From: Jack Cushing
To: Tom Moorer
Date: 2/20/04 9:19AM
Subject: Conference Call

Tom

Following are the items that are needed to complete the BA for Farley (as discussed in conference call on 2/19):

1) SNC to supply additional 2 years of NPDES reports (DMRs) - summary reports for last three years are preferred (These summaries should provide detailed descriptions of radiological and "contaminant" releases - aquatic only)

2) SNC to supply "priority pollutant" report that was submitted for NPDES permit

3) SNC to supply a summary of the "Mussel Coalition" reports

4) SNC to supply in summary form data on the 1975-78 studies on mussel tissues

5) SNC to supply entrainment study information that was completed upon licensing (316)

6) SNC to send a redline/strikeout version of the USFWS letter

7) Background information on safe Hydrazine limits

If your recollection is different please let me know.

Jack Cushing
Project Manager
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
USNRC
Phone 301-415-1424
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Telephone: 301-415-1424
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From: "Moorer, Tom C." <TCMOORER@southernco.com>
To: <JXC9@NRC.gov>
Date: 2/25/04 7:45PM
Subject: FW: Emailing: Historical NPDES Data.pdf, Mussel Coalition Report 1.pdf, Mussel Coalition Report 2.pdf, 316b Entrainment Study.pdf, Data from 1975-78 Mussel Tissue Studies.pdf

Jack:

In accordance with your E-mail dated February 20, 2004, please find attached the information requested in our recent teleconference to support response to Fish and Wildlife letter 04-0397 on the proposed Farley relicensing. The attachments are provided in response to the requests noted below. I have listed the name of each PDF file next to the applicable issue for clarity.

1. Supplemental NPDES data for hydrazine, zinc, and chromium for the last three years. Please note that zinc data is for the cooling tower blowdown, not the final discharge point. Hydrazine and chromium data is for the final discharge point unless otherwise noted in the spreadsheet. See File Historical NPDES Data.pdf

2. SNC Priority Pollutant report - See file FNP NPDES Renewal Form 2C

3. Summary of Mussel Coalition reports - See Files Mussel Coalition Report 1; Mussel Coalition
   Report 2

4. Data from 1975 -78 Mussel Tissue Studies - See File with same name

5. 316 -B Entrainment Study- See File 316B Entrainment Study

6. Redline/Strikeout Version of USFWS Letter -To be provided by FAX

7. Background Information on Safe Hydrazine Limits - Provided in previous response (See CD
   provided to USFWS Ref. 1991 Thermal Study)

I hope that the attached information is helpful in developing your response to the USFWS letter. As we discussed, a close review of the information contained in the Mussel Recovery Plan dated 9/19/03 may provide additional key information in formulating a response to the letter.

If you have questions or require additional information, please contact me at (205) 992-5807.

Tom Moorer

<<Historical NPDES Data.pdf>> <<Mussel Coalition Report 1.pdf>> <<Mussel Coalition Report 2.pdf>> <<316b Entrainment Study.pdf>> <<Data from 1975-78 Mussel Tissue Studies.pdf>>

CC: "Davis, James T." <JTDAVIS@southernco.com>, "Pierce, Chuck R."

<CRPIERCE@southernco.com>, "Greene, Amy B." <ABGREENE@southernco.com>

FAX

Southern Nuclear Operating Company, Inc.
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SOUTHERN COMPANY
Energy to Serve Your World

To JACK CUSHING
NRC

Telephone
Fax (301) 415-1032
CC

Date
From TOM MOORER

Telephone (205) 992 5807
Fax 205-992-6108
Number of pages including cover sheet 14

REMARKS ___Urgent ___Reply ASAP ___For your review ___Please comment

JACK —

MARKUP OF LETTER WITH OUR COMMENTS ATTACHED. EACH COMMENT CORRESPONDS TO A NUMBER AND ARROW POINTING TO THE APPLICABLE SENTENCE(S).

I HOPE THIS IS HELPFUL —

PLS. CALL ME AT (205) 992-5807 OR (205) 902-7847 (CELL) IF YOU HAVE QUESTIONS.

TOM

04-0397 February 6, 2004

Mr. Pao-Tsin Kuo, Program Director
License Renewal and Environmental Impacts
Division of Regulatory Improvement Programs
Office of Nuclear Reactor Regulation
United States Regulatory Commission
Washington, D.C. 20555-0001

Dear Mr. Kuo:

Thank you for your letter of November 26, 2004, requesting comments for the NEPA review of re-licensing of the Joseph M. Farley Nuclear Plant Units 1 and 2 (FNP), located in Houston County, Alabama, on the west bank of the Chattahoochee River. We have reviewed the information you enclosed and are providing the following comments in accordance with the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. et seq.) and the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Federally Listed Species

1 Historical data for the Chattahoochee River, Houston County, Alabama and Early County, Georgia are poor. One threatened species, purple bankclimber (*Elliptoideus sloatianus*), and three endangered species, shinyrayed pocketbook (*Lampsilis subangulata*), Gulf moccasinshell (*Medionidus penicillatus*), and oval pigtoe (*Pleurobema pyriforme*) are known from the mainstem of the Chattahoochee above Houston and Early counties, and are considered to have occurred throughout the mainstem, in appropriate habitats (Brim Box, and Williams, 2000). The latter three species are known in tributaries that feed into the mainstem in Early County, Georgia, currently support populations of three endangered species: Shinerayed pocketbook (*Lampsilis subangulata*), Gulf moccasinshell and oval pigtoe (*Pleurobema pyriforme*). Sawhatchee Creek, Early County, Georgia supports reproducing populations of Gulf moccasinshell (*Medionidus penicillatus*) and oval pigtoe (*Pleurobema pyriforme*) (Brim Box and Williams, 2000). There is archeological record of *E. sloatianus* in the mainstem of the Chattahootchee River, Houston County, Alabama (Williams and Fradkin 1999 in US FWS 2003).

2 No recent survey data are available for the mainstem Chattahoochee in this location. However, a single specimen of *E. sloatianus* was collected in upstream of the project area in Goat Rock Lake by Stringfellow (pers. comm.. 2003 in US FWS 2003), located on the mainstem of the Chattahootchee River, Lee County, Alabama. Since historical data within this reach of the

Chattahoochee River are poor and recent data are lacking, it is possible that the Chattahoochee River may still support some of these listed species in Houston County, Alabama and Early County, Georgia, and as such this reach may represent areas important to recovery of these species (pers. conv. with Ms. Holly Blalock-Herod, malacologist, US FWS, Panama City FO 2004).

The Service recommends that a survey be conducted for the Federally mussel species listed above. Further information on conducting the survey is provided under "Recommendations" below.

Species and habitat descriptions for the listed mussel species are provided in the recovery plan (USFWS 2003, http://endangered.fws.gov/). Enter the species name in the search box for information on each species.

We concur with the survey results for terrestrial species, but have remaining concerns listed below under "Maintenance of Transmission Line Rights-of-Way."

Concerns

We have the following concerns regarding the project:

- Release of radionuclides in the Chattahoochee River and long-term exposure of Federally protected mussels and other aquatic organisms
- Effects of plant operation on health and reproduction of fish and other aquatic organisms in the Chattahoochee River, especially effects on potential host fish of listed mussels
- Release of thermal heated water, chlorine, copper, and hydrazine into the Chattahoochee River in concentrations harmful to Federally protected mussels and other aquatic organisms
- Entrainment and subsequent mortality of aquatic organisms in intake cooling water due to exposure to intense heat, chlorine, and hydrazine
- Maintenance practices for existing transmission lines rights-of-way

Long-term Exposure of Aquatic Organism to Low Level Radiation

We are concerned about the effects of long-term, low-level radiation on Federally protected mussels, if present, as well as other aquatic organisms, communities, populations, and fishery resources in the project area. Freshwater mussels in the discharge of nuclear power plant effluent can accumulate radionuclides in soft tissues and shell at levels several orders higher than surrounding waters (Lutz, et al. 1980). Radionuclides do not concentrate consistently throughout the food chain, but vary in concentration depending on the system, species, and other variables (Lutz, et al. 1980). Radionuclide concentrations in biota vary depending on the organism's age, size, sex, tissue, season of collection, and other variables--and these have to be acknowledged

when integrating radiological analyses (Eisler 1994). In general, lower trophic levels of aquatic organisms have greater concentrations of radionuclides than higher trophic levels (Bowen et al. 1971).

Bivalves contain strontium in their shells at much higher rates than fish bone, making them good monitors of low-level radionuclide contamination of the environment (Smith 1974). Also, bivalves accumulate cesium and other metals in soft tissue. This is due to: (1) strontium replacement of calcium in the shells, (2) longer half-life of radionuclides in mussels than in fish, and (3) enhanced physical absorption by filter-feeding bivalves, and (4) consumption of particulate and phytoplankton, both rich sources of radionuclides, by bivalves. Concentrations in phytoplankton are 2,500 to 6,200 times that of surrounding water, whereas, the concentrations in fish are only 25 to 50 times that of surrounding water (Smith 1974). Since radionuclides are deposited in mollusk growth rings, their shells provide a record of the radionuclide contamination in their environment (Nelson 1962). 6

According to Mr. Jim Davis, Senior Engineer and Environmental Lead for Relicensing, FNP used to sample mussels as biomonitors of radionuclides contamination 1977-1981, but had difficulty finding mussels, therefore discontinued sampling. They searched all the way downstream from FNP plant to Lake Seminole for mussels. According to Mr. Davis, no habitat occurred within 10-15 miles of the plant. We are concerned if the lack of mussels is due to unsuitable habitat created by the powerplant and/or effluent exposures. 7

Results of fish tissue sampling provided in FNP's 2000, 2001, and 2002 Annual Radiological Environmental Operating Reports and 2001 and 2002 Annual Radiological Effluent Release Reports indicated low levels of radiation present for fish fillets. This information is applicable for evaluating human health concerns, but not for assessing aquatic organisms health.

Large populations of local filter feeders may drastically increase the rate of sedimentation of added trace elements and radionuclides, thus increasing their accumulation in the sediments (Hoffman, J.H., et al. 2003). Thus, large populations of *Corbicula* could cause increases in radionuclide concentrations in the sediments. *Corbicula* population growth could be stimulated by FNP's thermal discharge into the Chattahoochee River, resulting in this impact.

Reproduction of Fish and Other Aquatic Organisms

The Cooling Water Intake Study (316b) Demonstration by FNP (APC 1983) states that reproduction was observed for clupeids (herring and shad), but not other fish species. We are concerned that the release of radionuclides, contaminants, and/or thermal discharges from FNP plant may be having an adverse effect on resident fish populations and other groups of aquatic organisms. Mussels are dependent on fish as the host organism for glochidial attachment. Therefore, adverse effects to the host fish could indirectly cause adverse effects on listed mussel reproduction and recruitment.

NPDES Permit Limits

We believe the NPDES permit limits for temperature (111° F Daily Maximum and 100 ° F Monthly Average, April 1- Nov. 30; Daily Maximum = Monitor and Monthly Average 81.7 ° F, Dec. 1- March 31) may not be protective of listed mussels (if present) or of other aquatic life. A segment of Chattahoochee River below the Walter F. George Dam and upstream of the project area is on Georgia's 303(d) List due to violation of State standards for dissolved oxygen (D.O.) and fecal coliform bacteria. The cited causes are Walter F. George Dam release and non-point source runoff. The beneficial use classification of the Chattahoochee River is Fish and Wildlife. (11) A minimum dissolved oxygen (D.O) concentration of 5.0 mg/l has been established by ADEM as minimum numeric standard for supporting aquatic life and healthy warmwater fish populations. Limited or periodic (monthly) sampling by Georgia Department of Natural Resources, Water Protection Branch (Periodic Water-Quality Records, Apalachicola River Basin, 2000 Calendar Year) in Chattahoochee River at a station located 2.3 miles south of Columbia (river mile mark 46.5), yielded D.O. concentrations as low as 4.0 mg/L. A D.O. of 5.7 mg/L was recorded downstream at Alaga, Alabama. Water temperatures during that period ranged from 28.6 – 30.3 °C. We are concerned that a discharge limit of 100-111 °F (within ZID) may result in temperature outside the ZID exceeding State water quality standard for temperature (90 °F, not to exceed ambient by 5 °F) and D.O. concentrations lethal to freshwater (12) mussels and other aquatic life within and outside the ZID. A significant amount of habitat including the ZID (878 feet) may be adversely affected. FNP does not have ample water temperature monitoring data to fully evaluate temperature and DO impacts on listed mussels (if present), fish, and other aquatic life in the Chattahoochee River.

Elevated water temperatures at various distances from a studied nuclear generating facility had and adverse effect on the growth, survival and recruitment of mussels (Lutz et.el. 1980). In a study on effects of drought on freshwater mussels in the lower Flint River, habitat conditions and mussel survival were monitored weekly during the period of the drought. D.O. concentrations were highly correlated to mussel mortality. Unionid mortality increased when dissolved oxygen concentrations fell below 5 mg/L, with high mortality of *L. subangulata*, *M. pencilatus*, and *P. puriforme* experienced high mortality when D.O. fell below 5.0 mg/L (Jones et. el. 2000).

