October 1, 1996

Colonel Robert H. Reardon, Jr.
U.S. Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, Virginia 23510-1096

Attn: Thom Leedom
Regulatory Branch

Re: City of Roanoke Tinker Creek Interceptor, Permit Application No. 95-1717, Roanoke, Virginia

Dear Colonel Reardon:

The U.S. Fish and Wildlife Service has reviewed the Department of the Army permit application, 95-1717, submitted by the City of Roanoke, to install a sanitary sewer line in Roanoke, Virginia. Your May 21, 1996 request for formal consultation was received on May 24, 1996. This document represents the Service's biological opinion on the effects of that action on the Roanoke logperch (*Percina rex*) in accordance with Section 7 of the Endangered Species Act of 1973, as amended, (16 U.S.C. 1531 et seq.). A complete administrative record of this consultation is on file in this office.

I. CONSULTATION HISTORY

Consultation history is provided in Appendix A.

II. BIOLOGICAL OPINION

DESCRIPTION OF PROPOSED ACTION

The applicant proposes to install a sanitary sewer line in the City of Roanoke, Virginia (Figure 1) to replace the existing sewer line. The project consists primarily of 54- and 48-inch diameter pipeline, which runs from the Regional Water Pollution Control Plant along the Roanoke River and Tinker Creek for approximately 2 miles to Orange Avenue. The stated purpose of the project is to eliminate sanitary sewer overflows into Tinker Creek, a tributary to the Roanoke River, located on the boundary between the City of Roanoke and the Town of Vinton, and to increase the sanitary sewer flow capacity to the Regional Water Pollution Control Plant. Cost-sharing for this project is provided by the Cities of Roanoke and Salem, Town of Vinton, and Roanoke and Botetourt Counties.

The proposed project includes one pipeline crossing of the Roanoke River, one pipeline crossing of Tinker Creek, and two temporary work pads in Tinker Creek. The following general information applies to the entire project; specific information regarding stream crossings and areas of encroachment is given below.

Areas of pipeline installation not associated with instream work that require removal of streambank vegetation will be replanted and strict sedimentation and erosion control measures will be adhered to. Construction is to be performed during low flow periods to the extent possible. Pipeline crossings will be accomplished in a manner that will not prohibit stream flow. Approach areas will be controlled with perimeter measures such as silt fences or straw bales; within a few feet of a waterway, concrete jersey barriers and filter fabric will be used. The pipe will be placed below the stream bottom with concrete backfill to within 6 to 8 inches of the river bed; aggregate will be placed on top of the concrete to make it flush with the river bed. Both crossings will be submerged, encased in concrete, and will be installed with the use of non-erodible cofferdams. The pipeline will be installed in one-half of the stream bed, then the cofferdam will be removed and the area will be stabilized. The cofferdam will then be reconstructed in the other half of the stream to complete the remainder of the pipeline crossing.

The cofferdams may be constructed of non-erodible aggregate or other material, such as a steel framework with an impermeable membrane, at the contractor's option. Aggregate material will be used as temporary fill. A silt barrier will be installed at the edge of the waterway. All water removed during dewatering from the stream crossings will be passed through a dewatering device prior to discharge. Maximum temporary fill is approximately 1,825 cubic yards. After the pipeline is installed, the temporary fill will be removed to the extent practicable. Restabilization will consist of the installation of riprap on all disturbed streambank areas. Riprap will be used because the banks are so steep that soil/vegetation will not be stable enough. Stabilization of stream bed, banks, and approach areas will occur immediately following the attainment of final grade. All stream crossing areas will be inspected at the end of each day to ensure that construction materials are positioned securely.

Crossing 1: The pipeline crosses the Roanoke River approximately 2,000 feet downstream of the Bennington Avenue bridge. The pipeline at this crossing will consist of a triple-barreled siphon (24-, 30-, and 42-inch diameter pipes). Blasting of the stream bed may be required for this crossing. If an aggregate cofferdam is used, the temporary fill for the cofferdam will be approximately 1,550 cubic yards (120 feet by 50 feet by 7 feet). This crossing will result in 6,000 square feet of nontidal subaqueous impacts. Instream work for this crossing is estimated to take approximately 30 days, but may take as long as 60 days depending on weather conditions and contractor's method of operation. Riprap used for permanent stabilization will cover approximately 800 square feet subaqueous of habitat and 1,450 square feet of streambank.

Crossing 2: The pipeline crosses Tinker Creek approximately 800 feet upstream of the intersection of Wise Avenue and Indian Village Lane. The pipeline at this crossing will consist of a triple-barreled siphon (18-, 24-, and 30-inch diameter pipes). If an aggregate cofferdam is used, the temporary fill for the cofferdam will be approximately 200 cubic yards (35 feet by 40 feet by 4 feet). This crossing will result in 1,400 square feet of nontidal subaqueous impacts. Instream work for this crossing will take approximately 30 days. This time will vary depending on weather conditions and contractor's method of operation. Riprap used for permanent stabilization at the crossing will cover approximately 300 square feet of subaqueous habitat and 600 square feet of streambank. Downstream from Crossing 2, the triple-barrel siphon becomes a 48-inch diameter pipe laid into the slope along the creek. Construction equipment will need work space on the down-slope side of the alignment and will require the construction of a temporary work pad along

the creek. A portion of this work pad will require temporary fill in Tinker Creek. Temporary fill along the creek for the work pad will be approximately 45 cubic yards (400 feet by 3 feet by 1 foot); approximately 20 cubic yards in the creek and 25 cubic yards on the streambank. However, depending on the amount of recent precipitation, the entire 45 cubic yards may or may not be submerged. The material used for the work pad will be removed from the stream and used for streambank stabilization upon completion. Instream work will take approximately 60 days; this will vary depending on weather conditions and contractor's method of operation. Riprap used for permanent stabilization in the encroachment area will cover approximately 5,600 square feet (375 feet by 15 feet) of streambank.

Work Pad A: A temporary work pad will be constructed near the mouth of Tinker Creek to install a 54-inch diameter pipe under an existing railroad bridge near Kenwood Boulevard. The centerline of the pipe at the closest point in Tinker Creek is approximately 10 feet from the top of the bank. Approximately 70 linear feet of streambank will be disturbed. Approximately 20 cubic yards of fill may be temporarily deposited in the stream (70 feet by 4 feet by 2 feet). Instream work will take approximately 15 days; this will vary depending on weather conditions and contractor's method of operation. Riprap used for permanent stabilization will cover approximately 300 square feet of streambank.

RANGEWIDE STATUS OF THE SPECIES

Life History

The Roanoke logperch is a relatively large darter endemic to the Roanoke, Nottoway, and Meherrin River systems of southern Virginia. The species was first collected in the Roanoke River near Roanoke, Virginia in 1888 and described by Jordan (1889). It reaches 80 to 115 millimeters in length (Jenkins and Burkhead 1993). The back is dark green and the sides are greenish to yellowish, both with dark scrawlings and numerous small saddles; the belly is white to yellowish. Bar markings on the sides are prominent, usually separated from the dorsal markings and typically ovoid in shape. Males mature in two years and females are mature by three years (Jenkins and Burkhead 1993). This species commonly lives five to six years (Simonson and Neves 1986).

