November 15, 1999

Ms. Pamela P. Anderson
Department of the Navy
Naval Facilities Engineering Command
1510 Gilbert Street
Norfolk, Virginia 23511-2699

Attn: Mr. Steven Hubner

Re: Circular Disposed Antenna Array, NSGA Northwest - Chesapeake, Virginia

Dear Ms. Anderson:

The U.S. Fish and Wildlife Service has reviewed project plans for the U.S. Navy's proposal to clear vegetation on 48 acres to maintain an existing Circular Disposed Antenna Array at the Naval Security Group Activity Northwest, in the City of Chesapeake, Virginia. Your July 8, 1999 request for formal consultation was received on July 14, 1999. This document represents the Service's biological opinion on the effects of that action on the Dismal Swamp southeastern shrew (*Sorex longirostris fisheri*) in accordance with section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 et seq.).

This biological opinion is based on information provided in the Navy's July 8, 1999 letter, and other sources of information. A complete administrative record of this consultation is on file in this office.

I. CONSULTATION HISTORY

7-14-99 The Service receives request from the U.S. Navy, dated July 8, 1999, to initiate formal consultation.

7-30-99 Letter from Service to the Navy acknowledging that the Navy's July 8, 1999 letter requesting initiation of consultation was complete.

II. BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The U.S. Navy proposes to conduct vegetation clearing on approximately 48 acres to maintain the "clear zone" of an existing Circular Disposed Antenna Array (CDAA), located at the Naval Security Group Activity Northwest. While the Navy facility is headquartered in the City of Chesapeake, Virginia, the facility extends into North Carolina, and the antenna array is actually located in Currituck County, North Carolina (Figures 2 and 3). The purpose of the project is to reduce the height of the

existing vegetation below three feet. The proposed action is to cut all standing trees and vegetation in the 48 acre area shown on Figure 1. The cut vegetation, as well as the stumps and root mat will be left in place. Natural regeneration of the site will be allowed to proceed until the trees intercept the 3 degree reflecting area in about 20 to 30 years. The current height of the trees (35 to 66 feet) is interfering with antenna signal transmission and reception. The Navy will use a contractor to conduct the vegetation clearing. The contract will stipulate that stump grinding, root raking, drum chopping, or similar mechanized ground disturbing activities will not be permitted. Only low ground pressure wheeled or tracked, flail/brush cutting equipment, or hand cutting, will be utilized. All cut vegetation will remain on-site, and will be distributed so that the slash does not exceed three feet in height. There will be no construction of access roads, ditches, or landings to accomplish the clearing. Because the project involves only vegetation clearing in a wetland area, no Department of the Army permit from the U.S. Army Corps of Engineers is required for this project.

Action Area - The action area is defined as all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The Service has determined that the action area for this project consists of the 48 acres that will be impacted by the vegetation clearing. The 48 acres to be cut was cleared approximately 30 years ago when the antenna array was initially constructed. The clear zone was allowed to regenerate naturally until the trees intercepted the antenna's reflecting area. The site is flat with poorly drained soils from the Nimmo-Tomotley-Acredale soil association. The overstory vegetation is composed of sweetgum, red maple, and scattered loblolly pine. Tree diameter is between 1 and 10 inches diameter at breast height (DBH), and tree density is about 400 stems per acre. The understory vegetation is comprised of switch cane, greenbriar, honeysuckle, and wax myrtle. The site has not been thinned or prescribed burned since it was cleared and grubbed of all vegetation about 30 years ago.

STATUS OF THE DISMAL SWAMP SOUTHEASTERN SHREW RANGEWIDE

Species Description - The Dismal Swamp southeastern shrew is a small, long-tailed shrew with a brown back, slightly paler underparts, buffy feet, and a relatively short, broad nose (Handley 1979a). It weighs 3 to 5 grams and measures up to 10 centimeters in length. The species was first described as *Sorex fisheri* by C.H. Merriam (Merriam 1895). Merriam's description was based on four specimens trapped near Lake Drummond, Virginia by A.K. Fisher of the U.S. Department of Agriculture's Bureau of Biological Surveys. Rhoads and Young (1897) captured a specimen in Chapanoke, Perquimans County, North Carolina, that seemed intermediate between *S. fisheri* and the southeastern shrew (*Sorex longirostris* Bachman) (Handley 1979b). Jackson (1928) subsequently reduced *S. fisheri* to a subspecies of *S. longirostris*. Three subspecies of southeastern shrew are now recognized -- *Sorex longirostris eionis*, which occurs in the northern two-thirds of peninsular Florida (Jones *et al*. 1991); *S. l. fisheri*, which occurs in southeastern Virginia and eastern North Carolina; and *S. l. longirostris*, which occurs in the rest of the range that extends through eastern Louisiana, eastern Oklahoma, and Missouri, then eastward through central Illinois and Indiana, southern Ohio, and Maryland. Jones *et al*. (1991) examined the taxonomic status of these three subspecies and verified