FNP uses chlorine as a biocide for *Corbicula* control. Chlorine is extremely toxic to a wide variety of freshwater organisms (Hunn and Schnick 1990). Safe concentrations (i.e., those that do not produce lethality or sublethal effects) are likely much lower, especially considering the relatively sessile nature and long life span of mussels relative to these short- term test exposures. Under longer-term exposures (>96 hours), lethality to fish and aquatic invertebrates has been documented at chlorine concentrations between 3.4 and 26 ug /L (EPA 1985). Because of chlorine's extreme toxicity, the USEPA established a Federal ambient water quality criterion maximum concentration of 0.019 mg/L and a continuous concentration (CCC) of .011 mg/L for chlorine, respectively, to protect aquatic life (EPA 2002). Studies have shown that mussels are very similar in sensitivity to other sensitive aquatic organisms and that 0.019 mg/ L is likely protective (Ingersoll 2003). FNP should meet this criterion by inclusion of dechlorination unit or

use alternatives such as UV or ozonation. Alternatively, high flow rate velocity flushes, ultrasound, or robotic mechanical cleaning could occur on influent and effluent pipes. (13)

The toxicity of chlorine to aquatic life is a function of total residual chlorine (TRC), which includes both free chlorine and chloramines (Flora et al. 1984). Monitoring of free chlorine does not serve as an adequate indicator of the potential toxicity of facility effluents nor does it provide adequate data to avoid toxic effects to listed mussels. We therefore recommend measurement of TRC rather than free chlorine. (14)

FNP uses hydrazine to scavenge oxygen during blowdowns of its cooling towers. Discharges of this potential toxicant into the Chattahootchee River may cause more than detrimental effects to Federally listed mussels, if present, as well as many other aquatic organisms. The rate of degradation of hydrazine in water is highly dependent on factors such as pH, temperature, oxygen content, alkalinity, hardness, and the presence of organic material and metal ions. The toxicity of hydrazine increased for guppies in soft water (at pH < 7.0) compared with the toxicity in hard water at a pH ≈ 8.0 (Slonim 1977), indicating increased persistence of hydrazine in soft, non-alkaline water. Increased water temperature also enhance the toxicity of the compound for bluegills (Hunt et al., 1981) (http://www.inchem.org/documents/ehc/ehc/ehc68.htm#SectionNumber:5.1). According to modeling data collected by FNP at the point of discharge, the Chattahoochee River has low alkalinity. Instream water temperatures are elevated above ambient due to FNP's thermal discharge. These conditions elevate concerns for the toxicity of hydrazine in the discharge, and potential adverse effects on aquatic biota.

There is no maximum concentration limit for hydrazine in FNP's NPDES permit, but merely a "de facto" limit of 70 ppb. Standard acute toxicity test were performed for hydrazine on freshwater fish, lower trophic level organisms, and amphibians. The guppy (*Lebistes reticulatus*), fathead minnow (Pimephales promelas) (eggs), bluegill sunfish (*Lepomis macrochirus*); bacteria, *Pseudomonas putida*; protozoa (*Uronema paraduczi*) and (*Chilomenas paramecium*); the water flea (*Daphnia pulex*); and the amphibia, South African clawed toad (*Xenopus laevis*) (larvae). All experience mortality below 70 ppb. (15)

Entrainment

We are also concerned about uptake of aquatic organisms into the boiler reactor water by Entrainment, including larvae and early life stages of Federally protected Mussels (if present), as well as other mussels, fish, phytoplankton, and zooplankton. FNP withdraws 171 cfs of Chattahoochee River water for cooling of its reactors. The volume of water withdrawn represents 8 % of the 7Q10. Historic stream flow data (1975-2002) taken at the USGS Gauge Station in the Chattahoochee River near Columbia, Alabama, show short term (1-2 days) minimum flow occurrences on a regular frequency due to managed releases from Walter F. George Reservoir. The flow during those periods typically range from 650-1500, well below the 7Q10. During those periods of minimum flow, FNP's withdrawal may be as much as 25% of the instream flow. Pressurized boiler reactor water is subjected to intense pressure, heat, and biocide treatment. Any aquatic organisms taken up by entrainment into the intake pipe and subjected to such environment would be killed. (16) (17)

Maintenance of Transmission Lines Right-of-Way

We are concerned about FNP's practice of controlling vegetation at stream crossings, using mowing and herbicide applications to reduce the cover to herbaceous species. This modification to the natural vegetative cover may lead to erosion and sedimentation of streams. We are particularly conerned about this practice at stream crossings where Federally listed mussels may occur and specifically Sawhatchee Creek, mentioned above, where three Federally listed mussel species are known to occur.

Recommendations: ← SEE ITEM (18)

1.Perform a full characterization of different radionuclides and contaminants in the effluent waste stream on a minimum of 10 different full-strength (100% effluent) samples.

2. Conduct an initial mussel habitat survey extending from two miles upstream of the FNP site downstream to Lake Seminole. A malaecologist with a current collecting permit, familiar with the listed mussels and their habitats should conduct the survey. The habitat should be mapped and a detailed description provided, including substrate type, embeddedness, and velocity. A detailed mussel survey should follow in suitable habitat, with adherence to non-wadable stream protocols. Substrate characteristics and velocity should be recorded for each collection or observation location. A mussel species distribution map should be produced from the survey information. Dominant benthic fauna, including estimated densities should also be recorded.

3. Contingent on positive findings in Recommendation 1, sample surficial sediment (0-7 cm) in the mixing zone and stream reach above and immediately below the mixing zone for the detected radionuclide analytes. At each location, collect composite, triplicate samples consisting of at least five subsamples. In selecting sampling stations, look for pools where there is likelihood of fine sediment and organics in the deposits. Grain size and total organic carbon should be determined on sampled sediment. Depending on levels of targeted analytes found during initial limited sediment sampling, we may recommend more extensive sampling and isocuric mapping of radionuclide analytes in sediments (Churchill et al.1980). Also, if concentrations are significantly elevated above background, we may recommend mapping targeted radionuclide analytes distributions and compare to unionid mussel distributionson a map to determine possible relationships.

4. Collect large adult native unionid mussels and analyze tissue and shell for the radionuclides typically retained in these tissues. Areas and stations to collect unionids should be based on mussels distribution as determined from the survey. Mussels within, or downstream and closest to the mixing zone should be included in the analysis and compared with mussels at various distances upstream downstream. At least three mussels should be collected at each site. (Note: a nonlisted mussels should be collected and not listed species.

5. Sample the following large adult whole fish (skin on): largemouth bass (*Micropterus salmoides*), flathead catfish (*Pylodcitis olivaris*), and spotted sucker (*Minytrema melanops*) as bio-indicators of radionuclides. Sample six sites – (1) in the mixing zone or ZID, (2)

immediately upstream of Walter F. George Reservoir, (3) two miles upstream of discharge, (4) two miles downstream of the discharge, (5) riverine habitat immediately upstream of Lake Seminole, and (6) Lake Seminole forebay. Collect five fish of each species at each sampling site.

6. If levels of radionuclides in sediments are determined to be elevated in areas where *Corbicula* populations are high, also design and conduct a study to determine if FNP thermal discharge is causing an increase in the *Corbicula* population and whether those populations are affecting radionuclide concentrations in sediments, fish, and/or turtles consuming the *Corbicula*.

7. Design and conduct a study of native resident fish in the ZID, downstream of the ZID, and at least one mile upstream of the project site to determine whether fish abundance, diversity, and fecundity are affected by radionuclides, other contaminants, (e.g., hydrazine, copper, chlorine), thermal shock, or other plant operations.

8. Quantify the diversity and abundance of organisms entrained by water withdrawal at all intake pipes and evaluate screening mesh size, low velocity intake, and other techniques to minimize entrainment. Quantification should occur at least monthly for the year of the study and for the year following screen changes.

9. Monitor temperature, D.O., TRC, copper, and hydrazine at the downstream end of the ZID on a monthly basis to determine if modeling has accurately predicted concentrations. The Walter F. George Reservoir manages its releases such that there are frequently two consecutive days in which flow is well below the 7Q10. That period should be targeted for monitoring. Conduct a formal risk assessment (RA) using EPA methods to assess whether concentrations are protective of sensitive fish and invertebrates, particularly Federally listed mussels, if present. Include low-flow, high-temperature conditions in the RA.

10. If hydrazine is detemined to pose a risk to aquatic species (particularly mussels), eliminate discharge of hydrazine by designing a system for separating and containing hydrazine from all discharges to the Chattahoochee River.

11. Reduce or eliminate discharge of chlorine to the Chattahoochee River through use of a dechlorination unit for removal of chlorine before discharge. If there is a discharge of chlorine, then at least monitor TRC daily. To provide adequate protection of aquatic life, the permit should establish the EPA criterion chronic concentration of 0.011 mg of total residual chlorine per L as a permit limitation.

12. Compare alpha and beta radiation levels found in sediment within and downstream of the ZID to evaluate whether concentrations are protective of aquatic life, especially mussels. Compare concentrations found in fish (whole) and mussels (shell) to background conditions and concentrations considered protective of those organisms. If sediments, mussels, and fish levels are determined not to be protective, determine corrective measures needed.

13. Use mowing or prescribed burns as an alternative to herbicide use for controlling vegetation along transmission right-of-way, particularly near stream crossings and in gopher tortoise

habitat. Where gopher tortoise burrows are known to be present, mowing should be restricted to during the winter period when gopher tortoises are hibernating. If herbicides are used, use Roundup, Custom, or Accord, together with a low toxicity surfactant such as Agridex, or equivalent herbicides and surfactants, in strict adherence to the label. Periodically survey to determine if Federally listed pant species have become established in rights-of-way. If established, please contact our office.

14. At all stream crossings, especially where Federally listed mussels are known to occur, plant and maintain stream riparian areas with native shrub species. It is our understanding that Ms. Sandy Abbot with the W. Georgia Field Office, USFWS, Ft. Benning, Georgia, will be working with FNP to develop a list of recommended species for the Georgia area where stream crossings are involved. FNP should also contact Panama City, Florida Field Office, as well as our office (Daphne, Alabama) to develop a recommended species list in Florida and Alabama.

Depending on radionuclide results in sediments, we may recommend a histopathological study and stress proteins response analysis study using molecular biomarkers to assess effects of radionuclides on fish physiology and reproduction. Please provide copies of all D.O. monitoring data to this office.

We welcome the opportunity to assist in the design of monitoring plans. Upon receipt of recommended survey and study reports, we will provide our final comments and consultation under section 7 of the Endangered Species Act. Initiation of formal consultation with the Nuclear Regulatory Commission may be necessary after our review of the requested information. 19

If you have any questions or need additional information, please contact Mr. Bill Young at (251) 441-5842. In correspondence, please refer to the reference number above.

Sincerely,

Larry E. Goldman
Field Supervisor

Enclosure

References:

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U.S. E.P.A. 2002. National recommended water quality criteria: 2002. U.S. Environmental Protection Agency, Office of Water and Office of Science and Technology. EPA-822-R-02-047. 33 pp.

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Comments on USFWS Letter 04-0397

General Comment

As we discussed in our February 19, 2004 teleconference, this letter contains numerous errors, misstatements of fact, misunderstandings, and other incorrect information and it is difficult to respond in a meaningful way. However, we have tried to focus on honest, constructive feedback designed to make sure that each issue and concern expressed in the letter is reviewed with all the necessary information to ensure all decisions are well founded and protective of the environment. We have numbered each area of comment. and have included an arrow pointing to the sentence(s) to which the comment is applicable. Typographical and other editorial comments are noted directly on the letter. The numbers and corresponding comments are listed below:

1. A reference is made to the poor historical data provided for the Chattahoochee River in the Houston County AL and Early County GA reach. However, the Mussel Recovery Plan developed by USFWS dated 9/19/03 contains a statement on page ii stating "By approving this recovery plan, the Regional Director certifies that the data used in its development represents the best scientific and commercial data available at the time it was written." The Recovery Plan recognizes that the mainstem habitat has been permanently altered by impoundments. Recovery in the mainstem is not an element of the plan.
2. The letter states that no recent survey data are available for the mainstem Chattahoochee in this location. The Recovery Plan more correctly states that there are no endangered or threatened mussels in this location or anywhere near this location and that no attempt is being made to establish populations in this area.
3. This statement also is not consistent with the Recovery Plan information.
4. The Recovery Plan recommends no surveys for this area or any other area of the 200 mile reach of the mainstem open to navigation .
5. The concerns listed at Item 5 are very general in nature and use terms such as "other aquatic organisms". In order for concerns to be addressed, more specific cause and effect information is needed.
6. Item 6 makes reference to numerical concentrations observed in the referenced study, but does not state how the information is relevant to the specific concern. Data from the Farley Nuclear Plant Environmental Monitoring Program does not support the information in Item 6.
7. The Recovery Plan makes no mention of concerns over the impact of power plants (there are several in this basin) on mussel habitat. In fact, the Recovery Plan attributes mussel decline primarily to impoundments.
8. There is no evidence of large populations of any mussel species in the area of Farley Nuclear Plant. In fact, Farley suspended collection of mussels as an indicator species in the Radiological Environmental Monitoring Program in 1982 due to lack of availability of mussels in the area proximate to the Farley plant. At

that time, the majority of mussels collected were *Corbicula*, a species not native to the United States. Per discussion with biologists conducting the sampling, there were no mussel colonies located within at least 20 miles of plant Farley.