The logperch typically inhabits medium to large, warm, usually clear streams and small rivers of moderate to somewhat low gradient (Jenkins and Burkhead 1993). Two records are from impoundments (Jenkins and Burkhead 1993). Although all life stages avoid moderately and heavily silted areas of streams except during winter periods of inactivity (Jenkins and Burkhead 1993), "during different phases of life history and season, every major riverine habitat is exploited by the logperch" (U.S. Fish and Wildlife Service 1992). Simonson and Neves (1986) found that sites where the logperch occurs had a depth of 2.1 to 10.0 centimeters (cm), with an average of 5.2 cm. They also found that substrate most frequently found at logperch sites consisted of small boulder and small cobble, and when dominant, comprised 57% and 55% of the surface substrate, respectively. Seventy-one percent of their sample sites containing the logperch were entirely free of silt.

Within and upstream of the City of Roanoke in the Roanoke River, typical habitat features at logperch sites include: riffles (2 to 50 cm deep; current velocities of 25 to 75 centimeters/second (cm/s); substrate of

primarily gravel, pebble, cobble; and a low degree of embeddedness), runs (25 to 100 cm deep; current velocities of 25 to 100 cm/s; substrate of primarily pebble, cobble, boulder; and a low degree of embeddedness), and pools (greater than 1 meter (m) deep; current velocities less than 25 cm/s; variable substrate composition [silt to bedrock]; and a high degree of embeddedness). The degree of siltation appeared to increase downstream and average stream width at logperch sites was 20 to 30 meters. (Angermeier and Ensign 1991)

During most of the warm and mild months, adults usually inhabit the main body of pools, runs, and riffles and typically associate with gravel and rubble (Jenkins 1977, Burkhead 1983, Simonson and Neves 1986). Adults segregate preceding and during much of the spawning period (Burkhead and Jenkins 1991). Males are most commonly associated with shallow to moderate riffles (0.22 to 0.60 m deep); females are in moderate to deep runs (0.49 to 0.93 m deep) (Burkhead 1983, Jenkins and Burkhead 1993). Statistically significant differences have been found between sexes in relation to occupied current and depth, but no difference in substrate preference was determined (Burkhead 1983). Spawning occurs in April or May at 12 to 14^{o} centigrade © in deep runs over gravel and small cobble (Simonson and Neves 1986) with mature ova counts of 180 to 640 per female (Jenkins and Burkhead 1993). All *Percina* species typically bury their eggs with no subsequent parental care (Page and Swofford 1984). Burkhead (1983) observed four acts of spawning during which no preference for a particular substrate for ova deposition was noted. The larvae hatch at the spawning site and drift into quiet water areas. The few young of the year specimens that have been observed or collected were in sandy bottom pool margins. As young mature, they move to runs and riffles. Juveniles were occasionally captured in riffles, but were more common in runs or backwater areas adjacent to riffles (Burkhead 1983) and were found to occupy low velocity runs over sand and gravel (Simonson and Neves 1986). During the summer, juvenile fish may get washed into pool areas where they forage. Although this type of pool use has not been documented for the Roanoke logperch, it has been documented for the blotchside logperch (*Percina burtoni*), a similar species (W. Ensign, Virginia Polytechnic Institute and State University, pers. comm. 1996).

Logperch actively feed during the warmer months. Burkhead (1983) found that the feeding behavior of logperch consists of flipping over stones with its snout and ingesting the exposed prey. Juveniles and adults have been observed to flip an average of 2.3 stones per minute (Jenkins and Burkhead 1993). This foraging strategy, along with stomach content analysis, suggests that logperch do not actively select certain taxa as prey items, but consume most food items encountered (Simonson and Neves 1986). Foraging also occurs on unturned substrates (Jenkins and Burkhead 1993). Young fish feed primarily on small chironomid larvae (62.8%), elmid (7.6%), and *Hydropsyche* larvae (6.9%) (Burkhead 1983). Adults feed on *Hydropsyche* (26.0%), chironomids (25.5%), and *Cheumatopsyche* (11.1%). The shift in diet between young and adults likely reflects prey size and habitat differences (Burkhead 1983).

Winter habitat (water temperature less than 8^{o} C) of all individuals appears to be deep pools under boulders, during which time the fish are inactive (Burkhead 1983). "The pools in which *P. rex* was observed during the winter were moderately to heavily silted, but log perches were able to locate interstices" (Burkhead 1983).

Status of the Species Within its Range

The Roanoke logperch is endemic to three river systems in Virginia -- the Roanoke, Nottoway, and Meherrin basins, where it occurs in five populations located in widely separated segments of the upper Roanoke River, Pigg River, Smith River, Nottoway River and Meherrin River. The populations are small and separated by wide river gaps or large impoundments and no genetic exchange occurs among them. Each population is vulnerable because of its relatively low density and limited range. The populations in the Roanoke and Nottoway basins probably represent remnants of much larger populations that once occupied much of the Roanoke and Nottoway River drainages upstream of the fall line (U.S. Fish and Wildlife Service 1992).

The current range of the Roanoke logperch consists of approximately 99 stream kilometers (sk) in the upper Roanoke River system, 52.2 sk in the Pigg River system, 4.4 sk in the Smith River system, 119.9 sk in the Nottoway River basin, and two sites in the Meherrin River basin. Simonson and Neves (1986) found the logperch to be relatively rare within most of the known range and estimated that actual habitat occurred in only 14.5% of the total range in the Roanoke and Nottoway drainages. They documented this species at only 7% (Smith River) to 21% (Roanoke River) of sites sampled and determined that 0.13 was the probability of finding a Roanoke logperch in appropriate habitat within the range of the species. The mean number of logperch captured during their two-year surveying effort was 1.2 specimens per location.

Simonson and Neves (1986) determined essential habitat for the logperch to be: (1) the upper Roanoke River system upstream from Smith Mountain Lake Reservoir into the North and South Forks (Roanoke and Montgomery Counties); (2) the Pigg River system from Rocky Mount downstream to Leesville Reservoir, including Big Chestnut Creek (Franklin and Pittsylvania Counties); (3) the Nottoway River from above Fort Pickett to Southampton County, including the Stony Creek system (Dinwiddie and Sussex Counties); and (4) the Smith River, upstream from Philpott Reservoir, including Town Creek just below Philpott Reservoir (Patrick and Henry Counties). While the logperch has been collected at several new locations, these areas have not been thoroughly surveyed, nor have population densities been determined.

The following is a summary of the status of the species based upon the most recent information. Rangewide surveys for the species have not been conducted in the last several years.