substantial size differences among them. The authors found that *S. l. eionis* was significantly larger in four cranial measurements when compared with the other two subspecies; *S. l. fisheri* was significantly large in one cranial and one external measurement; and *S. l. longirostris* had a relatively short palate and rostrum, narrow skull, and short foot and tail. This study confirmed the subspecific status of *S. l. fisheri*. The species was listed as threatened by the U.S. Fish and Wildlife Service pursuant to section 4 of the Endangered Species Act in 1986.

Life History - Apart from a litter of five young found in a nest in the Dismal Swamp in 1905, little is known about reproduction or other life history features of *Sorex longirostris fisheri* (Handley 1979b). However, more is known about the life history of other *Sorex* species, and this information may apply to *S. l. fisheri*. *Sorex longirostris* reproduces from March through October, and it is likely that two litters are born each year, with one to six young produced per litter (Webster *et al.* 1985). Nests are shallow depressions lined with dried leaves and grasses and are usually associated with rotting logs (Webster *et al.* 1985). Young shrews grow rapidly and are almost adult size when they leave the nest (Jackson 1928). *Sorex longirostris* forage on spiders, crickets, butterfly and moth larvae, slugs, snails, beetles, centipedes, and vegetation (Webster *et al.* 1985, Whitaker and Mumford 1972). Little information is available about the daily activity patterns of *S. longirostris*. They forage intermittently throughout the day and night in all seasons, seem to be most active after rains and during periods of high humidity, and do much of their foraging in the leaf litter or in tunnels in the upper layers of the soil (Jackson 1928). Predators include barred and barn owls, cats, dogs, opossums, and occasionally snakes (French 1980).

The Dismal Swamp southeastern shrew is found in a range of habitats in southeastern Virginia and eastern North Carolina, a range that includes the species' type locality, the Great Dismal Swamp. The species has been found in a variety of habitats, including recent clearcuts, regenerating forests, young pine plantations, grassy and brushy roadsides, young forests with shrubs and saplings, and mature pine and deciduous forests (U.S. Fish and Wildlife Service 1995). The shrew has been found in highest densities in early successional habitats, such as cane stands; shrub-dominated areas; and young, open forests that retain a fairly dense herbaceous understory (Padgett 1991, Rose 1983). The shrew also occurs at high densities within cleared rights-of-way, such as those used for utility lines, since these areas often contain early successional habitats such as scrub-shrub. Although supporting lower densities, mature forests provide habitat diversity important to the integrity and dynamic structure of shrew populations across their entire range and are likely to be important to the survival of these shrews during periods of drought and fire. Densities of shrews in early successional stages are 10 to 30 per hectare (Rose 1995). Rose (1995) stated that, based on his previous studies, mature forests yield approximately 1/4 or less of the densities of *S. longirostris* compared with early successional stage habitats dominated by grasses and shrubs. Mature forests with closed canopies have densities of one to four shrews per hectare (Rose 1995). "Within two years of the cutting of a forest plot, and probably for 8-12 years afterwards on such cutover plots, the densities of southeastern shrews are likely to be five or more times greater than in nearby mature forests. (The number of years depends, in part, on whether the trees on the sites regenerate naturally or are planted.)" (Rose 1995).