9. This Item notes that the Farley 316 B Demonstration concludes that reproduction was observed for clupeid (herring and shad), but not other fish species. The 316 Demonstration was designed to be representative of organisms subject to entrainment by the Farley Intake Structure. The study was conducted using push nets and pull nets in the main channel of the river near Farley. Per discussion with the biologists responsible for the study, the predominance of clupeids was expected since sampling was limited to the "water column" subject to the Farley intake. Game fish species, and other species eggs and larvae typically are not present in the area sampled. In fact, the current 316 rules require sampling directly in the intake structure when possible. The absence of other species actually confirms that the Farley Intake Structure has no significant impact on game fish or other less common species.
10. Item 10 refers to the importance of host fish in mussel reproduction. The Recovery Plan contains a detailed discussion of the role of host fish and concludes that many of the mussels of concern have very specific host fish. The absence of mussel colonies for at least 20 miles from plant Farley tends to make this concern moot. In addition, there is no evidence that Farley Nuclear Plant has any negative impact on fish or other aquatic species.
11. Item 11 referring to establishment of a minimum D.O. concentration in the Chattahoochee River by ADEM is incorrect. The Chattahoochee River is technically in Georgia. Any criteria would have been established by the Georgia EPD or perhaps as a joint effort.
12. The entire discussion on NPDES permit limits is misleading and incorrect. The current NPDES permit limits are based on use of a mixing zone and the mixing zone studies conducted as a condition of a permit appeal in 1990 confirm that thermal limits, chlorine limits, and hydrazine discharges regulated by the permit are protective of aquatic life and in full compliance with the referenced water quality criteria.
13. The reference to alternatives such as UV, ozonation, high flow rate velocity flushes, ultrasound, or robotic cleaning are not applicable to a power plant service water system. Recommendation of specific technologies without confirmation of applicability is inappropriate.
14. In addition to measurement of FAC, Farley conducts Whole Effluent Testing (WET) on an annual basis. Testing has been conducted for over ten years and results have always been acceptable. The Alabama Department of Environmental Management (ADEM) is responsible for the Farley NPDES permit limits and requirements under EPA guidelines. The use of FAC to determine compliance with chlorine limits is consistent with EPA methods and appropriate. TRC is normally used to measure time of chlorine discharge for cooling tower blowdown.
15. The reference to a "de facto" limit of 70 ppb in the NPDES permit is incorrect. The NPDES permit contains no limit for hydrazine. A hydrazine study conducted to support the 1990 permit appeal determined that at an "end of pipe" value of 70 ppb, the water quality criteria for hydrazine would not be exceeded in the mixing

zone during an extreme low flow event. The concentration outside the ZID would be well below the 70 ppb value and protective of aquatic life.

16. The reference to "boiler reactor water", "pressurized boiler reactor water", and "intense pressure and heat" illustrates the misstatement of fact, incorrect information, and general lack of understanding of the Farley plant and its impact on the environment discussed in the General Comment.

17. This section implied that the Farley plant withdraws water from the river and pumps it into the reactor where it comes into contact with intense heat, pressure, and biocide that effectively sterilizes the water. This statement defies comment and further illustrates a lack of understanding of the Farley plant, including its impact on the environment.

18. As discussed in the February 19, 2004 teleconference, the Recommendation Section contains many items that are based on an assumption that there are contaminants in the Farley discharge at levels that require immediate corrective action. There is no technical basis for this assumption. It is hoped that the additional information provided, clarification of the incorrect information and misunderstandings evident in the letter, and detailed review of the Mussel Recovery Plan will provide a mechanism to withdraw many of these recommendations. We see no value in responding to each recommendation at this time. We will continue to be available for consultation if additional questions arise.

19. Southern Nuclear is committed to being a steward of the environment. And we will make every effort to support a productive end to this process. We are available to discuss the concerns expressed by the USFWS directly with them, if desired, or in a joint meeting with NRC and its contractors. We continue to be hopeful that this issue can be resolved without need for formal consultation.

PART A

Pollutant	Effluent - DSN001, Main Combined Facility Discharge									Intake (Optional)		
	Maximum Daily Value		Maximum 30 Day Value		Long Term Avg. Value		No. of Analyses	Units		Long Term Average		No. of Analyses
	Conc.	Mass	Conc.	Mass	Conc.	Mass		Conc.	Mass	Conc.	Mass	
BOD	1	302	—	—	—	—	1	mg/l	kg/day	1	374	1
COD	11	3,324	—	—	—	—	1	mg/l	kg/day	3	1,123	1
TOC	2.63	795	—	—	—	—	1	mg/l	kg/day	2.42	906	1
TSS	6	1,813	—	—	—	—	1	mg/l	kg/day	5	1,872	1
N, Ammonia	0.08	24	—	—	—	—	1	mg/l	kg/day	0.09	34	1
Flow	102.98	—	98.65	—	82.62	—	1,187	MGD	—	98.93	—	1*
Temperature, Winter	24.6	—	20.3	—	16.8	—	39	°C	—	13.5	—	40
Temperature, Summer	35.0	—	31.4	—	30.2	—	45	°C	—	26.7	—	45
pH	Minimum 6.03	Maximum 8.31	Minimum 6.15	Maximum 7.46			170	S.U.	—			

* Typical intake flowrate.

PART B

Pollutant	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge									Intake (Optional)		
			Maximum Daily Value		Maximum 30 Day Value		Long Term Avg. Value		No. of Analyses	Units		Long Term Average		No. of Analyses
			Conc.	Mass	Conc.	Mass	Conc.	Mass		Conc.	Mass	Conc.	Mass	
Bromide		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chlorine, Tot. Residual	X		0.19	57	0.13	39	0.07	21	1,137	mg/l	kg/day	Not Detected	—	1
Color	X		24	—	—	—	—	—	1	PCU	—	19	—	1
Fecal Coliform	X		1	—	—	—	—	—	1	colonies/ml	—	15	—	1
Fluoride		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Nitrate-Nitrite (as N)	X		0.62	187	—	—	—	—	1	mg/l	kg/day	0.52	195	1

PART B

Pollutant	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
Nitrogen, Tot. Org. (as N)	X		0.860	260	—	—	—	—	1	mg/l	kg/day	0.680	255	1
Oil and Grease	X		2.4	725	—	—	—	—	1	mg/l	kg/day	2.8	1,048	1
Phosphorous (as P), Tot.	X		0.034	10	—	—	—	—	1	mg/l as P	kg/day as P	0.034	13	1
Radioactivity														
(1) Alpha, Total	X		1.0	—	—	—	—	—	1	pCi/l	—	0.5	—	1
(2) Beta, Total	X		4.2	—	—	—	—	—	1	pCi/l	—	3.2	—	1
(3) Radium, Total	X		< 0.7	—	—	—	—	—	1	pCi/l	—	< 0.6	—	1
(4) Radium 226, Total	X		0.5	—	—	—	—	—	1	pCi/l	—	0.6	—	1
Sulfate (as SO4)	X		12.4	3,747	—	—	—	—	1	mg/l	kg/day	9.24	3,460	1
Sulfide (as S)	X		0.03	9	—	—	—	—	1	mg/l	kg/day	0.03	11	1
Sulfite (as SO3)		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Surfactants	X		0.03	9	—	—	—	—	1	mg/l	kg/day	0.02	7	1
Aluminum, Total	X		0.485	147	—	—	—	—	1	mg/l	kg/day	0.379	142	1
Barium, Total	X		0.025	8	—	—	—	—	1	mg/l	kg/day	0.024	9	1
Boron, Total	X		0.0390	12	—	—	—	—	1	mg/l	kg/day	0.0190	7	1
Cobalt, Total		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Iron, Total	X		0.515	156	—	—	—	—	1	mg/l	kg/day	0.561	210	1
Magnesium, Total	X		4.35	1,315	—	—	—	—	1	mg/l	kg/day	4.02	1,505	1
Molybdenum, Total		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Manganese, Total	X		0.055	17	—	—	—	—	1	mg/l	kg/day	0.101	38	1
Tin, Total		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Titanium, Total	X		0.018	5	—	—	—	—	1	mg/l	kg/day	0.014	5	1

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
METALS, CYANIDE, AND TOTAL PHENOLS															
Antimony, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Arsenic, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Beryllium, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Cadmium, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chromium, Total	X	X		0.003	0.9	0.003	0.9	0.000	0.1	39	mg/l	kg/day	Not Detected	—	1
Copper, Total	X	X		0.006	2	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Lead, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Mercury, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Nickel, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Selenium, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Silver, Total	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Thallium, Total	X	X		0.006	2	—	—	—	—	1	mg/l	kg/day	0.007	3	1
Zinc, Total	X	X		0.026	8	—	—	—	—	1	mg/l	kg/day	0.021	8	1
Cyanide, Total	X	X		Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Phenols, Total	X	X		Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
DIOXIN															
2,3,7,8-Tetra-chlorodibenzo-P-Dioxin			X	—	—	—	—	—	—	0	—	—	—	—	0

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
GC/MS FRACTION - VOLATILE COMPOUNDS															
Acrolein	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Acrylonitrile	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Benzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Bis (Chloro-methyl) Ether			X	—	—	—	—	—	—	0	—	—	—	—	0
Bromoform	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Carbon Tetrachloride	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chlorobenzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chlorodibromo-methane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chloroethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2-Chloro-ethylvinyl Ether	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chloroform	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Dichloro-bromomethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Dichloro-difluoromethane			X	—	—	—	—	—	—	0	—	—	—	—	0
1,1-Dichloro-ethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,2-Dichloro-ethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,1-Dichloro-ethylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,2-Dichloro-propane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,3-Dichloro-propylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Ethylbenzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Methyl Bromide	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Methyl Chloride	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
GC/MS FRACTION - VOLATILE COMPOUNDS (continued)															
Methylene Chloride	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,1,2,2-Tetra-chloroethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Tetrachloro-ethylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Toluene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,2-Trans-Dichloroethylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,1,1-Tri-chloroethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,1,2-Tri-chloroethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Trichloro-ethylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Trichloro-fluoromethane			X	—	—	—	—	—	—	0	—	—	—	—	0
Vinyl Chloride	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
GC/MS FRACTION - ACID COMPOUNDS															
2-Chlorophenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2,4-Dichloro-phenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2,4-Dimethyl-phenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4,6-Dinitro-O-Cresol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2,4-Dinitro-phenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2-Nitrophenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4-Nitrophenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
P-Chloro-M-Cresol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Pentachloro-phenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Phenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2,4,6-Tri-chlorophenol	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS															
Acenaphthene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Acenaphtylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Anthracene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Benzidine	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Benzo (a) Anthracene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Benzo (a) Pyrene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
3,4-Benzo-fluoranthene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Benzo (ghi) Perylene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Benzo (k) Fluoranthene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Bis (2-Chloro-ethoxy) Methane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Bis (2-Chloro-ethyl) Ether	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Bis (2-Chloroiso-propyl) Ether	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Bis (2-Ethyl-hexyl) Phthalate	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4-Bromo-phenyl Phenyl Ether	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Butyl Benzyl Phthalate	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2-Chloro-naphthalene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4-Chloro-phenyl Phenyl Ether	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chrysene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Dibenzo (a,h) Anthracene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,2-Dichloro-benzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,3-Dichloro-benzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)															
1,4-Dichloro-benzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
3,3'-Dichloro-benzidine	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Diethyl Phthalate	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Dimethyl Phthalate	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Di-N-Butyl Phthalate	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2,4-Dinitro-toluene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
2,6-Dinitro-toluene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Di-N-Octyl Phthalate	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,2-Diphenyl-hydrazine (as Azo-benzene)	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Fluoranthene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Fluorene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Hexachloro-benzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Hexachloro-butadiene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Hexachloro-cyclopentadiene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Hexachloro-ethane	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Indeno (1,2,3-cd) Pyrene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Isophorone	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Naphthalene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Nitrobenzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
N-Nitro-sodimethylamine	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
N-Nitrosodi-N-Propylamine	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)															
N-Nitro-sodiphenylamine	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Phenanthrene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Pyrene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
1,2,4-Tri-chlorobenzene	X		X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
GC/MS FRACTION - PESTICIDES															
Aldrin			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Alpha-BHC			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Beta-BHC			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Gamma-BHC			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Delta-BHC			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Chlordane			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4,4'-DDT			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4,4'-DDE			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
4,4'-DDD			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Dieldrin			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Alpha-Endosulfan			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Beta-Endosulfan			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Endosulfan Sulfate			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Endrin			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Endrin Aldehyde			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Heptachlor			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1

PART C

Pollutant	Testing Required	Believed Present	Believed Absent	Effluent - DSN001, Main Combined Facility Discharge: Maximum Daily Value Conc.	Maximum Daily Value Mass	Maximum 30 Day Value Conc.	Maximum 30 Day Value Mass	Long Term Avg. Value Conc.	Long Term Avg. Value Mass	No. of Analyses	Units Conc.	Units Mass	Intake (Optional): Long Term Average Conc.	Long Term Average Mass	No. of Analyses
GC/MS FRACTION - BASE/NEUTRAL COMPOUNDS (continued)															
Heptachlor Epoxide			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1242			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1254			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1221			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1232			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1248			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1260			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
PCB-1016			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1
Toxaphene			X	Not Detected	—	—	—	—	—	1	mg/l	kg/day	Not Detected	—	1

