public use may involve preparations or outcomes that have direct negative impacts to amphibians and reptiles. Mowing of grassy access roads and public use trails that lead to these proposed fishing areas occasionally destroys turtles, snakes or frogs if conducted during times of movement (warm months). The best way to minimize this direct type of negative impact is to keep public use and access roads mowed short so that they do not become attractive habitat. However, in many cases it will be impossible to find a perfect time to carry out maintenance actions that will completely avoid conflict for wildlife.

Construction of gravel parking areas and trails leading to the fishing areas pose the potential threat of blocking access between different habitat types, depending on the placement, length, width, and substrate material of the lot and trails leading to the fishing sites. Some salamander species will not cross openings that are too wide or dry, bare ground (Vinson 1998), thus earthen trails, if exposed to sunlight could become dry enough to form a barrier. Gravel roads or trails, even though permeable, may also act as a barrier to salamander movement (Marsh et al. 2005). The planned graveled trails and parking areas are for wheelchair access and will therefore be located on level terrain, avoiding ravines which are home to amphibians and reptiles. At most these trails will be five miles in length on four tracts, and their widths no more than six feet. Other walking trails will be simple cleared paths and perhaps mulched in some locations, but these too will avoid moist ravines close to amphibian habitat.

Disturbance to basking or nesting turtles may occur where public use is concentrated at points where land and water interface. Basking turtles can usually find alternate resting surfaces. Nesting turtles, once engaged in the act of digging usually will not allow their attention to be

drawn to anything else, and at such time are vulnerable to predators. A turtle wishing to make landfall to attempt egg-laying however, may be dissuaded by the presence of humans at the site. Because there will be ample wetland-forest-grassland interface elsewhere, we expect that the cumulative impact of parking lots, roads, and trails to amphibians and reptiles at the landscape scale will be insignificant.

In summary, our research, observations and knowledge of the area provide no evidence that cumulatively, the visitor activities we propose to allow will have an unacceptable effect on wildlife resources or their habitats. We do not expect a substantial increase in the cumulative effects of visitor use from this program. Refuge staff will monitor and evaluate the effects of visitor use, in collaboration with state agencies and partners, to discern and respond to unacceptable impacts on wildlife or habitats.

Public Review and Comment: This determination was made available for a 30-day public review and comment period in conjunction with the release of the Draft CCP and Environmental Assessment for the refuge.

Determination (check one below):

_____ **Use is Not Compatible**

__X__ **Use is Compatible With the Following Stipulations**

Stipulations Necessary to Ensure Compatibility:

1. All activities will comply with the Bald Eagle Protection Guidelines for Virginia, jointly developed by the U.S. Fish and Wildlife Service and the Virginia Department of Game and Inland Fisheries, in consultation with the Center for Conservation Biology.

2. Results of the fishing program will be reviewed annually to ensure that the program contributes to refuge objectives in managing quality fisheries and protecting habitats.

3. Lead sinkers and other lead tackle will be prohibited on refuge ponds to prevent ingestion, and possible lead poisoning, by wildlife.

4. Fishing will be permitted only in designated areas to prevent erosion and degradation of wetlands and water quality.

5. Fishing will follow all State regulations as well as tract-specific refuge regulations.

Justification: Fishing is one of the six priority public uses of the National Wildlife Refuge System and have been determined to be a compatible activity on hundreds of other refuges nationwide. The Refuge System Improvement Act of 1997 instructs refuge managers to seek ways to accommodate these six activities. The refuge properties described in this determination offer a wide variety of habitats and compatible wildlife-dependent recreational opportunities.

Impacts from this proposal, both short-term and long-term, direct, indirect, and cumulative, are expected to be minor and are not expected to diminish the value of the refuge for its stated purposes. The area affected by the proposed use represents a small fraction of the refuge land area. Available parking and size of the facilities will typically limit use at any given time, except during special events. Monitoring the health and continued sustainability of the fisheries at Wilna and Laurel Grove ponds will provide a basis for future recommendations to ensure the continued productivity of refuge habitats.

In accordance with 50 CFR 26.41, opening the Rappahannock River Valley National Wildlife Refuge to fishing, as described herein, will not materially interfere with, or detract from, the fulfillment of the National Wildlife Refuge System mission or the purposes for which the refuge was established.

Signature: Refuge Manager: Joseph F. McCauley 12/14/09
(Signature and Date)

Concurrence: Regional Chief: Anthony D Léger 12/21/2009
(Signature and Date)

Mandatory 15-year Re-evaluation Date: December 21, 2024

References:

Commonwealth of Virginia, Department of Conservation and Recreation, Division of Planning and Recreation Resources. 2002. *Virginia Outdoors Plan*. 445pp.

Galvez, John I. and Swihart, Gary L. 2000. *Assessment of Fishery Resources and Water Quality Parameters at Lake Wilna – Rappahannock River Valley National Wildlife Refuge, Virginia.* U.S. Fish and Wildlife Service Office of Fishery Assistance, Gloucester, Virginia. 26pp.

Marsh, D.M., G.S. Milam, Gorham, N.P. N.G. Beckman. 2005. Forest roads as partial barriers to terrestrial salamander movement. Conservation Biology. 19:6, 2004-2008.