Roanoke River Basin

Based on its fragmented range, many Piedmont logperch populations must have existed throughout the Roanoke basin and most of them probably disappeared in the last 150 years (Jenkins and Burkhead 1993). The logperch is an indicator of high-quality streams in the Roanoke basin and these high-quality waters have been much reduced (Jenkins and Burkhead 1993). Three disjunct populations occur in the Roanoke basin: upper Roanoke River, Pigg River, and Smith River.

Upper Roanoke River - The largest Roanoke logperch population is in the Roanoke River from the City of Roanoke into the lower reaches of the river's main forks (Jenkins and Burkhead 1993). In the upper Roanoke system, Roanoke and Montgomery Counties, the logperch is distributed from 0.5 kilometers (km) below Niagara Dam (on the mainstem Roanoke River) upstream into the North Fork (to sk 35.6) and South Fork (to sk 24.1). "The general preference by *P. rex* for moderate sized streams appears to limit its upstream penetration in the North and SFRR tributaries, and other smaller tributaries in the upper

Roanoke" (Burkhead 1983). Burkhead (1983) found that populations fluctuated greatly at his five study stations in the upper Roanoke and North and South Forks. He documented the following logperch densities at four sites (no estimate at one station where logperch were rarely taken): 0.0009 - 0.040/m^2, 0.006 - 0.076/m^2, 0.0008 - 0.035/m^2, 0.015 - 0.115/m^2.

Based on a survey by Burkhead (1983), the logperch is essentially absent from 7.6 sk between the State Route 419 bridge in Salem to the spillway dam at Wasena Park in the City of Roanoke. This stream section has fewer riffles and substrates are moderately silted to embedded by silt. The substrate below Wasena Park dam is scoured by turbulent overflow, but the area of enhanced substrate is fairly small. Another break in distribution (approximately 3.1 sk of pool) occurs from the riffle below Wasena Dam to the spillway dam beneath the State Route 220 bridge (Franklin Street). Below this dam, the logperch is found over the next 1.1 sk and is essentially absent down to Niagra Dam at sk 45.4. Angermeier and Ensign (1991) conducted surveys in the Roanoke River, within (14 km) and upstream (11.4 km) of the City of Roanoke. Logperch were most abundant approximately 500 m downstream of Roanoke Memorial Hospital. Logperch were also relatively numerous approximately 200 m downstream of Salem. Only a few logperch (1 - 3) were observed at other sites in the City of Roanoke. Upstream of the City, logperch were most numerous upstream of the end of Salem Industrial Road, and both adults and juveniles were generally more abundant than within the City limits. The logperch is also known from lower Mason (Jenkins and Burkhead 1993) and Tinker Creeks (U.S. Fish and Wildlife Service 1992), tributaries to the Roanoke River.

In 1993, Ferguson et al. (1994) sampled the North Fork from its junction with the South Fork to McDonald's Mill, near the Montgomery County/Roanoke County boundary, for a total of 40.8 sk. This resulted in an extension of the known range of the logperch to 35.6 sk in the North Fork. Logperch were collected from 11 of 27 sites, seven of which were not previously known to support the logperch. However, the abundance of logperch in the lower half of the North Fork (from the confluence with the South Fork upstream 21.0 sk) was more limited than expected. Much of the lower half of the stream is underlain by bedrock, which is not appropriate habitat for the logperch; areas in this lower section with seemingly good habitat did not contain any logperch. Such sites were often turbid and silty. Abundance of the logperch was generally low; the largest number of logperch captured at one site was five and the average number of logperch captured at sites containing logperch was 2.18. Reproduction was documented in the North Fork.

There is a 1981 record of one logperch in the impoundment of Smith Mountain Lake in the upper end of the Beaverdam Creek arm. This fish probably strayed from the upper Roanoke River. No logperch were found in Beaverdam Creek during 1983-1984 (Jenkins and Burkhead 1993).

Middle Roanoke River - Prior to pollution from the greater Roanoke area (Cities of Roanoke, Salem, Vinton, and adjacent areas), the middle reach of the Roanoke River probably had a logperch population that was contiguous with the upper Roanoke populations (Jenkins 1977). Any population supported by this reach of the Roanoke would have been further reduced by the Smith Mountain/Leesville Reservoirs, a 92-km long pumped storage project competed in 1966 on the Roanoke River (U.S. Fish and Wildlife Service 1992). Although the reservoirs hold back much of the fine sediment from the upper Roanoke, the

water level in the river below fluctuates widely due to hydropower operation, and often carries considerable silt from Piedmont tributaries below Leesville Dam (U.S. Fish and Wildlife Service 1992). Together, these modifications appear to have eliminated any habitat suitable for the logperch in the middle Roanoke (U.S. Fish and Wildlife Service 1992).

Pigg River - In the Pigg River system, Franklin and Pittsylvania Counties, the logperch is distributed from the vicinity of Gladehill downstream nearly to the backwaters of Leesville Reservoir (U.S. Fish and Wildlife Service 1992). The Pigg River and the lowest reaches of Big Chestnut Creek, a tributary to the Pigg, have low numbers of logperch (Jenkins and Burkhead 1993), with 15 specimens documented since 1967 (Burkhead 1983, Simonson and Neves 1986). Simonson and Neves (1986) did not find any specimens near the previously reported upstream limit at State Route 220 bridge in Rocky Mount. The logperch has been documented in Big Chestnut Creek 3.2 sk above its confluence with the Pigg (U.S. Fish and Wildlife Service 1992). Two logperch were collected from Leesville Reservoir (mainstem impoundment of the Roanoke River) in August 1989. These two fish likely came from the Pigg River, whose mouth is about 20 sk above the collection site. The continued existence of the logperch in the Pigg River is questionable due the low population density and siltation (Jenkins and Burkhead 1993).

Smith River - In the Smith River system, Patrick and Henry Counties, the logperch is known from a short reach of the Smith River and its tributary, Rock Castle Creek, upstream of the 15-mile long Philpott Reservoir. The sparse subpopulation in the upper Smith River is isolated by Philpott Reservoir (Jenkins and Burkhead 1993). The small Town Creek population in Henry County is isolated by the cold tailwaters of Smith River below Philpott Dam (Jenkins and Burkhead 1993). The historical status of the Town Creek population is unknown, but it probably extended into the Smith River prior to completion of Philpott Dam in 1953, three miles above the mouth of Town Creek (Jenkins 1977). Town Creek is a warm, slightly to moderately silted stream in an agricultural valley with one industry located in its middle section, in the Town of Henry above the logperch population (U.S. Fish and Wildlife Service 1992). The ecological and geographical isolation of these two small populations may threaten their long-term viability (U.S. Fish and Wildlife Service 1992). In August 1995, one adult logperch was collected in the Smith River 19.9 km below Philpott Dam in the town of Koehler (B. LaRoche, Virginia Department of Game and Inland Fisheries, pers. comm. 1996). However, additional sampling is needed to determine if this was a stray individual or, if not, to what extent the logperch occurs in this portion of the Smith River.