Date	Outfall	Parameter	Value	Unit
1/7/2001	1	Chromium	0.008	mg/L
2/7/2001	1	Chromium	0.003	mg/L
3/5/2001	1	Chromium	0.003	mg/L
1/18/2001	5	Chromium	0.01	mg/L
1/18/2001	5	Zinc	0.13	mg/L
2/15/2001	5	Zinc	0.07	mg/L
1/18/2001	7	Chromium	0.007	mg/L
1/18/2001	7	Zinc	0.14	mg/L
2/15/2001	7	Zinc	0.17	mg/L
4/24/2001	1	Chromium	0.002	mg/L
5/9/2001	1	Chromium	<0.001	mg/L
6/17/2001	1	Chromium	<0.001	mg/L
7/23/2001	1	Chromium	0.004	mg/L
8/11/2001	1	Chromium	<0.001	mg/L
9/24/2001	1	Chromium	<0.001	mg/L
10/18/2001	1	Chromium	<0.001	mg/L
10/26/2001	1	Hydrazine	0.082	mg/L
10/28/2001	1	Hydrazine	0.005	mg/L
11/5/2001	1	Hydrazine	0.004	mg/L
11/12/2001	1	Hydrazine	0.012	mg/L
11/17/2001	1	Chromium	0.001	mg/L
12/11/2001	1	Chromium	<0.001	mg/L
1/18/2002	1	Chromium	<0.001	mg/L
2/3/2002	1	Chromium	<0.001	mg/L
3/9/2002	1	Chromium	<0.001	mg/L
2/14/2002	5	Chromium	0.001	mg/L
2/14/2002	5	Zinc	0.02	mg/L
2/14/2002	7	Chromium	0.004	mg/L
2/14/2002	7	Zinc	0.02	mg/L
4/26/2002	1	Chromium	<0.001	mg/L
5/19/2002	1	Chromium	0.001	mg/L
6/24/2002	1	Chromium	<0.001	mg/L
7/31/2002	1	Chromium	0.001	mg/L
8/22/2002	1	Chromium	<0.001	mg/L
9/2/2002	1	Chromium	<0.001	mg/L
10/4/2002	1	Chromium	<0.001	mg/L
10/9/2002	1	Hydrazine	0.023	mg/L
10/21/2002	1	Hydrazine	0.005	mg/L
11/28/2002	1	Chromium	0.002	mg/L
12/9/2002	1	Chromium	<0.001	mg/L
1/7/2003	1	Chromium	<0.001	mg/L
2/3/2003	1	Chromium	<0.001	mg/L
3/27/2003	1	Chromium	<0.001	mg/L
4/24/2003	1	Chromium	0.012	mg/L
5/28/2003	1	Chromium	<0.001	mg/L
6/12/2003	1	Chromium	<0.001	mg/L
5/15/2003	5	Zinc	0.04	mg/L
5/15/2003	7	Zinc	0.03	mg/L
7/13/2003	1	Chromium	0.001	mg/L
8/23/2003	1	Chromium	<0.001	mg/L
9/28/2003	1	Chromium	0.001	mg/L

10/14/2003	1	Chromium	<0.001	mg/L
11/15/2003	1	Chromium	<0.001	mg/L
12/17/2003	1	Chromium	0.001	mg/L

Written Comments Provided by the
Tri State Mussels Coalition
on the Proposal by
the U.S. Fish & Wildlife Service
to List Five Freshwater Mussels as Endangered Species
and Two Freshwater Mussels as Threatened Species

Submitted by:

Sandra L. Vandagriff
Chairman
Tri State Mussels Coalition
and
Executive Director
Tri Rivers Waterway Development Association
P.O. Box 2322
Dothan, Alabama 36302

February 8, 1995

Written Comments of Sandra L. Vandagriff on behalf of the Tri State Mussels Coalition

I. INTRODUCTION

My name is Sandra L. Vandagriff. I am Chairman of the Tri State Mussels Coalition ("Coalition"), an organization composed of Georgia, Florida, and Alabama businesses, trade associations and individuals, formed to examine the issues surrounding the proposed listing of five freshwater mussels as endangered species and two freshwater mussels as threatened species. In addition, I am Executive Director of the Tri Rivers Waterway Development Association, one of the members of the Coalition. I am providing these written comments on behalf of the Coalition and in response to the U.S. Fish and Wildlife Service's ("FWS") invitation to the public to submit comments and materials on the proposed rule which appeared in the Federal Register on August 3, 1994 ("the Proposal"). I also submitted oral comments at the series of public hearing which were held by FWS on the proposed listing. These written comments contain a substantial amount of additional information which was not included in my oral comments. Consequently, my oral comments should be viewed only as a part of, and not a summary of or substitute for, these more detailed written comments. If FWS personnel have any questions regarding these comments, they are encouraged to contact me at telephone number (334)792-8611 or at P.O. Box 2322, Dothan, Alabama 36302.

II. BACKGROUND

On August 3, 1994, FWS proposed to list five mussels as endangered species and two as threatened species in the rivers of the Apalachicolan region. 59 Fed. Reg. 39524 (Aug. 3, 1994). The Proposal lists the following as factors contributing to mussel habitat loss:

> Impoundments and deteriorating water and benthic [bottom] habitat quality resulting from channel modification, siltation, agricultural runoff from crop monoculture and poultry farms, silvicultural activities, mining activities, pollutants, poor land use practices, increased urbanization, and municipal and industrial waste discharges.

Id. at 39528. In addition, the Proposal discusses the adverse effects of such activities as dairy farms, a "disregard for maintaining riparian buffers during silvicultural activities", and construction and mining practices. The November 1993 Status Survey prepared by Robert S. Butler, the author of the Proposal, states that "any additional threats or a magnification of existing threats to these species or their habitat, no matter how small, may potentially send these species [into extinction]."

After reviewing these and similar comments in the Proposal and the 1993 Status Survey, individuals and businesses with an interest in these waterways formed the Coalition to review the Proposal and offer comments to FWS. The purpose of the Coalition is to develop the best, credible scientific information on which to base a decision on the Proposal, and to use this information to protect the rivers' biological diversity while maintaining the economic

viability of the Apalachicola, Chattahoochee, and Flint River systems.

According to section 4 of the Endangered Species Act of 1973, as amended ("ESA"), proposals to list species as endangered or threatened must be based upon "the best scientific and commercial data available." In an effort to assess the scientific data underlying the Proposal, the Coalition retained two independent and qualified malacologists to review the Proposal, the 1993 Status Survey and related literature and information. The report prepared by these malacologists, which is discussed further below, is attached at Tab 1 to these comments. We trust that FWS will impartially evaluate this and other scientific information submitted in accordance with the Adminstrative Procedure Act ("APA"), the ESA and the recent policy statements issued by FWS. See, e.g., 59 Fed. Reg. 34271 (July 1, 1994) (requiring impartial evaluation of all scientific comments). Based upon our extensive analysis of the Proposal, the Coalition opposes the listing of these mussels as endangered or threatened.

III. Public Meetings and Hearings

As detailed in the Coalition's October 31, 1994, written comments, FWS received numerous requests for public hearings on this proposal prior to the expiration of the 45-day deadline for making such a request. As of October 31, 1994, FWS had not made any definite plans for holding hearings, or at least had not informed the public of those plans. However, numerous people had

written FWS to request that the agency hold hearings at least in Marianna, Florida, and Dothan, Alabama. (See, e.g., Letter from Congressmen Pete Peterson, Sanford D. Bishop, Terry Everett and Sonny Callahan dated October 27, 1994, included in Appendix III of the Coalition's October 31, 1994, written comments). Although FWS received numerous requests that the Alabama hearing be held in Dothan (population approximately 53,500), FWS initially planned to hold that hearing in the small, unincorporated town of Seale, Alabama (population not recorded in the 1990 census). (See FWS "Acquisition Request" dated November 15, 1994, attached at Tab 2). It is the Coalition's belief that FWS's decision to hold the Alabama hearing in a remote and sparsely populated area, rather than in Dothan, was part of an overall effort to deny the citizens of Alabama a reasonable opportunity to comment on this Proposal.

Fortunately, in response to concerns expressed about this decision, FWS agreed to move the Alabama public hearing to Dothan, Alabama, and schedule four other hearings in Georgia and Florida as well. 59 Fed. Reg. 63987 (Dec. 12, 1994). On a positive note, the Coalition was extremely pleased that FWS chose to hold a series of "public meetings" in these same locations "to provide an advance opportunity for the public to ask questions and gain additional information in preparation for the hearings to be held at a later date." Id. Unlike the public hearings, at which FWS merely accepts oral and written testimony, these public meetings did indeed provide an opportunity for the public to ask questions and hear FWS's responses. However, as discussed further below, many of

the statements made by FWS at the public meetings and in the media contradict statements in the Proposal and supporting documentation. In an effort to clarify FWS's positions on various issues, we have attached (at Tabs 3 through 7) transcripts of those public meetings taken from tape recordings made at those meetings. Representatives of the Coalition and other interested parties have also presented oral statements at the various public hearings held by FWS. (Copies of selected oral and written statements attached at Tab 8).

IV. SCIENTIFIC ISSUES

Having thoroughly examined the Proposal, the 1993 Status Survey and other documentation related to the Proposal, the Coalition is firmly of the opinion that FWS has not satisfied the "best scientific and commercial data" standard of the ESA. Our review reveals that FWS is relying in many respects upon speculation and conjecture rather than defensible science. Furthermore, it is abundantly clear that FWS has extremely little valid scientific information about the location, history, population status, life cycle needs and host fish requirements of any of these mussels, as well as the activities which adversely affect them. The following quote from the exhaustive analysis performed by Drs. Paul Yokley and Terry Richardson summarizes their findings:

> Based upon our review of the Proposal and the Survey upon which it was based, as well as pertinent literature and available data and documents, the Proposal fails to substantiate claims critical to the proposed action with either data or referenced material. Furthermore, much of the currently available information, both agreeable and

> contradictory, were not included in either the Proposal or the Survey. FWS failed to present or misrepresented some information and data that was available at the time the Proposal was prepared. In some cases, conclusions drawn about population viability and abundance are contradictory to the data gathered by FWS or are based on data inadequate to verify the claims. Both documents claim a range reduction for these species, yet present insufficient evidence to substantiate these claims, and FWS apparently ignored at least two rivers known to be within the historic range of two of the proposed species. The FWS contends that ample historic data exists, yet fails to acknowledge the Proposal author's own previous statements regarding lack of historic records for many of these streams. Similarly, the documents' statements about the adverse effects of impoundments, channel maintenance, gravel mining, various land-use practices, industrial and municipal discharge, disease, predators, and competitors are made without reference to published information; however, in other fora, FWS readily recognizes and publicizes that some of the these factors do not represent problems and apparently withholds information supporting these statements. Also, while recognizing the lack of biological and life historical information available for these species, the Proposal fails to acknowledge the potential ineffectiveness of conservation efforts made without this knowledge. In addition, they fail to recognize that the lack of fish hosts may be primarily responsible for the decline of the seven proposed species. It appears that the Proposal and the Survey are not predicated upon, or at least do not make use of, the best scientific and commercial data available.

Comments of Drs. Yokley and Richardson at pp. 24-25 (attached at Tab 1).

The analysis performed by Drs. Yokley and Richardson confirm the Coalition's earlier doubts about the adequacy of the scientific data in this matter. The Coalition agrees with the recommendation of Drs. Yokley and Richardson that additional survey work be performed on these species prior to FWS's final decision on this proposal.

Drs. Yokley and Richardson also reviewed an internal FWS memo describing numerous changes made by the FWS Washington Office prior to publication of the Proposal. Drs. Yokley and Richardson point out that those changes were scientifically significant, and emphasize that the information that the FWS Washington Office deleted from the original version of the Proposal is "necessary for the scientific and nonscientific reader to make an accurate assessment of the Proposal." FWS should not simply "reinstate" the changes made to the Proposal in a final rule, but rather should withdraw the entire Proposal permanently or publish a new and accurate proposal. Failing to do this would violate not only the standards of scientific integrity, but also the ESA, the APA and Constitutional guarantees of due process.

Mr. Dennis Cato, a biological specimen collector operating in the Apalachicolan region, testified at one of the public hearings regarding the status of the purple bankclimber (Elliptoideus sloatianus). Mr. Cato, who has also submitted written comments to FWS on this point (copy attached at Tab 9), has substantial experience in diving for mussels in these rivers. Based on his experience as a commercial mussel collector, Mr. Cato believes that the purple bankclimber is much more abundant than reflected by the results of the 1993 Status Survey, and that it reproduces. The Coalition agrees with Mr. Cato's conclusion that the purple bankclimber should not be listed as either threatened or endangered. The information submitted by Mr. Cato, being the best

available commercial data on the purple bankclimber, should be given strong consideration by FWS.

In an effort to assess the scientific information utilized by FWS in drafting this Proposal, Dr. Terry Richardson requested certain specific information and raw data from FWS. (Letter to FWS and responses contained at Appendix D of the comments submitted by Drs. Yokley and Richardson). However, as noted by Drs. Yokley and Richardson in their comments, FWS failed to provide certain requested information critical to their analysis of the Proposal. For example, FWS failed to provide historical data which would have revealed the accuracy of the conclusions in the Proposal regarding reductions in range and numbers. In view of Yokley's and Richardson's findings regarding FWS's misrepresentation of historical data (see Yokley and Richardson comments at pp. 7-9), it is not surprising that FWS was reluctant to provide further detail on the data (or lack thereof) underlying the Proposal. It is the Coalition's opinion that FWS's refusal to provide requested raw data and scientific information is a violation of the ESA, the APA, and the due process guarantees of the U.S. Constitution. Without access to that data, the scientific community is unable to comment intelligently on the Proposal. Similarly, FWS's misuse and misrepresentation of the van der Schalie data (as described by Drs. Yokley and Richardson) surely violates the arbitrary and capricious standard of the APA.

V. FWS CHANGE IN POSITION

FWS's proposal to list these mussels as endangered or threatened has generated a substantial amount of public concern and, consequently, numerous newspaper articles. (Copies of various newspaper articles attached at Tab 10). It was through the avenue of the media that Coalition members first learned of FWS's remarkable change in position on the scientific information contained in the Proposal. As mentioned above, the Proposal and the 1993 Status Survey contain many clearly-stated conclusions about which activities adversely impact these seven mussels. Following is a partial sampling of statements expressing FWS's views on the impacts of various activities in or near the waterways:

> Impoundments and deteriorating water and benthic (bottom) habitat quality resulting from channel modification, siltation, agricultural runoff, silvicultural activities, mining activities, pollutants, poor land use practices, increased urbanization, and waste discharges have resulted in the restriction and fragmentation of these mussels current ranges.