Status and Distribution - Until recently, the distribution of *Sorex longirostris fisheri* was considered coincidental with the historical boundaries of the Great Dismal Swamp (Handley 1979a, Hall 1981, Rose 1983). Prior to its listing as a threatened species in 1986, Rose (1983) conducted surveys for the species in Currituck and Gates Counties, North Carolina, and in the Cities of Chesapeake, Suffolk, and Virginia Beach and the Counties of Isle of Wight and Surry in Virginia. Rose determined that *S. l. fisheri* was associated with the Dismal Swamp proper, except for a population north of the Great Dismal Swamp National Wildlife Refuge and a population east of the Refuge. A narrow zone of hybridization (these populations contained specimens that represent the parent stocks and individuals that may be hybrids) was found to border the Dismal Swamp running approximately north/south along its western edge and running northwest/southeast adjacent to the southeastern corner of the Refuge. *Sorex longirostris longirostris* was found to the east and west of the Dismal Swamp with distinctive populations of *S. l. longirostris* occurring within 20 miles of the Dismal Swamp border. The results of this analysis indicated that the largest *Sorex* were located within the Refuge and the smallest *Sorex* were located at greater distances from the Refuge, with specimens of intermediate size on the margins of the Refuge. This suggested that interbreeding of the two subspecies might be occurring, particularly at the margins of the Refuge. Rose (1983) tentatively recommended that *S. l. fisheri* be listed as threatened primarily because of the potential for contact and interbreeding with *S. l. longirostris*.

While a significant amount of study on the distribution of the Dismal Swamp southeastern shrew had taken place in Virginia subsequent to its Federal listing, knowledge of the species in North Carolina continued to be sparse. D.W. Webster of the University of North Carolina-Wilmington began collecting southeastern shrew specimens from eastern North Carolina and made comparisons to the voucher specimen for *S. l. fisheri* at the Smithsonian Institution. Webster *et al.* (1996a, 1996b) compared *Sorex longirostris* specimens from east-central and southeastern North Carolina to specimens from the Dismal Swamp. They also examined specimens from Charleston County, South Carolina (near the type locality for *S. l. longirostris*) and Citrus County, Florida (the type locality for *S. l. eionis*), and representative samples of *S. longirostris* from throughout the southeastern U.S. They concluded that *S. l. fisheri* "is much more widespread and ubiquitous than previously believed."

From this information, it was determined that morphometric characteristics would be used to better delineate the geographic distribution of *S. l. fisheri* in Virginia and North Carolina. The morphometric analysis used 626 *S. longirostris* from the southeastern U.S. (15 from Florida, 375 from North Carolina, 159 from Virginia, and the remaining 77 from Alabama, District of Columbia, Indiana, Kentucky, Maryland, Mississippi, Missouri, South Carolina, and Tennessee). The morphometric analysis included six cranial measurements, palatal length, and braincase length. If available from specimen tags, the total specimen length, tail length, hind foot length, and weight were also utilized. Head and body length or the difference between total length and tail length were determined where possible. There was significant geographic variation in all cranial measurements; samples from southeastern Virginia, eastern North Carolina, and southern Georgia and Florida had much larger cranial characteristics than samples from elsewhere in the range. The significant geographic variation in

external measurements and weight typically followed the same pattern. A two-dimensional plot of the samples formed three clusters: (1) shrews from Georgia and Florida that have longer and overall much wider crania; (2) shrews from southeastern Virginia and eastern North Carolina that have longer crania with relatively narrower rostra; and (3) shrews from elsewhere in the range that were smaller in all cranial measurements. This plot explained 93.2 percent of the total morphometric variation exhibited in *S. longirostris* crania. Shrews from the Piedmont and mountains of Virginia and North Carolina were more similar to specimens from the Mississippi and Ohio River basins than they were to those from the mid-Atlantic coast.

Webster *et al*. (1996a, 1996b) concluded that *Sorex longirostris fisheri* ". . . has a much broader geographic distribution than previously believed, extending from southeastern Virginia to southeastern North Carolina along the outer coastal plain. In Virginia, all specimens examined from Isle of Wight County, the City of Chesapeake, and the City of Virginia Beach are referable to *S. l. fisheri*, whereas those from Surry, Sussex, and Southampton Counties are assignable to *S. l. longirostris*. In North Carolina, *S. l. fisheri* is distributed throughout the coastal counties as far south as New Hanover, Brunswick, and Columbus Counties." Since the conclusion of that study, *S. l. fisheri* has been documented in Hyde County, North Carolina (D.W. Webster, pers. comm. 1997). No trapping for *S. longirostris* has been conducted in Onslow, Martin, Pamlico, or Burtie Counties, North Carolina (D.W. Webster, pers. comm. 1997). Webster (pers. comm. 1997) does not have any records of *S. l. fisheri* from Pasquotank County, although surveys were conducted there in 1995. At the time of listing, Pasquotank County was listed as a county of occurrence for *S. l. fisheri*, however, the literature cited does not support this.