Nottoway River Basin

In the Nottoway River system (Dinwiddie, Sussex, Southampton, and Greensville Counties), the logperch is known from the Nottoway River; Stony Creek, a Nottoway River tributary; and Butterwood Creek, a tributary to Stony Creek (Norman and Southwick 1985, Simonson and Neves 1986). The logperch was known to occur in 52 sk of the Nottoway mainstem in Sussex and Greensville Counties from the State Route 619 bridge downstream to just above the State Route 40 bridge east of Sussex (U.S. Fish and Wildlife Service 1992). In 1996, 16 logperch were collected in the mainstem Nottoway River by the Virginia Department of Game and Inland Fisheries (T. Wilcox, Virginia Department of Game and Inland Fisheries, pers. comm. 1996), extending the range by approximately 25 sk to State Route 653 in Southampton County. The distribution in Stony Creek, Dinwiddie and Sussex Counties, is from its

headwaters (Butterwood Creek) downstream to roughly its confluence with the Nottoway River (above the U.S. Route 301 bridge in the Town of Stony Creek as of 1988) (U.S. Fish and Wildlife Service 1992). In 1949, three logperch were collected in Sappony Creek, a tributary to lower Stony Creek, but none were obtained in 10 collections during 1978-1987 (Jenkins and Burkhead 1993).

Meherrin River Basin

During the summer of 1995, several Roanoke logperch were collected in Kits Creek, a tributary to the South Meherrin River in Mecklenburg County, and in Buckhorn Creek, a tributary to the Meherrin River, in Mecklenburg County. In November 1995, these sites were sampled again and the logperch was not found, but appropriate logperch habitat occurs at both sites (T. Wilcox, Virginia Department of Game and Inland Fisheries, pers. comm. 1996). This represents a new drainage record for this species. Additional surveys are necessary to determine the extent and population density of the logperch in this river basin.

The following biological opinions have been completed for this species:

- On July 24, 1990, a non-jeopardy opinion was issued to the Corps of Engineers (Wilmington District) for the Roanoke River Upper Basin, Headwaters Area, Flood Damage Reduction Project. The project will include: channel widening (36,000 linear feet of bench construction); construction of training walls, gabions, and riprap; bridge removal, relocation, and construction; utility, road, and building relocation; and snag and debris removal in and adjacent to the Roanoke River in the City of Roanoke. The project was expected to result in the loss of 25% of the logperch population in the Roanoke River in the City of Roanoke. However, construction of this project has not been initiated (T. Leedom, U.S. Army Corps of Engineers, pers. comm. 1996).

- On March 29, 1994, a non-jeopardy opinion was issued to the Federal Highway Administration and the Corps (Norfolk District) for replacement of the State Route 647 bridge over Stony Creek in Dinwiddie County. This project was expected to result in the loss of logperch from 200 m upstream of the bridge to 800 m downstream of the bridge during instream construction, along with permanent habitat loss (170 square feet) within the footprint of the bridge pier.

Threats to the Species

It appears that massive habitat loss associated with the construction of the large impoundments of the Roanoke River Basin in the 1950s and 1960s (Roanoke Rapids, Gaston, Kerr, Leesville, Smith Mountain, and Philpott Reservoirs) was the original cause of significant population declines of this species. These reservoir systems resulted in major disruptions in the ability of this species to move throughout its historic range, since it cannot survive in the slow-moving, deep water of reservoirs. The five currently known population centers are virtually isolated, with little to no chance for interchange of genetic material. Thus, any catastrophic loss of one of these populations will have a serious impact on the species.

While impoundment construction is likely responsible for the historic losses of this species, current threats are mostly due to nonpoint pollution and spills and accidents associated with chemical releases. Nonpoint

pollution results from stormwater runoff from urban and agricultural sources. Burkhead (1983) classified operation of construction machinery in the river as being a potential high impact activity and stated that it "should be avoided as much as possible, if not completely." This type of activity "alters the distribution of substrate particles, effectively destroying habitats, causes some immediate fish mortality, and produces voluminous amounts of silt, affecting downstream sections." He further stated that "construction should be kept to a minimum, if possible, from March through June. It is during these periods when spawning habitats are entered, and spawning and early larval development occurs. After June the new age class (of *P. rex*) will have moved into pools and backwater areas." "Because eggs are incubated on the stream bottom, additional silt loads are especially problematic during the spawning season (April and May)" (Angermeier 1994). Excessive silt deposition reduces habitat heterogeneity and primary productivity; increases egg and larval mortality; abrades organisms; and alters, degrades, and entombs macrobenthic communities (Burkhead and Jenkins 1991). There are significant agricultural activities throughout the range of the species and urban development is increasing.

Although not currently a significant threat, consumptive water withdrawals may pose a serious threat to the species in the future as the human population of the Roanoke River basin increases. The logperch inhabits primarily shallow riffles and runs; thus changes in instream flow levels could adversely alter available habitat for this species. This threat can be avoided by insuring that adequate hydrologic evaluations of future water withdrawals are conducted and that instream flow standards are established to protect this species. Existing water withdrawals could be retrofitted with wedge-wire type intakes that would minimize the impingement and entrainment of the logperch. Additional threats to the logperch include channelization and cold-water releases (Burkhead and Jenkins 1991, U.S. Fish and Wildlife Service 1992).

Natural threats to the logperch are minimal. Predation by other species of fish is probably relatively low. The northern banded watersnake (*Nerodia sipedon sipedon)* may be the most likely predator of the logperch. The main parasite is a non-host specific nematode (Burkhead 1983).

The following presents an overview of the threats to the logperch in each of its population centers.

Upper Roanoke River - The human population of the greater Roanoke area is continuing to expand, resulting in increasing development of the Roanoke Valley (U.S. Fish and Wildlife Service 1992). The remainder of the upper Roanoke basin is mostly rural, with considerable livestock and crop farming. Nonpoint pollution, from urban and agricultural sources, remains a problem. Toxic chemical spills, channelization, and fill of and construction in the floodplain are also threats. Numerous liquid manure storage facilities in the Upper Roanoke drainage and other drainages supporting the logperch represent a potential threat to the species (U.S. Fish and Wildlife Service 1992).

The water quality of the North Fork Roanoke River has been significantly degraded by silt washed from agricultural lands (U.S. Fish and Wildlife Service 1992). In 1993, Ferguson et al. (1994) surveyed the North Fork from its junction with the South Fork to McDonald's Mill, a distance of 40.8 sk. Ferguson et al. found that siltation was evident throughout the watershed, negatively affecting the quality of both the water column and the substrate, increasing in a downstream direction. Siltation was found to be especially severe sub-surface, embedded within the rock interstices, and turbidity was common. Ferguson et al.

observed that the widening of State Route 723 along the North Fork left bare soil uncovered for lengthy periods and high turbidity runoff into tributaries was often noted after heavy rains. The upper third of the survey area had denuded banks, due to cattle use and tree removal, erosion, and excessive nutrient loading. The middle third of the survey area had these same problems. Turbidity levels were much higher in the lower end of this section, from its confluence with the South Fork to 16.4 sk upstream. However, a substantial portion of this section is forested and the riparian areas are generally in good condition. Therefore, it seems likely that the turbidity and siltation in this lower section are a result of upstream practices.