59 Fed. Reg. at 39524.

> Factors contributing to this habitat loss are: impoundments and deteriorating water and benthic habitat quality resulting from channel modification, siltation, agricultural runoff from crop monoculture and poultry farms, silvicultural activities, mining activities, pollutants, poor land use practices, increased urbanization, and municipal and industrial waste discharges.

Id. at 39527-28.

> Navigation channel maintenance in the Chattahoochee and Apalachicola Rivers has destroyed long stretches of benthic habitat. In addition to the damage caused by the mechanical removal of tons of substrate, these activities increase sedimentation in downstream areas by

> resuspending silt fines which smother benthic organisms. Dredging activities may also resuspend contaminants that are bound to sediments, thus potentially exposing aquatic organisms to released toxicants. Potential host fishes for the fat three-ridge and purple bankclimber in the Apalachicola River may also be disrupted by channel modifications. Maintenance operations in the Apalachicola River mainstem continue to disrupt habitat for these two species.

Id. at 39528.

> Runoff from chicken farms causes oxygen depletion in streams and has been implicated in fish and mussel die-offs in Alabama (U.S. Fish and Wildlife Service 1993). Feedlots are also another source of pollution in localized portions of the region's streams large dairy farms located in the Suwannee River watershed also contribute to the pollution of this system's waters.
>
> Erosion from poor land use practices causes extensive loss of topsoil and the subsequent siltation of stream bottoms. Sources of siltation include timber clearcutting and other silvicultural activities, clearing of riparian vegetation for agricultural purposes, and those construction and mining practices that allow exposed earth to enter streams.

Id.

> The aquatic fauna of these river systems is obviously imperilled. Additional extinctions may be expected if watershed and particularly riparian protection plans are not implemented to preserve and enhance habitat quality.

1993 Status Survey at 3.

> Contributing to habitat loss in this region are impoundments and benthic habitat quality resulting from channel modification, siltation, agricultural runoff from crop monoculture and poultry farms, silvicultural activities, mining activities, other pollutants, poor land use practices, increased urbanization, and municipal and industrial waste discharges.

Id. at 14.

> Navigation channel maintenance activities in the Chattahoochee and Apalachicola rivers has destroyed long stretches of benthic habitat. In addition to the damage caused by the mechanical removal of tons of substrate, these activities increase sedimentation in downstream areas by resuspending silt fines and smoother benthic

> organisms where spoils are deposited within-bank. Dredging activities may also resuspend contaminants that are bound to sediments, thus potentially exposing aquatic organisms to these toxicants. Populations of potential host fishes for the fat threeridge, purple bankclimber, and round washboard in the Apalachicola may also be disrupted by channel modifications. Maintenance operations in the Apalachicola River mainstem continue to disrupt habitat for these three species.

Id. at 17. Obviously, as stated by Senator Richard Shelby, a "reasonable man simply cannot read statements like those found in the proposal without being concerned that their livelihood is being threatened by this listing." (Shelby comments attached at Tab 8).

In response to the public's justifiable concern over the potential impact of this Proposal, FWS has adopted in its more recent communications and with the media an entirely different position on which activities adversely affect these mussels. Following are a few examples of FWS's new positions on these issues:

> Listing would not likely have a measurable impact [on the economy in the three-state area].

Document entitled "Common Questions Concerning the Proposed Listing of Seven Freshwater Mussels" at 3.[1]

> The Service anticipates that listing would not have a significant impact on dredging or navigation on the [Apalachicola, Chattahoochee, Flint ("ACF")] waterway.

Id. at 5. In addition, throughout this same document, FWS assured the public that the listing would not significantly affect private

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[1] This document was included as an attachment to a memo to the Tri-State Study Environmental Scope of Work (ESOW) Mailing List from Jerry Ziewitz, ESOW Study Manager, dated December 9, 1994. (Copy attached at Tab 11). At the Marianna, Florida, public meeting, FWS personnel stated that this document was prepared by FWS's public affairs office.

sector activities, and was unlikely to affect reservoir operations, gravel mining operations, highway operations, or silvicultural activities. Id.

FWS has also sought to allay public concerns through an aggressive public relations campaign in the news media. (See media articles attached at Tab 10). For example, FWS spokesman Cal Garrett stated in one newspaper article that "development along and dredging of those waterways would be subject to an additional layer of review, but few if any projects will be adversely affected." "Endangered debate centers on mussels," The Birmingham News (Jan. 9, 1995). FWS Director Mollie Beattie, in a January 17, 1995, editorial argued that "the listing of these mussels will have very little impact on the economy of the three states and would not deprive anyone of their private property rights." "Let's not lose our mussels," Atlanta Journal/Atlanta Constitution (Jan. 17, 1995). Similarly, FWS Assistant Regional Director Warren Olds, Jr. stated that "From the Fish and Wildlife Service, we don't see any detectable impact to the economy [resulting from the listing]." "Protecting mussels would have little economic impact," Dothan Eagle (Jan. 22, 1995).

When questioned about this switch in positions at the public meetings, FWS officials were unable to provide a satisfactory explanation. For example, at the Dothan, Alabama, public meeting, FWS biologist and Proposal author stated that FWS "can have it both ways", arguing that "most of the degradation has occurred in the past . . . . " However, FWS Field Supervisor Michael Bentzien

indicated that these activities still adversely affected the species, but that FWS "lacked the authority to do much about it." FWS's recent assurances, although more comforting than the predictions of doom found in the Proposal and the 1993 Status Survey, are not legally binding on FWS. FWS has requested comments on the Proposal and the conclusions contained therein, not on the more accommodating message adopted recently. Because many of the conclusions contained in the Proposal are based on speculation, the Coalition opposes the Proposal and believes that any redrafted proposal to list these species as endangered or threatened should contain those specific assurances made to the public by FWS in the media, in public affairs documents and at the public meetings. This would give the public an opportunity to comment on FWS's actual scientific position.

In our review of FWS files, we discovered an internal FWS memo (copy attached at Tab 12) revealing that numerous substantial changes were made to the scientific conclusions in the Proposal before its publication in the Federal Register. Nine members of Congress recently sent a letter to Secretary of Interior Bruce Babbitt discussing these alterations to the science, stating:

> These changes were clearly made in an effort to "soften" the science and thereby defuse any public outcry over the proposal. For example, the statement that "any additional threats" could send the species into extinction was deleted from the draft proposal by the Service's Washington Office. Similarly, that office deleted the conclusion that "additional extinctions may be expected if watershed and particularly riparian protections plans are not implemented to preserve and enhance habitat quality." Numerous other substantive changes were made to the scientific conclusions and information contained in the draft proposal. Even the

> author of this internal memo concluded that "Due to the severity of the changes, the integrity of the rule has been significantly compromised."
>
> * * *
>
> Mr. Secretary, it appears that the Service is at best misrepresenting the science in this case in order to obtain a final listing of these seven mussels. In view of the fact that the author of the internal memo vowed to "reinstate most of the omissions" in his draft of the final rule, we question whether the published proposal is actually a "stealth proposal" designed to avoid legitimate public comment. We call upon you to initiate an investigation into this matter, instill safeguards to prevent this type of manipulation of the science in the future, and withdraw this mussels proposal until the Service decides which version of the science it believes satisfies the "best scientific and commercial data available" standard of the Endangered Species Act.

Letter from Senator Richard Shelby, et al. to Secretary Babbitt dated February 2, 1995 (copy attached at Tab 13). The Coalition echoes those comments, and calls upon FWS to withdraw the Proposal permanently and, if necessary, publish a new proposal reflecting its real views on the scientific issues. This internal memo clearly reflects the arbitrary and capricious nature of this listing process.

VI. LEGAL ISSUES

In several instances throughout this listing process, FWS officials have made statements indicating that they had already decided to list these mussels, regardless of the comments submitted by the public. For example, the passionate arguments advanced by FWS Director Mollie Beattie in a recent editorial certainly reveal that she has already decided to publish a final rule listing these

mussels. "Let's not lose our mussels," Atlanta Journal/Atlanta Constitution (Jan. 17, 1995). Similarly, at the Albany public meeting, Mr. Butler stated that the 1993 Status Survey "clearly demonstrates that these seven mussel species are in need of federal protection." Numerous statements such as these are found throughout the public meeting transcripts and in FWS statements to the press. Especially when combined with FWS's promise to reinstate omissions made to the Proposal by FWS's own Washington Office, it certainly seems that FWS had already decided to list these species even prior to publishing the Proposal. This bias toward listing is certainly not consistent with the standards of the APA, the ESA and Constitutional guarantees of due process.

As pointed out in the comments submitted by Drs. Yokley and Richardson, FWS failed to perform excavation and sieving to sample for the presence of juvenile mussels. FWS's critical conclusions regarding whether these mussels are reproducing is thus based on nothing more than speculation. (See also comments submitted by Mr. Dennis Cato at Tab 9). In light of the importance of this issue, it certainly seems that FWS could have sampled (and indeed still could sample) for the presence of juvenile mussels. The "best scientific and commercial data" standard of the ESA requires that an agency initiate feasible and necessary tests. Failure to do so clearly violates the ESA.

For example, in Village of False Pass v. Watt, the court noted that the "best scientific and commercial data available" standard "assures that a decision with potentially adverse consequences . .

. will be made after full and careful review of the then available and relevant data." Village of False Pass v. Watt, 565 F. Supp. 1123, 1154 (D. Alaska 1983), aff'd, 733 F.2d 605 (9th Cir. 1984) However, "[t]his duty is violated if the agency fails to initiate feasible and necessary tests or studies, . . . or if the agency initiates tests and studies and then acts prematurely before the results are known." Id. (citations omitted) (emphasis added). Furthermore, the federal agency "cannot defer investigations when it is possible and necessary to undertake them." False Pass, 565 F. Supp. at 1157 (citations omitted). See also Conservation Law Foundation v. Watt, 560 F. Supp. 561 (D. Mass. 1983), aff'd, 716 F.2d 946 (1st Cir. 1983) (discussing duty under ESA section 7 to perform all practicable tests and studies prior to approving an action with potentially grave environmental costs); The Fund for Animals, Inc. v. Turner, 1991 WL 206232 (D.D.C. 1991) (enjoining FWS approval of limited hunting of the threatened grizzly bear on the ground that FWS lacked sufficient data on "habitat condition or carrying capacity, total numbers, annual reproduction and mortality, and most importantly, annual turnover and population trends.").

Finally, the Coalition notes that FWS made certain assurances of financial and other assistance were to Fayette County, Georgia, to assist that County in its efforts to site a public water supply reservoir. When asked about this at public meetings, FWS stated that it could not extend similar assurances to other potentially affected parties. Whether because of political clout or otherwise,

Fayette County has secured commitments from FWS to lessen the impact of this listing on their activities. Members of the Coalition believe that this agreement between FWS and Fayette County is unfair to the remainder of the affected parties, and is in violation of the equal protection guarantees of the U.S. Constitution.

VII. IMPACT ON THE TRI STATE COMPREHENSIVE STUDY

Mr. Robert Butler and Ms. Jane Brim Box, at the public meetings, acknowledged that James D. Williams of the National Biological Service in Gainesville, Florida, was heavily involved in the preparation of the 1993 Status Survey. The Coalition is aware that Mr. Williams has been retained to perform the mussel study in the Threatened and Endangered Species sub-part of the ACT/ACF Comprehensive Study. The Environmental Scope of Work ("ESOW") for the Comprehensive Study is one of the components of that study, which ultimately will be used in determining the feasibility of water allocations in the ACT/ACF basins. Although the ESOW is but one of approximately eleven scopes of work in the Comprehensive Study, the impact of adverse environmental conditions (such as the need to alter or preclude certain water use projects) could potentially limit or eliminate otherwise viable and efficient water supply alternatives in a given part of the study area. Further, it must be recognized that the purpose of the Comprehensive Study is to determine the water allocation needs in the study area and to develop a process to meet those needs through the year 2050. Thus,

this listing, by altering the water quantity and/or quality requirements in the ACF basin, certainly could have a devastating impact on the Comprehensive Study.

The Comprehensive Study is, as its name implies, a comprehensive review of all factors relating to water needs, availability, allocation and the mechanisms by which to accomplish equitable water distribution in the tri-state area. In view of this, it would be highly inappropriate to take a single component of one scope of work and allow it to dictate or undermine the entire study process. The proposed listing of these seven mussels certainly appears to be a means to accomplish just that end. If, by listing these seven mussels, FWS intends to alter current or future water allocation projects within the ACF basin, then it is in reality attempting to dictate the water allocation policy in the ACF basin. This directly contradicts the purpose of the Comprehensive Study and the agreements among the States of Alabama, Florida, Georgia and the United States Army Corps of Engineers. Too much work, cooperation and resources have been invested in this study effort to allow this Proposal to thwart this very important process.

Finally, the Coalition believes it is highly inappropriate for the same person who is conducting the endangered species portion of the ESOW to be intimately involved in initiating a proposal to list these species. The listing effort and the ESOW work should be mutually exclusive and independent of each other so as not to taint the result of either task. Such a dual effort by one individual

certainly creates the perception that FWS has a hidden agenda behind its involvement in the Comprehensive Study process. Whether real or perceived, such a possibility is unacceptable and Mr. Williams' involvement in both processes should be terminated.