Gurshaw (1996) examined allozyme variability in specimens of the southeastern shrew from North Carolina and Virginia to identify characters that differentiate *Sorex longirostris fisheri* and *S. l. longirostris* and to determine if there are similarities between shrews from the Dismal Swamp region and the coastal plain of southeastern North Carolina. She found that shrews from the coastal plain of southeastern North Carolina grouped most closely with those from the Dismal Swamp. The author found an allele in the shrews from the coastal plain that represents a genetic distinction from *S. l. longirostris*. Distribution of this allele appeared to follow the Fall Line, the boundary between the Piedmont plateau and upper coastal plain in the southeastern U.S.

At the time of listing, *Sorex longirostris fisheri* was believed to occur in only two cities in Virginia and four counties in North Carolina. *Sorex longirostris fisheri* is now known to occur in Beaufort, Bladen, Brunswick, Camden, Cateret, Chowan, Columbus, Craven, Currituck, Dare, Duplin, Gates, Greene, Hyde, Jones, Lenoir, New Hanover, Pender, Perquimans, Robeson, Scotland, Tyrrell, and Washington Counties in North Carolina and Chesapeake, Suffolk, and Virginia Beach Cities and Isle of Wight County in Virginia. Information gaps still exist in the distribution of *S. l. fisheri* in North Carolina and potentially South Carolina. Jones *et al*. (1991) noted a sample of *Sorex* specimens from coastal South Carolina that appeared to be similar to *S. l. fisheri*, but substantiation is needed regarding the taxonomy of these specimens.

Threats to the Species - Extensive habitat alteration has occurred within the area historically occupied by the Great Dismal Swamp. At the beginning of the twentieth century, the Dismal Swamp occupied 2,000 to 2,200 square miles (sq mi) (5,200 to 5,700 square kilometers (sq km)). Currently, less than 320 sq mi (830 sq km) of the historical Dismal Swamp remain, 189 sq mi (490 sq km) of which are protected within the Great Dismal Swamp National Wildlife Refuge and the Great Dismal Swamp State Park in North Carolina. Remnants of the historical Dismal Swamp outside Refuge and State Park boundaries and land beyond the historical Dismal Swamp boundaries are disappearing due to development associated with the rapid growth of the Hampton Roads metropolitan area of southeastern Virginia. Agricultural and silvicultural conversions (especially in North Carolina) also contribute significantly to habitat loss. Habitat loss was a primary reason for listing the Dismal Swamp southeastern shrew, considered at the time to be endemic to the historical Dismal Swamp. However, because the species is now known to occur across a much larger area and in a wider variety of habitats, the threat of habitat loss is not as significant as was believed at the time of listing.

At present, the only known method for studying or monitoring the Dismal Swamp southeastern shrew involves lethal collection with pitfall traps. Researchers have been permitted to take individuals of the species to gain an understanding of its taxonomy, ecology, and distribution. However, because the Dismal Swamp southeastern shrew has a high reproductive potential and a rapid maturation rate, limited collection of individuals is not considered detrimental to healthy populations. Utilization for commercial, recreational, or educational purposes is not known to occur.

Southeastern shrews are subject to some predation, most frequently by owls, snakes, opossums, and domestic cats and dogs (French 1980, Webster *et al*. 1985). The number of dead shrews found in woods and on roads suggests that many predators reject the shrew, probably because of the bad taste associated with their musk glands (French 1980). There is no evidence that predation or disease is a significant threat to the Dismal Swamp southeastern shrew.

One of the reasons for listing the Dismal Swamp southeastern shrew was concern regarding the possible loss of genetic integrity through interbreeding with the nominate subspecies. Gurshaw (1996) examined allozyme variability in specimens of the southeastern shrew from North Carolina and Virginia. She found an allele in the shrews from the coastal plain that represents a genetic distinction from *Sorex longirostris longirostris* and that appeared to follow the Fall Line. The author stated, "A cline for this allele may be shifted in the direction of dispersal in proportion to the direction of gene flow through barriers such as the Fall Line and population size. If the populations containing . . . (this) . . . allele are small, they will not have as many individuals dispersing . . . and gene flow may be restricted (Endler, 1977). In this study, however, the opposite appears to be happening. Populations with . . . (this allele) . . . are widespread in eastern North Carolina and southeastern Virginia, with gene flow carrying . . . (this) . . . allele above the Fall Line in central North Carolina." She concluded that genetic swamping within the Dismal Swamp region was not evident.