Other factors that could affect water quality in the North Fork include domestic and industrial wastewater treatment discharge, agricultural waste storage, underground storage tanks, handling of hazardous materials, railway operations, road construction, transportation of materials on roads and railways, mining, landfills, and pipeline crossings (Anderson and Associates 1992, Poole 1993). High levels of nickel have been reported in the North Fork, but phosphorous levels have improved (U.S. Soil Conservation Service 1993). Potential adverse effects in the lower third of the North Fork include a railroad corridor that parallels and crosses the river several times (Ferguson et al. 1994).

The North Fork also receives the Virginia Pollutant Discharge Elimination System (VPDES) permitted discharge from a country club, which includes a golf course. The characteristics of this discharge have not been evaluated for effects, however, runoff or the discharge may contribute nutrients from fertilizers, and pesticides, such as herbicides to control weeds and insecticides to control insect pests. There is one recorded occurrence of the logperch less than a mile downstream and there are two additional occurrences within approximately 2 miles downstream of this discharge.

Ferguson et al. (1994) concluded that the North Fork contributes significantly to the stability of the upper Roanoke logperch population. "The Roanoke logperch in the NFRR is especially vulnerable to extirpation, due to low population levels, detrimental land use practices, and possibly to municipal and industrial effluents. The stream channel in the upper NFRR is narrow and logperch densities are low. An increased silt load in these upper reaches could result in the loss of individuals, which often were located in small patches of favorable habitat. Catastrophic loss of logperch habitat in this region could result in extirpation of the species from the upper NFRR."

The South Fork of the Roanoke River receives two municipal discharges (regulated by VPDES permits) that have not yet been thoroughly evaluated for potential effects to the Roanoke logperch. Downstream of these discharges there are 30 or more documented Roanoke logperch occurrences within 1 to 5 miles of the discharges.

In September 1991, a pump failure resulted in the release of approximately 175,000 gallons of liquid manure into Elliott Creek, a tributary of the South Fork. It was estimated that over 190,000 fish of various species were killed as a result of this spill (Ensign and Angermeier, undated). Approximately 13 sk of Elliott Creek were impacted, as well as 9 sk of the South Fork from the mouth of Elliott Creek downstream to the Route 460 bridge crossing just below the town of Shawsville. An estimated 300 Roanoke logperch were killed (Ensign and Angermeier, undated), which resulted in a significant setback in recovery. After

the fish kill, logperch population density and structure were monitored for two years. Logperch recolonized the kill reach via natural redistribution of existing upstream and downstream populations in the year after the fish kill, but were not as abundant as in the control reach. Juvenile logperch were proportionally more abundant in the kill reach than in the control reach, indicating that recolonization was primarily achieved through dispersal by juveniles (Ensign and Angermeier, undated).

The Roanoke River in Roanoke area receives VPDES permitted discharges from one electric power company, a railroad company, a fuel oil company and the Roanoke Water Pollution Control Plant. The City of Roanoke constructed the secondary sewage treatment facility on the Roanoke River in 1972. It was enlarged in 1976 to include tertiary treatment. Between 1974 and 1976, larger capacity sewage pipes were installed to service additional portions of the Roanoke valley. These additions, and stricter regulation of industrial effluents, have improved water quality (Burkhead 1983). The water quality in the river, from Salem downstream, has improved since 1970 as a result of reduction of wastes from other point sources (U.S. Fish and Wildlife Service 1992). The County of Roanoke water supply project, an off-river impoundment called Spring Hollow, was constructed in 1986. The impoundment is used as an extra water source for Roanoke. It has been filled and the Service has worked with Roanoke County to ensure that water withdrawal occurs during times that will not impact the Roanoke logperch. Relatively frequent spills of toxic chemicals have occurred in the river in the Cities of Salem and Roanoke (U.S. Fish and Wildlife Service 1992).

Virginia's draft 303(d) Total Maximum Daily Load Priority List, dated April 1,1996, lists 11.25 miles (river mile 222.1-210.92) of the Roanoke River, encompassing the City of Roanoke, as impaired. The river segment does not meet Virginia's Water Quality Standards' General Standard, which states: "...will support the propagation and growth of all aquatic species...." The Virginia Department of Environmental Quality (DEQ) indicates the source of impairment as urban nonpoint source pollution. The draft Priority List also lists 11.72 miles (river mile 210.92 - 199.20) of the Roanoke River, encompassing the City of Salem, as impaired. This segment violates the fecal coliform bacteria criteria and, thus, does not support contact recreation, and the General Standard of the Virginia Water Quality Standards. According to the DEQ, the segment exhibits a moderately impacted benthic community due to organic enrichment from urban nonpoint source pollution. Adverse impacts to the benthic community can reduce the quality and quantity of the logperch's invertebrate prey base. According to the draft Priority List, the watershed is ranked as a high priority by the Virginia Department of Conservation and Recreation to minimize non point source pollution impacts.

The morphology and hydraulics of the upper Roanoke have been modified in numerous location as a result of channelization or levee construction (U.S. Fish and Wildlife Service 1992). In Roanoke and Salem, significant portions of the floodplain have been filled for industrial parks and residential areas. Farmers have channelized small portions of the South Fork Roanoke River (Jenkins 1977). The logperch will be adversely affected by the Corps' Roanoke River Flood Reduction project in the City of Roanoke (described above). When discussing this proposed project, Burkhead (1983) stated "The most important consideration is the development and implementation of methods of channel modification that will result in the minimum production of streamborn silt, and in particular, methods of construction producing chronic or severe silt loading should be avoided. Biologically, chronic or severe silt loading is here considered to

be the amount of silt sufficient to significantly reduce the volume of substrate interstices in riffles with currents of 0.3 - 0.5 m second-1 during normal water levels. The impacts of chronic silt loading can vary by season, but primarily will adversely affect the macrobenthic food organisms of the study species. If chronic silt loading occurred during the spawning cycle, high mortality of the new age class would probably result."

Pigg River - Much of the Pigg River contains moderate to heavy silt deposits (U.S. Fish and Wildlife Service 1992). In 1975, copper sulfate and silver nitrate were discharged into Furnace Creek, a tributary of the Pigg, causing a severe fish kill for approximately 37 km downstream (James 1979), likely reducing or eliminating the logperch population near Rocky Mount, Virginia.