VIII. POSITION OF THE CORPS OF ENGINEERS

On September 29, 1994, the U.S. Army Corps of Engineers ("Corps"), FWS and representatives of the Tri Rivers Waterway Development Association met in Panama City, Florida, to discuss the potential impact of the Proposal on the Corps' operation and maintenance programs. (See Corps Memorandum for Record dated October 7, 1994, and FWS response dated October 26, 1994, attached at Tab 14). According to a Memorandum for Record describing that meeting, FWS expressed "concern with the dredge cuts, plumes created as a result of dredging and annually used within bank disposal sites of the Apalachicola River." In its November 1, 1994, written comments on the Proposal, the Corps stated:

> We have serious concerns over the Service's proposed rule because conclusions are based on supposition, without adequate supporting evidence (i.e., navigation channel maintenance has destroyed long stretches of benthic habitat). Also, the proposed rule acknowledges that the life history is unknown and little biological information is available. We support [sic] that additional scientific data be obtained and/or developed prior to determining whether these species should be protected under the ESA.

Letter from James B. Hildreth, Acting District Engineer, to Michael M. Bentzien dated November 1, 1994 (copy attached at Tab 14). Comments attached to this cover letter generally criticizes the scientific information relied upon by FWS in the Proposal and

suggests that additional scientific information is necessary to support the conclusions reached in the Proposal. The Coalition also has some very real concerns about the science in this Proposal, and supports the Corps' call for further research before a final decision is reached on the Proposal.

IX. POTENTIAL ECONOMIC IMPACTS

It appears that the author of this Proposal merely listed all activities of man in and near creeks and rivers in this area, and concluded that all such activities are harmful to the mussels. The Proposal's broad indictments of every economic activity in the area indicate that listing these mussels has the potential to harm the economy and the people of this region. Although the ESA states that listing decisions must be based solely on the best scientific and commercial data available, it is clear that species listings often have adverse impacts on the economies in the vicinity of the species' habitat. These social impacts are extremely difficult to quantify, and the only reliable method to predict the extent of those impacts is through an economic impact analysis. The Coalition, in an effort to gauge for themselves the potential impact of this listing, retained Dr. Mac R. Holmes of Troy State University to conduct such a study. (Copy attached at Tab 15). The Coalition submits this preliminary study into the administrative record as evidence of the potential impact that the Proposal's "scientific" speculation could have on the economy of this region. In order to avoid these types of adverse impacts, FWS

should eliminate these types of sweeping indictments from any redrafted proposal or final rule. We concur with Dr. Holmes' findings and, in particular, the following statement contained in that study:

> The capital costs of adjusting to potential new regulations by the U.S. Fish and Wildlife Service on industrial and municipal discharges and on waterway use could be in the hundreds of millions of dollars. Annual costs of these regulations and others on farmers, timber owners and harvesters, and local community economies could be in the hundreds of millions of dollars annually. When these possibilities are compared to the present state of [scientific] knowledge about the mussels, it seems clear that much more should be known about the mussels than is presently known <u>before</u> the listing is carried out and regulations are imposed.

X. CONCLUSIONS AND RECOMMENDATIONS

In conclusion, the Coalition opposes the August 3, 1994, proposal to list five freshwater mussels as endangered species and two freshwater mussels as threatened species. Although we remain unconvinced that this listing would not affect the economy of our region, we base this opposition on FWS's failure to satisfy the "best scientific and commercial data" standard of ESA section 4. Further, the Coalition believes that the actions taken by FWS in preparation of the Proposal and in the listing process are in clear violation of the ESA, the APA and Constitutional guarantees of equal protection and due process. For these reasons, the Coalition calls upon FWS to withdraw this Proposal. In the event FWS elects to publish a final rule listing these species as endangered or threatened, the Coalition requests that specific assurances which

FWS has made to the public about the economic and other impacts of this listing be included in the final rule.

Written Comments Provided by the
Tri State Mussels Coalition
on the Proposal by
the U.S. Fish & Wildlife Service
to List Five Freshwater Mussels as Endangered Species
and Two Freshwater Mussels as Threatened Species
in the Apalachicolan Region

Submitted by:

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Tri State Mussels Coalition
and
Deputy Director
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July 25, 1996

Written Comments of Sandra L. Vandagriff on behalf of the Tri State Mussels Coalition

I. INTRODUCTION

My name is Sandra L. Vandagriff. I am Chairman of the Tri State Mussels Coalition ("Coalition"), an organization composed of Georgia, Florida and Alabama businesses, trade associations and individuals, formed to examine the proposed listing of five freshwater mussels as endangered species and two freshwater mussels as threatened species. In addition, I am Deputy Director of the Tri Rivers Waterway Development Association, one of the members of the Coalition. I am providing these written comments on behalf of the Coalition and in response to the U.S. Fish and Wildlife Service's ("FWS" or the "Service") invitation to the public to submit comments and materials on the August 3, 1994, proposed rule ("the Proposal"). I also submitted oral comments at the series of public hearings which were held by FWS on the proposed listing. These written comments contain a substantial amount of additional information which was not included in my oral comments.

These written comments are also supplemental to, and not a replacement for, written comments I previously submitted on behalf of the Coalition, including comments dated February 8, 1994. If FWS or Interior Department personnel have any questions regarding these comments, they are encouraged to contact me at telephone number (334)792-8611 or at P.O. Box 2232, Dothan, Alabama 36302.

II. BACKGROUND

On August 3, 1994, FWS proposed to list five mussels as endangered species and two as threatened species in the rivers of the Apalachicolan region. 59 Fed. Reg. 39524 (Aug. 3, 1994). The Service asserts in the Proposal that these seven species of mussels are being harmed by virtually every human activity imaginable -- including agriculture, forestry, poultry farming, mining, dredging to maintain the navigation channel, and "poor land use practices." The November 1993 Status Survey prepared by Robert S. Butler, the author of the Proposal, asserts that "any additional threats or a magnification of existing threats to these species or their habitat, no matter how small," could send these mussels into extinction.

After reviewing these and similar comments in the Proposal and the 1993 Status Survey, individuals and businesses with an interest in these waterways formed the Coalition to review the Proposal and express their concerns to FWS. As stated in previous comments, the purpose of the Coalition is to develop the best, credible scientific information on which to base a decision on the Proposal, and to use this information to protect the rivers' biological diversity while maintaining the economic viability of the Apalachicola, Chattahoochee, and Flint River systems.

According to section 4 of the Endangered Species Act of 1973, as amended ("ESA"), proposals to list species as endangered or threatened must be based upon "the best scientific and commercial data available." In an effort to assess the scientific data

underlying the Proposal, the Coalition retained two independent and qualified malacologists to review the Proposal, the 1993 Status Survey and related literature and information. The report prepared by these malacologists has previously been submitted to FWS. A subsequent scientific publication, which is discussed further below, resulted from independent scientific research commissioned by the Coalition. We trust that FWS will impartially evaluate this and other scientific information submitted in accordance with the Administrative Procedure Act ("APA"), the ESA and the recent policy statements issued by FWS. See, e.g., 59 Fed. Reg. 34271 (July 1, 1994) (requiring impartial evaluation of all scientific comments). Based upon our extensive analysis of the Proposal and new scientific information, the Coalition continues to oppose the listing of these mussels as endangered or threatened.

III. Reopened Public Comment Period

As an initial matter, the Coalition objects to the extremely short time period allowed for public comment in this "reopened" public comment period. According to the July 9, 1996, Federal Register notice reopening the public comment period on this proposal, FWS will accept comments until July 26, 1996 -- a time period of only 17 days. 61 Fed. Reg. 36020. Compare 61 Fed. Reg. 37034 (July 16, 1996) (two-month comment period on copperbelly water snake proposal); 61 Fed. Reg. 33082 (June 26, 1996) (two-month comment period on proposal to list five plants and a lizard); 61 Fed. Reg. 29047 (June 7, 1996) (35-day comment period on least

chub proposal). This time period is simply not sufficient to allow the public to respond, especially in light of the fact that this proposal has lain dormant for over one year. The Service should reopen and extend the public comment period to allow a reasonable time for comment.

IV. Scientific Information

Because Service scientists failed to find juvenile mussels during their sampling efforts, the Service concluded that the mussels were not reproducing and that drastic actions would be necessary to save the mussels. See 59 Fed. Reg. 39524 (Aug. 3, 1994). When Coalition members pointed out in public meetings and comments that the Service had not used effective methods for locating juvenile mussels (among other criticisms), Service representatives scoffed at the idea that their scientific results were in any way inaccurate or incomplete. In a study commissioned by the Coalition, mussel experts Dr. Paul Yokley and Dr. Terry Richardson sampled only a very small area of river bottom on the Apalachicola River, using substrate excavation and sieve sampling. Using this accepted mussel sampling method, they were able to locate juvenile mussels easily. Their soon-to-be published finding directly contradicts the Service's position, and casts substantial doubt on the accuracy of the entire proposed listing. Galley proofs of this peer-reviewed scientific article are attached at Tab 1.

This scientific study, which the Coalition authorized and funded, conclusively demonstrates that the fat three-ridge (Amblema neisleri) is reproducing in the Apalachicola River. More importantly, it supports the Coalition's contention that the scientific basis for the Proposal is highly questionable. (See Congressional testimony of Drs. Richardson and Yokley and news articles attached at Tab 2). If the Service's employees had utilized effective, inexpensive and accepted methods for assessing reproduction of these seven species during their Status Survey, they would not have been forced to speculate in the Proposal about whether the mussels were reproducing. The Service's failure to obtain needed scientific information is simply one of many such failures associated with this Proposal, and is a violation of the "best scientific and commercial data" standard of ESA section 4. See, e.g., Village of False Pass v. Watt, 565 F. Supp. 1123, 1154 (D. Alaska 1983), aff'd, 733 F.2d 605 (9th Cir. 1984) (the best scientific and commercial data standard "is violated if the agency fails to initiate feasible and necessary tests or studies . . . . "). If FWS had obtained sound scientific data on reproduction and other scientific issues, the Proposal would have been based on good science -- rather than speculation.

The Coalition notes with concern that certain scientific papers related to these seven mussels are scheduled for presentation at a scientific meeting in St. Louis, Missouri, in October 1996 by FWS employees. The Coalition hereby officially requests copies of any such reports, and particularly requests any

scientific information upon which FWS intends to rely in considering whether to finalize this proposal. If FWS intends to rely in any way on these or other new scientific reports, the ESA and the APA require that the public have the opportunity to review and comment on this information. See, e.g., Endangered Species Comm'n of the Bldg. Indus. Ass'n of S. California v. Babbitt, 852 F. Supp. 32 (D.D.C. 1994) (holding that the Service's failure to provide certain scientific data to the public violated the APA).

Simply stated, if the mussels are reproducing, then the Service's dire conclusions about the health of the rivers are unwarranted. However, it does not follow that the absence of reproduction means that the Service's dire conclusions are accurate. Rather, it could simply mean that the host fish is no longer present. The absence of the host fish in turn may simply be the result of competition from introduced species or of natural changes in the contours of the rivers. Rather than painting all economic activity as harmful to the mussels, it is the Service's duty to determine which, if any, of those activities are actually harming the mussels. The Service certainly has not explained why other freshwater mussels in these same river systems seem to be doing quite well under exactly the same conditions. It does not assist either the economy of this region or the mussels to restrict economic activity unnecessarily on and near the rivers. As currently written, the Proposal's broad and unsupported indictments of economic activities, if included in a Final Rule, will

inevitably lead to such restrictions -- whether as a result of regulatory actions or an ESA citizen suit.

V. Listing Moratorium

The supplemental defense appropriations bill, Public Law No. 104-6, which President Clinton signed into law on April 10, 1995, contained a "moratorium" on final listing decisions under the ESA. Chapter IV of that defense appropriations bill prohibited the Department of the Interior from using any funds "for making a determination that a species is threatened or endangered or that habitat constitutes critical habitat." Congress passed a continuing appropriations bill at the end of September 1995, which was intended to keep the Federal government operating until a complete appropriations bill for fiscal year 1996 could be negotiated and approved. That and subsequent continuing resolutions retained the moratorium on final listings under the ESA.

In April of this year, Congress passed and President Clinton signed a final appropriations bill for fiscal year 1996. Although that bill retained the moratorium on listing activities, it also contained a provision allowing President Clinton to "waive" the moratorium if appropriate "based upon the public interest in sound environmental management, sustainable resource use, protection of national or locally-affected interests, or protection of any cultural, biological or historic resources." President Clinton

elected to "waive" the listing moratorium upon signing the omnibus fiscal 1996 appropriations bill into law on April 26, 1996.

The statutory deadline for acting on the Proposal was August 3, 1995. 16 U.S.C. § 1533(b)(6). On May 16, 1996, FWS published its final listing priority guidance document, stating that it would first proceed with emergency listings and then turn to processing final decisions on outstanding listing proposals (i.e., those proposals which FWS had not been able to finalize due to the moratorium). According to the notice reopening the public comment period on this Proposal, the seven-mussels proposal is considered a "Tier 2 priority". 61 Fed. Reg. 36021, 36022 (July 9, 1996) (see news article attached at Tab 3). It is unclear from the notice whether FWS chose to proceed with the Proposal in the belief that the seven mussels are facing an "imminent threat" of some kind. See 61 Fed. Reg. 24722 (May 16, 1996). Nevertheless, it is clear that FWS has failed to satisfy the statutory deadlines for listings contained in the ESA.