Webster *et al*. (1996a, 1996b) found that intergradation between *Sorex longirostris fisheri* and *S. l.*

longirostris is evident in specimens from the inner coastal plain of Virginia and North Carolina. The zone of intergradation is relatively narrow in Virginia and relatively wide in North Carolina, commensurate with the relative size of the inner coastal plain. Shrews from samples immediately to the east and west of the present Dismal Swamp were slightly smaller than shrews from the Dismal Swamp in cranial and external measurements. This trend was noted by Padgett *et al.* (1987). However, when compared with specimens from throughout the range of the species, these shrews are referable to *S. l. fisheri*.

The following summarizes available information regarding potential environmental contaminant threats to the Dismal Swamp southeastern shrew throughout its range. In 1987 and 1989, the Service conducted a preliminary study (Ryan *et al.* 1992) within the Refuge to determine if contaminants were impacting fish and small mammals. All water (metal-laden leachate and groundwater) draining the Suffolk City Landfill, at the time a Federally designated Superfund site, enters the Refuge. This landfill received industrial and domestic wastes, including 30 tons of organophosphate pesticides in the 1970s. Numerous automobile junkyards border the Refuge to the north and drain into the Dismal Swamp and the Refuge. Oil, grease, metals, polycyclic aromatic hydrocarbons (PAHs) and alkanes (PAHs and alkanes are components of petroleum products) are common constituents of junkyard and roadway runoff. Agricultural fields to the north and west of the Refuge contribute surface runoff that may contain residual herbicides, insecticides, and fungicides.

The Service's study (Ryan *et al.* 1992) included analyses for contaminant residues in the short-tailed shrew (*Blarina brevicauda*). Short-tailed shrews trapped near the East Ditch displayed elevated levels of lead, mercury, and several organochlorine pesticides. The lead levels for short-tailed shrews exceeded normal ranges and fell within the range for lead toxicosis according to Ma (1996). Small mammal lead toxicosis symptoms may include neurological dysfunction, reproductive disorders (including stillbirths), liver and kidney failure, etc. Apart from overt symptoms, asymptomatic effects may occur at lower levels and have significant effects on animal behavior, yet be difficult to evaluate and/or document. Ryan *et al.* (1992) found that mercury levels for short-tailed shrews collected at East Ditch, Badger Ditch, Railroad Ditch, and Pocosin Swamp were elevated in comparison to levels for short-tailed shrews collected from the study reference location and other sites within the Refuge. The mercury levels reported for short-tailed shrews, although elevated when compared within study area sites, were below those levels reported in the literature as causing observed adverse effects. Organochlorine pesticide levels of short-tailed shrews from the East Ditch were higher than those reported from all other study sites. However, the levels were below those documented in the literature for observed adverse effects. In summary, there may be a contaminant concern for the Dismal Swamp southeastern shrew near the East Ditch of the Refuge. However, no contaminant analysis has been conducted in Dismal Swamp southeastern shrews. Further monitoring has been recommended by the Service.

Small mammals tend to have limited ranges, and, therefore, elevated levels of contaminants found in shrews from one location cannot be interpreted as a condition for shrews throughout the Refuge or

range. Land uses such as agriculture, transportation, and urbanization with increased impervious surfaces contribute measurable levels of contaminants to the environment, and many persistent contaminants are passed through the food web. However, the Service does not have any information indicating that contaminants pose a significant threat to the continued existence of the Dismal Swamp southeastern shrew.

Recovery Goals and Accomplishments - In the early 1990s, a group of biologists from Virginia held meetings to discuss information and issues related to the recovery of the Dismal Swamp southeastern shrew. Initially, most of the effort was focused in Virginia because of the development pressure occurring there. In 1992, biologists from North Carolina were included in the group. The Service then convened an official recovery team, and the first meeting was held in February 1993. A draft recovery plan was completed in July 1994, and a notice of availability of the plan was published in the *Federal Register* (59 FR 37260). The recovery plan was finalized on September 9, 1994, and updated on June 13, 1995 (U.S. Fish and Wildlife Service 1995).