The Rocky Mount Sewage Treatment Plant discharges to the Pigg River and has recently changed from disinfection by chlorination to ultraviolet radiation. In the past, chlorine spills have resulted in massive fish kills in many rivers throughout Virginia. The change in disinfection method to ultraviolet radiation eliminates the chance of an accidental chlorine spill or overdose to the Pigg River from this facility, and is a positive step towards protection of this aquatic habitat for the Roanoke logperch. This facility monitors the discharge for zinc and performs whole effluent toxicity tests. Although metals and whole effluent toxicity testing are required, these tests reveal only whether the discharge may violate instream water quality standards or is toxic, as determined against a specific set of test organisms that do not include the Roanoke logperch. The logperch's sensitivity to chemicals may be greater than that of the test organisms. Effects from metals in the wastewater, although not violating water quality standards, may still hinder the recovery of the logperch. Studies conducted with specific surrogates for the logperch would better enable a determination of whether the toxicity of the discharge is at a level protective of the Roanoke logperch.

Virginia's draft 303(d) Total Maximum Daily Load Priority List, dated April 1,1996, lists a segment of the Pigg River (river mile 62.73 - 42.73) as only partially meeting Clean Water Act goals. There are several documented occurrences of the logperch in this segment. The DEQ indicates this segment is adversely impacted by fecal coliform bacteria from agricultural non-point source pollution. These same sources may also be contributing sediments due to erosion from agricultural lands as well as pesticides and nutrients. Such impacts can be cumulative, impairing potential habitat by decreasing diversity and abundance of the logperch's benthic prey base.

Smith River - The sparse subpopulation of the Roanoke logperch in the upper Smith River is threatened by chemical effluents (Jenkins and Burkhead 1993). The upper Smith River population has likely remained small because of heavy metal and chlorinated effluents from a fabric knitting, dyeing, and finishing facility plant (Burkhead and Jenkins 1991). There are two documented occurrences of the Roanoke logperch within three miles upstream and eight documented occurences within ten miles downstream of this discharge. Adverse effects may be associated with the discharge of metals and chlorine in the wastewater. The facility is changing the method of disinfection from chlorination to ultraviolet radiation. This change represents a positive step towards protection of the logperch downstream of the discharge. Accidental chlorine spills and over-dosing will no longer pose threats to the species from this facility. Metals and/or other chemicals in the discharge may also affect the logperch. Although metals and whole effluent toxicity testing are required, sensitivity of the Roanoke logperch may be greater than tested

species.
A Martinsville, Virginia nylon manufacturer at river mile 27.56 withdraws and discharges an average of 18 million gallons per day from the Smith River. According to the Virginia Pollutant Discharge Elimination System permit, this non-contact cooling water is discharged at temperatures as high as 31ÿC to the Smith River. The documented 7 day, 10 year low flow for the Smith River is 26 million gallons per day. The heated discharge represents approximately two thirds of the stream flow during low flow conditions, which normally would occur during the summer when heat stress to aquatic organisms could already be higher than normal. The Roanoke logperch is known to occur less than three miles above the discharge, and could occur in the vicinity of the intake/discharge. Although potential habitat may exist, the force of withdrawal of 18 million gallons per day may cause impingement of fish at the intake, and the rise in water temperature within the instream mixing zone of the discharge may cause avoidance behavior by fish. The rise in water temperature may also alter the diversity of the instream macroinvertebrate and benthic community that would normally occur at this location and serve as a prey base for the Roanoke logperch. Virginia's draft 303(d) Total Maximum Daily Load Priority List, dated April 1,1996, lists this facility as discharging cyanide. According to the Priority List, the source of the cyanide is unknown. The DEQ considers this to be a high priority and has indicated it will develop a total maximum daily load for cyanide for the mixing zone related to this discharge. Impingement, increased instream water temperature, and the potential toxicity of this cyanide discharge all may be affecting the logperch in this area.

Nottoway River Basin - Excessive siltation, generated by poor agricultural and logging practices is a problem in this watershed; this is especially true because the soils in this drainage are highly erodible (U.S. Fish and Wildlife Service 1992).

Meherrin River Basin - Because the logperch was recently documented in this river basin, threats to the species have not been determined, but are likely similar to those in the Nottoway basin.

Recovery Goals and Accomplishments

The Roanoke logperch was listed as endangered on August 18, 1989 (U.S. Fish and Wildlife Service 1992). The recovery goal is to maintain or restore viable populations of the logperch in a significant portion of its historical range (U. S. Fish and Wildlife Service 1992). This can be accomplished by: (1) protecting and enhancing habitat containing the logperch, and (2) expanding populations within river corridors that either now support this species or supported it historically.

Work on goal 1 has been initiated through riparian habitat restoration work. The Service, the Virginia Department of Game and Inland Fisheries, Natural Resources Conservation Service, local Soil and Water Conservation Districts, and private landowners, have completed the following restoration projects to aid in the recovery of the logperch, and additional projects are planned:

o In 1995, a riparian restoration project was completed on the North Fork Roanoke River in Montgomery County. The project included construction of a livestock exclusion fence (2,750

feet), an alternative watering system, native tree and shrub plantings in the riparian corridor, bank stabilization, and an armored stream crossing for livestock and equipment access.

- In 1995, a restoration project was completed on the Nottoway River in Greensville County. The project included construction of a livestock fence (8,000 feet) and an alternative watering system.

- In 1995, a riparian restoration project was completed on Stony Creek, a tributary to the Nottoway River, in Dinwiddie County. The project included construction of a livestock fence (5,500 feet), vegetative stabilization of an old feed lot, and an alternative watering system.

- In 1995, a riparian restoration project was completed on an unnamed tributary to the Nottoway River in Nottoway County. The project included construction of a livestock fence (800 feet) and an alternative watering system.

More extensive habitat protection and restoration, through reductions in nonpoint runoff and restoration of wooded riparian areas, will be needed to accomplish goal 1. No such large-scale effort has been implemented. Efforts to control and minimize the effects of point discharges, chemical spills, and water withdrawals will also be necessary.

A portion of goal 2 has been met through the Ferguson et al. (1994) study, during which the known range of the logperch was documented further upstream in the North Fork Roanoke River. In addition, the Virginia Department of Game and Inland Fisheries have documented a range extension in the Nottoway River and possibly in the Smith River. Further data collection in the Meherrin River will also contribute to meeting this goal. No reintroduction efforts have been initiated due to lack of funding.

Reclassification of the logperch to threatened can occur when the likelihood of extinction in the foreseeable future has be eliminated by meeting the following criteria: (1) populations are shown to be stable or expanding and reproducing (as evidenced by sustained recruitment) in each of the following river systems: upper Roanoke, Pigg, Smith, and Nottoway; achievement of this criteria will be determined by population monitoring over at least a ten-year period, and (2) each of the known populations is protected from present and foreseeable threats that may interfere with the species survival (U.S. Fish and Wildlife Service 1992). After those two criteria have been met, the logperch may be delisted when habitat improvement measures have been developed and successfully implemented, as evidenced by a sustained increase in logperch population size and/or length of river reach inhabited within the upper Roanoke drainage and a similar increase in at least two of the other three logperch populations (Pigg, Smith, Nottoway) (U.S. Fish and Wildlife Service 1992). Considering the severe threats to this species due to continuing declines in water quality and habitat, recovery of the logperch currently seems problematic at best. Simonson and Neves (1986) stated that one or more logperch populations “may be in jeopardy of extirpation, and all but one population are of limited size.” They concluded “The future outlook for the Roanoke logperch appears precarious without improvements or protection of existing water quality and habitat.”