VI. Navigational Dredging

In numerous public statements, FWS has taken the position that listing these seven mussels would not adversely impact the economy of this region or navigation on the Apalachicola, Chattahoochee, Flint ("ACF") waterway system. For example, FWS stated that "[l]isting would not likely have a measurable impact [on the economy in the three-state area]. Document entitled "Common Questions Concerning the Proposed Listing of Seven Freshwater

Mussels" at 3. FWS also stated that it "anticipates that listing would not have a significant impact on dredging or navigation on the [ACF] waterway." Id. at 5. In addition, throughout this same document, FWS assured the public that the listing would not significantly affect private sector activities, and was unlikely to affect reservoir operations, gravel mining operations, highway operations, or silvicultural activities. Id.

FWS has also sought to allay public concerns through an aggressive public relations campaign in the news media. For example, FWS spokesman Cal Garrett stated in one newspaper article that "development along and dredging of those waterways would be subject to an additional layer of review, but few if any projects will be adversely affected." "Endangered debate centers on mussels," The Birmingham News (Jan. 9, 1995) (attached at Tab 10 to February 8, 1995, Coalition comments). FWS Director Mollie Beattie, in a January 17, 1995, editorial argued that "the listing of these mussels will have very little impact on the economy of the three states and would not deprive anyone of their private property rights." "Let's not lose our mussels," Atlanta Journal/Atlanta Constitution (Jan. 17, 1995) (attached at Tab 10 to February 8, 1995, Coalition comments). Similarly, FWS Assistant Regional Director Warren Olds, Jr. stated that "From the Fish and Wildlife Service, we don't see any detectable impact to the economy [resulting from the listing]." "Protecting mussels would have little economic impact," Dothan Eagle (Jan. 22, 1995) (attached at Tab 10 to February 8, 1995, Coalition comments).

As discussed in previous Coalition comments, the above statements contradict the language of the Proposal, the Status Survey and several other FWS documents relating to the Proposal. With respect to navigation, the above statements certainly seem to contradict the position taken by FWS in a September 29, 1994, meeting with the U.S. Army Corps of Engineers ("Corps"). In that meeting, Ms. Gail Carmody of FWS addressed the potential impacts of listing on navigational dredging in the following language:

> If the mussels are listed and new dredge cuts are proposed, the Corps may be required to survey the area for mussels prior to conducting any dredging. Mussel surveys may be required adjacent to and downstream of the within bank disposal site prior to placement of material in this site.
>
> Also, if endangered and/or threatened mussels were displaced as a result of dredging the Corps would be requested to shut down the dredge, at least until appropriate mussel surveys of the area could be conducted. This stoppage could require the Corps to relocate the dredge until these dredging limits were cleared and the Corps was once again in compliance with Section 7 of the Act.

October 7, 1994, Corps Memorandum for Record (attached at Tab 14 to February 8, 1995, Coalition comments). Clearly the Service's public statements on the impacts to navigational dredging are at odds with the position taken in meetings with the Corps. Certainly the listing of the heelsplitter mussel has adversely impacted the Corps' navigational dredging program on other rivers. See, e.g., article entitled "Mussel Discovery Halts Pearl River Dredging" attached at Tab 4. In order to provide certainty to the Corps and waterway users, as well as forestall potential ESA citizen suits, FWS must in any final rule clearly state that listing the mussels

will not adversely impact dredging on the ACF system and explain its rationale for reaching that conclusion. (See articles attached at Tab 4). Furthermore, FWS must back up those assurances in any subsequent consultation process or incidental taking permit process. The Coalition appreciates FWS's willingness to meet and discuss these and related issues and trusts FWS will seriously consider the Coalition's questions, comments and suggestions. (See correspondence attached at Tab 5).

VII. Conclusions and Recommendations

In conclusion, the Coalition continues to oppose the August 3, 1994, proposal to list five freshwater mussels as endangered species and two freshwater mussels as threatened species. Although we remain unconvinced that this listing would not affect the economy of our region, we base our opposition to the listing on FWS's failure to satisfy the "best scientific and commercial data" standard of ESA section 4. Further, the Coalition believes that the actions taken by FWS in preparation of the Proposal and in the listing process are in clear violation of the ESA, the APA and Constitutional guarantees of equal protection and due process. For these reasons, the Coalition calls upon FWS to withdraw this Proposal. In the event FWS elects to publish a final rule listing these species as endangered or threatened, the Coalition requests that specific assurances which FWS has made to the public about the economic and other impacts of this listing be included in any final rule.

WRITTEN TESTIMONY
SUBMITTED TO THE
U.S. HOUSE OF REPRESENTATIVES
COMMITTEE ON RESOURCES
ENDANGERED SPECIES ACT TASK FORCE HEARING

SUBMITTED BY
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May 25, 1995

TESTIMONY OF
DR. TERRY D. RICHARDSON
AND
DR. PAUL YOKLEY, JR.

Mr. Chairman and distinguished Committee Members, it is a privilege to present to you our professional views on the Endangered Species Act of 1973, as amended, and its current application.

Terry Richardson is an Aquatic Ecologist, Director of the Rare and/or Endangered Species Research Center, and Assistant Professor of Biology at the University of North Alabama located at Florence, Alabama. Paul Yokley, Jr. is a malacologist, retired Professor of Biology (also from the University of North Alabama) and founder of the Rare and/or Endangered Species Research Center at the University of North Alabama. As a routine part of our professional endeavors, we are continually involved with activities related to the preservation of rare, threatened or endangered species. We work closely with federal, state and private agencies on issues of endangered species recovery, relocation, surveys, habitat assessment, and proposed listings. As such, we are familiar with the implementation of the Endangered Species Act by the U.S. Fish and Wildlife Service and the U.S. Department of the Interior. We are presenting this testimony in order that our cumulative experience, as well as our professional opinions, may be considered by this committee during its review of the Endangered Species Act.

While all parties involved believe that preservation of species and habitat is a high priority, the perceived inequities of the Endangered Species Act have placed the Act under intense scrutiny by the industrial and private sectors. Industries are concerned with land and waterway application issues, and management and maintenance costs encountered when species are listed. Similarly, private landholders are concerned with how listing species limits their rights of ownership and land usage.

The numerous proposals submitted by the U.S. Fish and Wildlife Service to list species under the Endangered Species Act and the concomitant recovery plans have become the focus of listing issues primarily because of their potential economic impacts. As cases-in-point, we cite the concerns surrounding the two recent proposals for listing the so-called Alabama sturgeon and the listing of seven mussels in the Apalachicolan Region.

There are two critical issues we find in need of examination in any review of the current Endangered Species Act. First is the lack of an independent peer-review process for U.S. Fish and Wildlife Service's listing proposals. Second is the recovery planning process for listed species.

Because listing species under the Endangered Species Act is predicated on using the ". . . best scientific and commercial data available" and because listings are to be ". . . as accurate and as effective as possible," we are concerned that the Endangered Species Act does not currently address the scientific review of status surveys and the ensuing proposals upon which

species listings are based. Because these scientific reports are used to implement law, their preparation and, more importantly, their review should be explicitly governed by language in the Endangered Species Act.

The scientific community as a whole has a rigorous peer-review process through which all published scientific works, large or small, must pass. While there are numerous versions of this process, all share a common procedure. First, manuscripts are prepared that contain an introduction to the study, a detailed materials and methodology section, a results section providing readers with essential summary data sufficient to judge the scientific validity of conclusions, a discussion of the author's conclusions regarding the data, and a bibliography. Next, the completed manuscript is submitted to a senior editor who is typically not associated with the author's institution. The editor will then select two or more anonymous expert reviewers to critically examine the document for accuracy, adherence to sound scientific practices and ethics, and validity of results and conclusions. The reviewers' comments and conclusions are sent back to the senior editor who, with the benefit of all reviews, will make a decision regarding the publication status of the manuscript. Very often scientific works are rejected for publication, because they do not satisfy the standards of the reviewers and review process. Some works, however, will be accepted for publication, but only after the author addresses some specific concerns of the reviewers and editor.

The scientific community has voluntarily subjected itself to such a rigorous set of checks and balances to ensure that only the best, most accurate and reliable scientific information will be released for general use and application. The U.S. Fish and Wildlife Service, however, is not required to submit their listing proposals and status surveys to the peer-review process under the current Endangered Species Act. This inadequacy is compounded when one considers that the results of the U.S. Fish and Wildlife Service's activities can take on the force of law with serious environmental and economic consequences.

The current process of publishing proposals in the Federal Register and inviting comments from interested parties is inadequate at best and does not address the issue of having a peer-review process in place to ensure good and accurate science. Most of the reviews a proposal receives are by other U.S. Fish and Wildlife Service personnel, and such internal "friendly" reviews are often subject to bias. Also, independent external experts who are qualified to review a listing proposal rarely read the Federal Register; consequently, they are not aware of the proposals that appear there. Furthermore, for those scientists who are aware of listing proposals in the Federal Register, there is often not enough detail on methodology or inadequate data provided in the published proposal to give a reviewer sufficient information to judge the scientific merit and soundness of the proposal. As a case-in-point, we again refer to the Service's proposal to list seven mussels as threatened or endangered in the Apalachicolan Region published in the August 3, 1994 Federal Register. Information critical to assessing the validity of the proposed listing was simply not available in the Federal Register document. Finally, because the published proposal is the document used by the Secretary of the Interior to make a decision on the listing, the request for comments comes at the wrong stage of the process. To ensure that only the best available scientific data are used to make a decision on

listing, the peer-review process should come before the proposal is published in the Federal Register. Essentially, it is the status survey upon which a proposal is based that should be subjected to a vigorous independent peer review.

Currently, when the U.S. Fish and Wildlife Service does request review of a status survey, it is distributed among fellow federal agencies and a handful of other interested persons. The Fish and Wildlife Service has also recently adopted a policy of seeking comments from experts when a proposal encounters substantial scientific criticism. However, even this recent change is solely voluntary on the part of the Service and is not required under the current Endangered Species Act. In addition, the active solicitation of reviews and comments comes only after sufficient questions have been raised concerning the science upon which the proposal was based. Again, we refer to the proposed listing of seven mussels in the Apalachicolan Region. Requests for external review by experts of the science were not made until January 3, 1995, fully five months after the proposal appeared in the Federal Register and over one month after the public comment period was originally scheduled to close. This is not acting within either the spirit or intent of the scientific peer-review process. The current practice of the U.S. Fish and Wildlife Service requesting reviews after the proposal has been published is clearly a case of putting the proverbial cart before the horse. Because of this, much of the U.S. Fish and Wildlife Service's work is being met increasingly with skepticism and criticism from not only the industrial and private sectors, but the scientific community as well.

Concerns about the proposal process are compounded by current internal editorial practices of the U.S. Fish and Wildlife Service. Draft proposals submitted for publication in the Federal Register are subjected to editorial changes in content and scientific conclusions without the author's consent or knowledge. In the proposal to list the seven mussels in the Apalachicolan Region, there is documentation in the record that the U.S. Fish and Wildlife Service's internal editors made-substantial changes and deletions to text in the draft proposal. The result of those editorial changes subsequently appeared in the Federal Register without the author's knowledge or approval. Those editorial revisions altered the scientific conclusions drawn by the author. Such a practice is unheard of in the scientific community. This type of editorial license used within the U.S. Fish and Wildlife Service is scientifically unacceptable and verges on being unethical. Taking such liberties with editing when the author's consent has not been sought and when no peer-review process is in place only serves to exacerbate growing criticisms and skepticism of the listing process.

It is our professional opinion that any revision of the Endangered Species Act should include a mandatory, external, independent, and anonymous peer review of both the status survey and the listing proposal. This process should be rigorous and require standards that would meet with the approval of the scientific community as a whole. Furthermore, the status survey document should conform to the same basic content requirements as other scientific manuscripts. In addition, the Service should not make any substantial changes to a draft proposal submitted for publication in the Federal Register without first obtaining the author's approval.

By requiring such a process, all parties involved in a listing proposal would benefit. The U.S. Fish and Wildlife Service would receive valuable input and criticism from outside scientists which could be used continually to improve their scientific efforts. The Service would also benefit by meeting with fewer challenges once the proposal has been published. Industrial and private concerns would profit by having only the best, rigorously scrutinized scientific data used in preparing a proposal for listing. Both the economy and the environment would gain by ensuring that species that are threatened or endangered are indeed listed while at the same time validating that only those truly in need of protection are listed. Finally, taxpayers would benefit from having in place a process of checks and balances that makes those conducting the science accountable to the scientific community for their activities.

Also of critical concern to us are the recovery plans for listed species currently required by the Endangered Species Act. These plans, when implemented through Section 7 consultations or Section 10 habitat conservation plans, often require substantial financial input and/or sacrifice from those who own, control or utilize the habitat. As a result, recovery plans, in essence, are nothing more than unfunded federal mandates applied via the Endangered Species Act. It is ultimately left up to the state and local taxpayers, and industrial and private concerns to cover the costs of recovery plan implementation.

Most species are proposed for listing with no recovery plan in place or even proposed. In some instances there is insufficient information on the biology of the proposed plant or animal to allow adequate recovery plans to be drawn up. As a case in point, we again refer to the Apalachicolan Region proposed mussel listing. By the U.S. Fish and Wildlife Service's own admission, little is known about the life cycle and reproduction biology of the seven mussels which have been proposed for listing. Noted scientific experts in the field, however, are in agreement on the futility of conservation efforts without this type of essential biological information.

Species are also routinely listed for which the recovery plan amounts to little more than a preservation or subsistence measure. Too little time, effort, research, and money is available during the critical period following listing to truly implement recovery of the species. Listing a species without concomitantly and quickly implementing a realistic, knowledgeable recovery plan doesn't really benefit the species. Little can be gained by listing a species if we are simply prolonging the inevitable--especially when economic hardship accompanies the listing.