Based on questions raised by D.W. Webster, a member of the recovery team, about the shrew's distribution and taxonomy, in March 1995, studies were funded by the Virginia Department of Game and Inland Fisheries and the Service to determine if large shrews are distributed from the Dismal Swamp region southward throughout the coastal plain of North Carolina, and if the large shrews from coastal North Carolina are similar to *S. l. fisheri* from near the type locality. A combination of morphometric and genetic analyses were undertaken to answer these questions.

In May 1996, reports on morphometric variation among the three *Sorex longirostris* subspecies (Webster *et al.* 1996a) and protein electrophoresis and allozymic variation between *S. l. fisheri* and *S. l. longirostris* (Gurshaw 1996) were received by the Service and sent to the recovery team members. The recovery team convened in June 1996 to discuss the two reports. The consensus of the team was that the results of both the morphological and genetic analyses conclusively show that *S. l. fisheri* is widely distributed along the coastal plain of southeastern Virginia and eastern North Carolina at least as far south as Wilmington, North Carolina; that *S. l. fisheri* uses a wide variety of habitat types; and that *S. l. fisheri* is not in danger of genetic swamping by *S. l. longirostris*. However, the team agreed that the reports should be sent out for independent peer review before further action was taken. The Service sent the reports to independent peer reviewers in June 1996. Reviewers that responded concurred with the conclusions of the authors and were supportive of delisting. Based on comments provided by recovery team members, the Service, and peer reviewers, the original manuscripts were revised (Moncrief 1996, Webster *et al.* 1996b).

The Service published a proposed rule to remove the shrew from the List of Endangered and Threatened Wildlife in the *Federal Register* on October 21, 1998 (63 FR 56128). However, as of the date of this biological opinion, the Service has not issued a final rule, and the species remains covered by the provisions of the Endangered Species Act.

ENVIRONMENTAL BASELINE

Status of the Species in the Action Area - Although no survey for the Dismal Swamp southeastern shrew has been conducted within the action area, the Navy did conduct a mammal survey of its facility in 1988 (Rose *et al*. 1988). The 1988 survey confirmed the presence of this species in suitable habitat throughout the facility, and the Navy has chosen to assume the shrew's presence within the action area, rather than conduct another survey. Based on the habitat type within the action area (mid-successional forest and schrub-shrub), the 48 acres provide excellent habitat for the shrew, and the species is expected to be present in densities of approximately 12 per acre (Rose 1983, 1994). Based on the lack of development or other human activities within the antenna array's clear zone, the 48 acre action area provides a relatively secure habitat for the species and is not under any imminent threat of loss.

EFFECTS OF THE ACTION

Direct Effects - In evaluating the effects of the Federal action under consideration in this consultation, 50 CFR 402.2 and 402.14(g)(3) require the Service to evaluate the direct and indirect effects of the action on the species. Direct impacts to the shrew associated with this project include the potential to crush shrews with vehicles and heavy equipment, resulting in death or injury, while clearing vegetation within the 48 acres of the antenna array. There will be no permanent loss of shrew habitat. Since the cleared area will be allowed to succeed to the schrub-scrub and early forest successional stage, the action area will continue to provide good habitat for the shrew.

Based on densities of shrews known from other areas near the action area, it is likely that approximately 12 shrews per acre could occur in the area of the antenna array. Over the 48 acre action area, this would be approximately 576 shrews at any one time. The Navy has estimated that there will be 300 vehicle passes within the action area during the vegetation clearing. The Navy assumes that there will be a 4-foot wide vehicle footprint, and that the average length of each cut will be approximately 700 linear feet. This would result in approximately 0.064 acre being directly impacted by heavy equipment for each vehicle pass, or a total of 19.2 acres. If all shrews within each of the 300 vehicle passes were affected through either direct killing, harassment, or harm, approximately 231 shrews could be taken. The Service believes this number to be a high estimate, as all shrews within a vehicle pass area are not likely to be crushed or injured. Some shrews will be able to move out of the way, or will be burrowed and not affected. There should be sufficient shrews remaining at the site to ensure future population viability in the action area.

Indirect Effects - Indirect effects are defined as those that are caused by the proposed action and are later in time, but are still reasonably certain to occur (50 CRR 402.02). The Service does not believe there are any indirect effects to the Dismal Swamp southeastern shrew associated with this project.