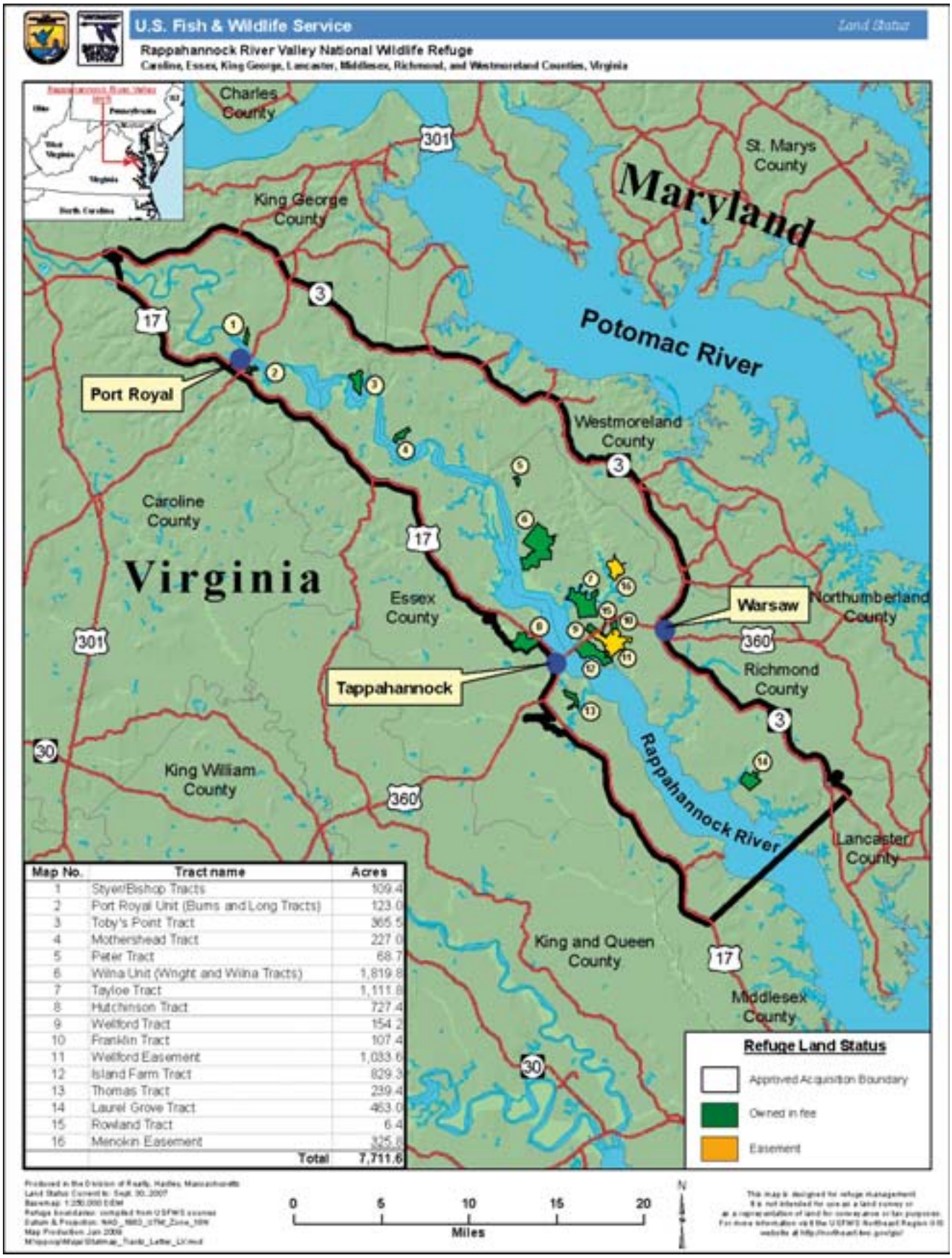
Moss, Lisa. 2007. *Fishing and Aquatic Resources Management Plan, Rappahannock River Valley National Wildlife Refuge, Laurel Grove, Farnham, Virginia.* U.S. Fish and Wildlife Service Gloucester Fishery Resources Office, Charles City, Virginia.

USGS. 2007. Draft Community Survey Results for Rappahannock River Valley National Wildlife Refuge: Completion Report.

Vinson, M. 1998. Effects of recreational activities on declining anuran species in the John Muir Wilderness, CA. Missoula, MT: University of Montana. 83 p. Thesis.

Virginia Department of Conservation and Recreation. 2007. Draft Virginia Outdoors Plan http://www.dcr.virginia.gov/recreational_planning/vop.html

Map B.8. Rappahannock River Valley National Wildlife Refuge and its Regional Setting



Map No.	Tract name	Acres
1	Styer/Bishop Tracts	109.4
2	Port Royal Unit (Burns and Long Tracts)	123.0
3	Toby's Point Tract	365.5
4	Mothershead Tract	227.0
5	Peter Tract	68.7
6	Wilna Unit (Wright and Wilna Tracts)	1,819.8
7	Taylor Tract	1,111.8
8	Hutchinson Tract	727.4
9	Wellford Tract	154.2
10	Franklin Tract	107.4
11	Wellford Easement	1,033.6
12	Island Farm Tract	829.3
13	Thomas Tract	239.4
14	Laurel Grove Tract	463.0
15	Rowland Tract	6.4
16	Menokin Easement	325.8
	Total	7,711.6