ENVIRONMENTAL BASELINE

As defined in 50 CFR 402.02 "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies in the United States or upon the high seas. 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 direct and indirect effects of the actions and activities resulting from the Federal action must be considered in conjunction with the effects of other past and present Federal, State, or private activities, as well as the cumulative effects of reasonably certain future State or private activities within the action area. The Service has determined that the action area for this project is Tinker Creek and its streambanks from 200 m upstream of Orange Avenue to its confluence with the Roanoke River and the Roanoke River and its streambanks from 200 m upstream of the Roanoke River crossing to 800 m downstream of its confluence with Tinker Creek.

Status of the Species in the Action Area - The Tinker Creek drainage area is approximately 70 square miles and average stream flow is approximately 70 cubic feet per second. The Roanoke River drainage area is approximately 400 square miles and average stream flow is approximately 500 cubic feet per second. “The Roanoke logperch was taken in Tinker Creek, 3.2 sk above its confluence with the Roanoke River, in August 1986 (W. Adams, pers. comm. 1986)” (Simonson and Neves 1986). A thorough Roanoke logperch survey has not been conducted in Tinker Creek. However, the applicant has chosen to assume this species is present in areas with appropriate habitat.

During the spawning period it is likely that the Roanoke logperch is present in Tinker Creek (W. Ensign, Virginia Polytechnic Institute and State University, pers. comm. 1996). However, logperch numbers are probably very low in this stream at any time and the species is not likely to be present during winter (P. Angermeier, Virginia Cooperative Fish and Wildlife Research Unit, pers. comm. 1995). Crossing 1 (Roanoke River) is a slow water area due to water backing up from Niagra Dam and likely receives minimal logperch use. Past surveys indicate that the logperch is scarce in this section of the Roanoke River (Burkhead 1983, Angermeier and Ensign 1991). However, this area may receive some winter logperch use and/or use by juveniles during the summer. Crossing 2 (Tinker Creek) is located 8,800 feet above the confluence of Tinker Creek and the Roanoke River and contains good logperch habitat. The work pad area immediately downstream of Crossing 2 is in a very silty area and does not contain logperch habitat. Work Pad A, at the railroad bridge, is a slow water area due to Niagra Dam and likely receives minimal logperch use.

Effects of the Action - Direct effects to the logperch will occur in several ways. There is likely to be direct killing and/or injury of logperch during preparation for pipeline installation through blasting and instream work (cofferdam and work pad installation/removal and dewatering). Maximum total days of instream work is approximately 165 days. If blasting for Crossing 1 occurs, fish in the immediate blast area will be killed and fish in the vicinity will be temporarily stunned and/or permanently injured; some of the stunned fish will recover, while others will

have spinal injuries (R. Neves, Virginia Cooperative Fish and Wildlife Research Unit, pers. comm. 1996). Siltation and turbidity of all habitat types is of concern. Installation/removal of work pads and cofferdams, blasting, and dewatering will result in siltation and turbidity. Moderately silted areas and areas with high turbidity will be unusable by the logperch for foraging and spawning. This will occur in the immediate project vicinity as well as downstream areas. Heavy siltation is also likely to result in a loss of prey items. If instream work occurs during warm months, fish will not be able to forage in and near work areas due to instream construction, siltation, and turbidity. If the work occurs during spawning, the fish will be unable to successfully spawn in these areas. If work occurs after completion of spawning, crushing or removal of eggs is likely to occur. In cold months, the construction activity may force fish from their pool habitat, resulting in death or injury.

Temporary loss of instream habitat will occur during installation and use of work pads (temporary fill is 1,480 square feet) and cofferdams (if used, aggregate material temporary fill is 7,400 square feet). Instream pipeline impacts will be 7,400 square feet. In addition, 1,100 square feet of riprap will be permanently placed instream for stream bed stabilization. However, if the material placed instream is similar to that which was present pre-construction, no permanent habitat loss should occur. Permanent habitat alteration will occur adjacent to streambanks where vegetation is to be removed (7,950 square feet) and replaced with riprap. Loss of streambank vegetation will result in increased water temperatures and changes in light regime in these relatively small areas. In addition, temporary habitat alteration will occur through loss of streambank vegetation along much of the pipeline route; these areas will be replanted after pipeline installation.

Indirect effects are defined as those that are caused by the proposed action and are later in time, but still are reasonably certain to occur (50 CFR 402.02). Instream pipeline maintenance and/or breakage is not likely because the pipeline will be encased in concrete and in some places will be installed in bedrock (D. Henderson, Hayes, Seay, Mattern and Mattern, Inc., pers. comm. 1996). Therefore, no indirect effects are anticipated.

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 consulta-tion pursuant to Section 7 of the ESA. Sewer upgrades may be necessary in the future; however, this will likely require permits from the Corps and will therefore be handled through Section 7 consultation.

Floodplain construction/clearing, streambank clearing, and chemical spills have occurred in the past and are likely to occur in the future in the action area. Floodplain and streambank alteration results in siltation, turbidity, and microhabitat alteration as discussed above. Eleven chemical spills (two in Tinker Creek) have been documented in the Roanoke River and its tributaries between October, 1970 and March, 1992 (U.S. Fish and Wildlife Service 1992). Chemical spills may result in minor stream impacts or complete fish kills within a given stream reach. A complete fish kill may result in a significant setback in recovery of the Roanoke logperch, and it may take several years before the logperch population in that stream reach

is restored to pre-spill levels.

The biological impacts of the proposed project are not significant to the continued existence of the Roanoke logperch population within or outside of the action area for several reasons: (1) Tinker Creek likely contains few logperch even during periods of peak use, (2) the work pad areas contain marginal or no logperch habitat, (3) the Roanoke River crossing contains marginal or no logperch habitat, (4) the majority of the impacts from the project will be temporary, and (5) the only permanent habitat alteration that will occur is from the placement of a small amount of riprap in and adjacent to portions of the waterways.

CONCLUSION

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

III. INCIDENTAL TAKE STATEMENT

Sections 4(d) and 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage in any such conduct) of listed species of fish or wildlife without a special exemption. Harm is further defined 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 as 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 any take of listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or applicant. 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.