Interrelated and Interdependent Actions - An interrelated activity is an activity that is part of the proposed action and depends on the proposed action for its justification. An interdependent activity is

an activity that has no independent utility apart from the action under consultation. The Service is not aware of any such actions.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to Section 7 of the ESA. Since the action area is owned by the Federal government, no future State, local, or private actions are anticipated. The Navy plans to maintain the action area as early to mid-successional habitat; therefore, there will be periodic vegetation clearing that will result in the take of the shrew. This vegetation clearing will occur on average every 30 years, and is not expected to have a long-term effect on the population of the shrew within the action area.

CONCLUSION

After reviewing the current status of the Dismal Swamp southeastern shrew throughout its range and in the action area, the environmental baseline for the action area, the effects of the proposed clearing, and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Dismal Swamp southeastern shrew. No critical habitat has been designated for this species, therefore, none will be affected.

III. INCIDENTAL TAKE STATEMENT

Section 9 of the Endangered Species Act, and federal regulations pursuant to section 4(d) of the ESA, prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns such as breeding, feeding, or sheltering. Harass is defined by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns, which include, but are not limited to, breeding, feeding, or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, carrying out an otherwise lawful activity. Under the terms of Section 7(b)(4) and Section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

The measures described below are nondiscretionary, and must be implemented by the Navy in order for the exemption in Section 7(o)(2) to apply. The Navy has a continuing duty to regulate the activity

covered by this incidental take statement. If the Navy (1) fails to adhere to the terms and conditions of the incidental take statement, and/or (2) fails to retain oversight to ensure compliance with these terms and conditions, the protective coverage of Section 7(o)(2) may lapse.

AMOUNT OR EXTENT OF TAKE

As discussed in the "Effects of the Action" section, the Service anticipates that the project will result in the take of up to 231 Dismal Swamp southeastern shrews. The incidental take is expected to be in the form of direct killing, harm, and/or harassment.

REASONABLE AND PRUDENT MEASURES

The Service believes that the U.S. Navy has implemented all reasonable and prudent measures to minimize take of the Dismal Swamp southeastern shrew. Additional measures are not deemed necessary.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the Navy must comply with the following terms and conditions. Monitoring is not required for this project because only a small number of the Dismal Swamp southeastern shrew are likely to be affected by the proposed project and the anticipated take is minimal. These terms and conditions are nondiscretionary.

1. The Navy is required to notify the Service before initiation of construction and upon completion of the project at the following address:

   Virginia Field Office
   U.S. Fish and Wildlife Service
   6669 Short Lane
   Gloucester, VA 23061

   Phone: (804) 693-6694
   Fax: (804) 693-9032

2. Care must be taken in handling any dead specimens of the Dismal Swamp southeastern shrew that are found in the project area to preserve biological material in the best possible state. In conjunction with the preservation of any dead specimens, the finder has the responsibility to ensure that evidence intrinsic to determining the cause of death of the specimen is not unnecessarily disturbed. The finding of dead specimens does not imply enforcement proceedings pursuant to the ESA. The reporting of dead specimens is required to enable the Service to determine if take is reached or exceeded and to ensure that the terms and conditions

are appropriate and effective. Upon locating a dead specimen, initial notification must be made to the following Service Law Enforcement office:

Division of Law Enforcement
U.S. Fish and Wildlife Service
P.O. Box 187
1005 Moorehouse Road
Yorktown, VA 23690

(757) 890-0003

The Service believes that up to 231 Dismal Swamp southeastern shrews will be incidentally taken as a result of the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures. The Navy must immediately provide an explanation of the causes of the additional take, and review with the Service the need for possible modification of the reasonable and prudent measures and the terms and conditions.

IV. REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the Navy's request letter dated July 8, 1999. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

The Service appreciates this opportunity to work with the Navy in fulfilling our mutual responsibilities under the Endangered Species Act. Please contact me at (804) 693-6694, ext. 103 if you have any questions or require additional information.

Sincerely,

Karen L. Mayne
Supervisor

Virginia Field Office

Enclosures

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Endangered Species Coordinator, Region 5
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Law Enforcement, Yorktown, VA
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Law Enforcement, Richmond
(Attn: Senior Resident Agent)
Endangered Species Biologist, Raleigh Field Office
Refuge Manager, Great Dismal Swamp National Wildlife Refuge

10 business days after the date of this letter, mail copies to:

VDGIF, Richmond, VA
(Attn: Environmental Services)
DNH, Richmond, VA
(Attn: Tom Smith)