AMOUNT OR EXTENT OF TAKE

The Service anticipates that incidental take of the Roanoke logperch will be difficult to detect because of the species' small body size and cryptic coloring. In addition, finding a dead or impaired specimen is unlikely. The action area is 4.85 sk in length (1.67 sk in the Roanoke River and 3.18 sk in Tinker Creek). Based on surveys conducted by Angermeier and Ensign (1991) within and upstream of the City of Roanoke, an average of 3.43 logperch (adults and juveniles) per sk are likely to occur in this section of the Roanoke River. Using this density, approximately 6 logperch may occur within the Roanoke River portion of the action area. The Service anticipates that no more than 25% of the Roanoke logperch population (1 to 2

individual Roanoke logperch) will be taken in the Roanoke River during construction of the project, as proposed. Because a survey has not been conducted within Tinker Creek and the numbers of logperch in this much smaller waterway are not likely to be similar to that of the Roanoke River, the Service cannot quantify the anticipated take of logperch in Tinker Creek. However, the Service anticipates that 25% of the logperch in Tinker Creek between 200 m upstream of Orange Avenue and the confluence of Tinker Creek and the Roanoke River will be taken. The incidental take is expected to be in the form of direct injury or death, harassment, and harm. In addition, permanent habitat loss is expected to occur instream from the pipeline crossings (7,400 square feet) and the instream placement of riprap for stream bed stabilization (1,100 square feet). Permanent habitat alteration will also occur adjacent to streambanks where vegetation is to be removed (7,950 square feet) and replaced with riprap.

REASONABLE AND PRUDENT MEASURES

The measures described below are nondiscretionary, and must be implemented by the Corps so that they become binding conditions of any permit issued to the applicant in order for the exemption in Section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to require the applicant to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit, 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. The Service considers the following reasonable and prudent measures to be necessary and appropriate to minimize take of the Roanoke logperch.

o Instream work will be conducted outside of the spawning season, preferably during low flow conditions, in order to minimize the effects of the action on eggs, larvae, and juvenile logperch.

o Instream and streambank impacts and duration of instream activities will be minimized to reduce siltation, which adversely affects the logperch.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of Section 9 of the ESA, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline the required reporting/monitoring requirements. Monitoring is not required for this project because only a small population of logperch is likely to be affected by the proposed project and the anticipated take is minimal. These terms and conditions are nondiscretionary.

1. No instream work will be conducted from 15 March through June 30 of any year. Instream work will be conducted during the low flow period of any year, 1 August through 31 October, when possible.

2. Instream work in Tinker Creek associated with Crossing 2 and its associated work pad, and Work Pad A, will not occur within 14 days of each other.

3. Blasting will only be conducted where other methods of excavation are infeasible, and will be coordinated with the Service prior to initiation. The permittee must notify the U.S. Fish and Wildlife Service at least 3 working days in advance of any blasting via telephone, at the number listed in condition 14 below.

4. All cofferdams must be constructed of non-erodible materials. If aggregate is utilized, it must be of a size large enough that it cannot be moved by normal stream flows, and shall contain minimal amounts of fine particles.

5. All maintenance of temporary and permanent sedimentation and erosion control facilities shall be carried out in accordance with Section 1.7 of the Virginia Erosion and Sediment Control Handbook regulations (VR 625-02-00). During the period that the project site is under construction, the contractor will be responsible for inspection of the sedimentation and erosion control facilities on a daily basis. Any damage discovered will be repaired promptly by the contractor.

6. No excavated material will be stockpiled instream or between the water's edge and 25 feet landward of the top of the streambank.

7. All excavated material will be immediately taken off-site unless the majority is composed of stone. In those cases, the excavated material will be placed over the pipeline after installment instead of riprap obtained off-site.

8. All backfill on top of pipelines and riprap placed instream will consist of stone that is of approximately the same size as the stone existing in the waterway prior to construction.

9. Loose or free concrete and other construction materials will be prevented from entering the waterway.

10. Refueling of equipment or vehicles will not occur instream or between the water's edge and 25 feet landward of the top of the streambank.

11. Within five days of completion of pipeline installation in areas without riprap, original shoreline contours will be restored and all exposed surfaces will be seeded with a fast-growing annual prior to permanent stabilization with perennial vegetation.

12. Within 5 days of completion of installation of permanent riprap along streambanks, shade-producing vegetation (such as trees or shrubs) will be planted upslope of the riprap such that the vegetated area is equal to the area covered by vegetation prior to initiation of the clearing associated with this project.

13. Water needed for bank seeding will not be obtained from Tinker Creek or the Roanoke River.

14. The permittee or the Corps is required to notify the Service before initiation of construction and upon completion of the project at the address given below. All additional information to be sent to the Service should be sent to the following address:

Virginia Field Office
U.S. Fish and Wildlife Service
P.O. Box 480
6983 Mid County Drive, Suite D
White Marsh, VA 23183

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

15. Care must be taken in handling any dead specimens of Roanoke logperch 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
5721 S. Laburnum Avenue
Richmond, VA 23231
(804) 771-2883

IV. CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the ESA directs Federal agencies to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to further minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans and other recovery activities, or to develop information to benefit the species.

As stated in our letter of April 15, 1996, the Service recommends that a thorough Roanoke logperch survey be conducted in Tinker Creek. We also recommend that additional surveys be conducted during and after construction to monitor impacts to the logperch. The Service would be pleased to provide recommendations for survey methodology.

In order for the Service to be kept informed of actions that minimize or avoid adverse effects or benefit listed species or their habitats, the Service requests notification of the implementation of any of these conservation recommendations by the Corps.

V. REINITIATION - CLOSING STATEMENT

This concludes formal consultation on the action outlined in the Corps' request. 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 Corps in fulfilling our mutual responsibilities under the ESA. Please contact Cindy Schulz of this office at (804) 693-6694 if you require additional information.

Sincerely,

Karen L. Mayne
Supervisor
Virginia Field Office

Enclosure
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U.S. Soil Conservation Service. 1993. Upper Roanoke River Basin study: natural resources study for hydrologic units. 65pp.

APPENDIX A

04-05-95 The Service participated in a meeting and site visit with the Corps, the City's consultants, the Virginia Department of Game and Inland Fisheries, and the Virginia Department of Environmental Quality.

05-18-95 The Service received a copy of the minutes from the April 5, 1995 meeting.

01-10-96 The Service received a copy of the minutes from a December 5, 1995 meeting that the Service was not able to attend.

02-29-96 The Service received a copy of the Joint Permit Application for the proposed project.

03-01-96 The Service received a copy of the Joint Public Notice for the proposed project.

04-15-96 The Service sent a letter to the Corps recommending that a Roanoke logperch survey be conducted in Tinker Creek.

05-24-96 The Service received the Corps' request to initiate formal consultation and receive a copy of the draft biological opinion.

08-13-96 The Service submitted the draft biological opinion to the Corps. The Corps provided the draft to the applicant and its consultants. The Service provided the draft opinion to the Virginia Department of Game and Inland Fisheries and several species experts.

08-26-96 The Corps provided comments to the Service on several of the terms and conditions.

09-09-96 Discussions between the Service, the Corps, and the applicant's consultant clarified the meaning and intent of several of the terms and conditions. The Service agreed to reword several of the terms and conditions.

09-17-96 The Service provided revised terms and conditions to the Corps for review.

09-24-96 The Corps indicated that the revised terms and condtions were acceptable.
CShculz/KMayne:10/1/96

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