It is our belief that any revision of the Endangered Species Act should include required, comprehensive, federally-funded, recovery plans and/or studies, as needed, if a species is to be listed as threatened or endangered under the Endangered Species Act. Such studies and plans should include a listed species' specific requirements for recovery, conclude whether or not a species will ultimately recover if the proposed recovery plan is implemented, and specify what steps are necessary to implement such a successful recovery. Only by providing sufficient funding can we guarantee that true recovery of a protected species will be realized, along with the preservation of biological diversity as is the true intent and spirit of the Endangered Species Act. Such a revision would benefit the U.S. Fish and Wildlife Service and the environment by

ensuring adequate levels of funding to implement successful recovery of a listed species. Industry and state and local economies would benefit not only from having species preservation and recovery, but also from not having to shoulder the financial burden of recovery plan implementation.

We believe that the preservation and protection of species is required to maintain biological diversity for both posterity's sake and for ecological stability. We believe, however, that the Endangered Species Act, as written, suffers from a lack of checks and balances, and from insufficient follow-through on species recovery. Addressing these areas as the Endangered Species Act is revised will serve only to strengthen the integrity of the Act and ensure that the Act's intentions are fully met. It will serve favorably all parties involved in the listing of a species as threatened or endangered under the Act--from the U.S. Department of the Interior, environmentalists and scientists, to local taxpayers, businesses, industries and landowners.

Terry D. Richardson, Ph.D.
Assistant Professor of Biology
and
Paul Yokley, Jr., Ph.D.
Emeritus Professor of Biology
Department of Biology
University of North Alabama
Florence, Alabama 35632-0001
(205) 760-4429

Mussels species are facing hard times

► Debate continues over whether five species should be classified as endangered

y Ken Edelstein
tlanta Bureau

A debate between scientists ould help determine the fate of even rare mussels in the Chathoochee and neighboring rivers, now that President Clinton as lifted a moratorium on ndangered species listings.

Nearly two years ago, government biologists proposed that ve mussel species in the Apalchicola-Chattahoochee-Flint asin be classified as endangered and that two be listed as hreatened.

But barging advocates used ne congressionally ordered, ear-long moratorium to mar hat the grow forces. While the S. Fish and Wildlife Service proposal sat on a shelf, scientists hired by the industry concluded that the mussels were better off than the government had let on.

"We're not angry with each other. We're just trying to seek the truth," said Paul Yokley, a mussel expert hired by barging interests to scrutinize the government's research.

But truth in science, as in politics, can depend on where you sit.

On one side of the mussel dispute sit government malacologists, or shellfish biologists, backed by many of their independent colleagues, who insist that the seven species of native, clam-like bottom feeders could disappear if more isn't done to protect them.

On the other side are Yokley and fellow malacologist Terry Richardson of the University of North Alabama, who believe they've found a fatal flaw in the government's research.

Politics may ultimately determine whether the mussels finally are listed. But, for now, at least, the scientists have draped the debate in their own sorts of questions: What, for example, is the best way to gather evidence about endangered mussels? How should the data be interpreted? And how far must listing backers go to demonstrate that a species is on the brink of extinction?

"What do you have to do to prove to someone that they don't occur as often as it did in the past? It's a river. Do you have to survey every meter?" asked biologist Jayne Brim Box, who led the field team of government scientists that surveyed the species.

Brim Box works for the National Biological Service. In 1991 and 1992, she led a team that picked over river and creek beds from Columbus downstream to

See MUSSELS, B4

► Mussels may have been first to go fishing in Chattahoochee River

By Ken Edelstein
Atlanta Bureau

Using minnows as fishing bait may have gotten its start right here in Columbus.

The inventor? A 3-inch wide clam-like creature that once thrived on the bottom of the Chattahoochee River.

Long before people got the bright idea of tying a string to a rod, a mussel called the shiny-rayed pocketbook developed a child-rearing system uncannily like the method today's anglers use to catch food.

"We thought we invented fishing lines. These things have been using lines and lures for millions of years," said U.S. Fish and Wildlife Service biologist Bob Butler.

Last year in Russell County's Uchee Creek, the National Biological Service's Jayne Brim Box became the first scientist to observe the shiny-rayed pocketbook's fishing habit.

After its fertilized eggs grow into larvae, the pocketbook exudes a gooey string about 5 feet. The string floats up into moving water.

At its end is a 1-to-2 inch packet that looks like a minnow. It has dark dots at one end to mimic eyes and stripes down each side.

When predators, like bass, spot the lure, they figure they've found a tasty morsel. But Butler likens the packet to a coffee capsule: One nibble release thousands of smaller packets of larvae, some of which manage to attach themselves to fins or gills of the still-hungry fish.

They suck nutritious juice from their host, develop their

See FISHING, B

ISHING / From B1

ıells, and, within a month, drop
lf as fully developed mussels.

Butler discovered the elabo-
ıte reproductive technique in
ıe southern sandshell mussel in
)88 in north Florida. He and
wo colleagues recently pub-
shed their findings on what
ıey've dubbed "super-conglutl-
ates" in the journal Freshwater
liology.

It's considered a relatively
ıte evolutionary feature: An-
lent animals, like snapping
urtles and angler fish fool their
ırey by dangling lures that look
ike worms. The shiny-rayed
ıocketbook only could have
:ome along after minnows de-
ıeloped and bass began eating
hem.

European Americans first
dentified the species in 1840 in
:he Chattahoochee River at Co-
:umbus. But recent surveys
along the Chattahoochee and its
tributaries have revealed only
one remaining population, in
Uchee Creek. Up to 18 sites may
remain in other basins.

The species is one of five
natives of the Apalachicola-
Chattahoochee-Flint basin that
Fish and Wildlife has proposed
to list as endangered. Scientists
believe people have so altered
the three rivers with dams,
dredging, pollution and a new
mix of wildlife that a once-
brilliant evolutionary feature
now seems something of an
anachronism.

"They really put all their eggs
in one basket so to speak," Fish
and Wildlife biologist Dick Big-
gins said of the super conglutl-
nates. "It's a good strategy in
some respects because it's very
effective (at attracting a host
fish). But you have to have clean
water for the fish to see them,
and you have to have a good
population of predatory fish."

MUSSELS / From B1

Apalachicola, Fla., and back upstream along the Flint River in search of 10 types of freshwater mussels suspected to be in trouble.

They snorkeled and scuba dived along sand spits, gravel bars and murky river bottoms. They spent some 600 hours in the field, and at least as much time sifting through data back in the service's Gainesville, Fla., office.

"Gosh, we sampled almost every five miles," Brim Box said.

What the team found surprised few in the tight-knit field of mussel experts: There are far smaller and fewer populations in the Apalachicola-Chattahoochee-Flint basin than naturalists and travelers reported in years past. Decades of logging, development, dams, dredging and pollution have worn down colonies of the creatures, which once blanketed stream creek beds in vast, multi-species quilts.

Brim Box's team decided that two of the 10 species probably are extinct. The other eight species resided in scattered pockets, raising questions about their long-term survival prospects.

She sent her findings to the Fish and Wildlife Service, which is in charge of endangered species listings. In September 1994, Fish and Wildlife malacologist Bob Butler recommended listing five of the mussels as endangered and two as threatened.

"I would love to go out and say that all these things are common. But they aren't," Brim Box said. "The data shows that these species are on decline."

Yokley agrees that these are hard times for mussels.

"Of course, they are reduced in numbers. Most mussel species are reduced in numbers," he said. "I just don't want to say that it's doomed to extinction if it isn't."

Yokley, a retired professor at the University of North Alabama, and Richardson were hired by the Tri State Mussels Coalition. The coalition is backed by barge companies, farmers and others who want the U.S. Army Corps of Engineers to continue to maintain a barge channel up the three rivers.

The two biologists thought they found a weakness when they reviewed the National Biological Service's work. Brim Box and her team hadn't use the method that Yokley and Richardson say is best for finding juvenile species. That method involves straining river-bottom sediment through sieves.

Last June, they and two students spent a day at three sites on the Apalachicola River. If they found juveniles, they reasoned, they'd have evidence that the species are reproducing.

At the first site, just below Jim Woodruff Dam near the Georgia line, they dredged up six buckets of sediment, sifted through it and found only adults. At the second, they found neither adults nor juveniles.

At the third site, however, they plucked up three juvenile shells of the fat three-ridge, one of the five proposed endangered species.

"We were excited," Richardson said, although he added that he felt some sympathy for his colleagues. "We were a little remorsed in that this threw some doubt on the previous work that had been done."

Yokley and Richardson argued that the juvenile samples cast a shadow over the entire National Biological Service inventory: If the sieve yielded three fat three-ridge juveniles in just a day, how many other juveniles might be found with a comprehensive search?

But Butler and Brim Box drew a different conclusion:

"What they found really corroborates what we said," Butler countered. "They were in a very dense mussel bed, and all they found were a few juveniles. If there's just a few juveniles to be found in (the fat three-ridge's) best bed, it's not very good news for the species."

Butler said the real point is that all seven species are now isolated in ever-shrinking populations. The proposed listing doesn't mention whether there are juvenile fat three-ridges. It stresses instead that the species, adult and juvenile, is now found in an extremely limited range.

Now, it's Butler's job to restart the listing process for the seven species. When the moratorium ended this month, he pulled the proposal back off the shelf in his office and began to review last year's public comments on the proposal.

BIRMINGHAM NEWS
Birmingham, Alabama
May 13, 1996

State's rare mussels among those to be re-evaluated

WASHINGTON (AP) — Controversy over endangered species listings may soon heat up again in the Southeast as federal biologists begin re-evaluating 10 types of rare mussels found in the region's rivers.

The mussels are among 243 species that were proposed for designation as endangered or threatened before Congress stopped all listings in April 1995. The moratorium ended two weeks ago after Congress, in the final budget bill for fiscal 1996, gave President Clinton the authority to waive it.

Mollie Beattie, director of the Fish and Wildlife Service, said last week it likely will be months before final decisions are made.

The highest priority will be given to those species most in need of protection, Beattie said. When the moratorium was imposed, 162 of the 243 proposed species, including all 10 of the mussels, had been determined to face "immediate, high magnitude threats" of extinction.

The mollusks fall into two groups. In July 1994, the agency proposed listing as endangered five mussels historically found in the Cumberland and Tennessee river systems of Kentucky, Tennessee, Alabama and Virginia.

A month later, the agency proposed endangered designations for five mussels that are found in the rivers of southwest Georgia, southeast Alabama and North Florida. Two other mussels in the same rivers were proposed for listing as threatened.

Alabama species

Mussel species traditionally found in Alabama that were proposed for listing as endangered prior to the congressional moratorium, which was lifted last week, are the Cumberlandian combshell, gulf moccasinshell, oval pigtoe, oyster mussel and shiny-rayed pocketbook.

Those that had been proposed for listing as threatened were the Chipola slabshell and purple bankclimber.

Fish and Wildlife officials concede that listing the mussels would add an additional layer of review to development along and dredging of the waterways. But they contend that few if any projects would be adversely affected.

Longtime critics of the Endangered Species Act, like Sen. Richard Shelby, R-Ala., aren't wasting any time in attacking the administration's plans to restart the listing process.

"I remain very concerned that the department has not used the time provided by the moratorium to re-evaluate its strategy for determining whether a species should be listed," Shelby said in a statement Friday.

Mussel Discovery Halts Pearl River Dredging

Vicksburg, Miss.—Discovery of shells of the inflated heelsplitter mussel brought plans for reopening the West Pearl River in south Mississippi and Louisiana to a halt recently. Col. J. F. Castonguay, acting commander of the Vicksburg Engineer District, on August 8 issued a memorandum

—SEE PEARL PAGE 8

Pearl

(CONTINUED FROM PAGE 3)

rescinding an April 15, 1995, decision to proceed with dredging the waterway, after shells of the federally protected mussel were found at two planned dredging sites.

He called for a survey for the mussel throughout the West Pearl River Navigation Project area. Depending on findings, new biological assessment, environmental assessment or other reports could be required, taking six months to one year.

No dredging is expected before spring 1997.

The inflated heelsplitter mussel is listed as a threatened species under the Endangered Species Act.

Funding Urged:

Tri Rivers Assn. Pitches the House

Washington, D.C.—Ben F. Bowden, president of the Tri Rivers Waterway Development Association, appeared recently before the House Subcommittee on Energy and Water Development, Committee on Appropriations, on behalf of funding for the Apalachicola-Chattahoochee-Flint inland waterway and river system.

His purpose was to maintain and increase funding for the entire Tri Rivers system, but he also testified on the U.S. Fish and Wildlife Service's recent proposal to place seven freshwater mussels on the endangered species list and other issues impacting the ACF Waterway and the region.

Bowden urged the committee during his March 21 appearance to continue waterway funding for fiscal 1996. His request involved the continued operation and maintenance of the ACF river system, including George W. Andrews Lock, Dam and Lake, $4,3211,000; Jim Woodruff Lock, Dam and Lake Seminole, $5,111,000; Buford Dam and Lake Sidney Lanier, $7,377,000; Walter F. George Lock, Dam and Lake, $6,434,000; and West Point Dam and Lake, $5,114,000.

Bowden reminded the committee that the six public ports along the ACF waterway represent an investment of more than $15 million, that there are millions of additional dollars invested in private facilities and industrial operations, and that navigation users and commercial interests are depending more and more on the growing waterway system to satisfy their transportation needs.

Endangered Species

Recognizing that endangered species are not a direct concern of the committee, Bowden said "...the inequities of the current act add to the cost of constructing and maintaining waterways throughout the nation. As we have seen in recent years, this industry has been impacted almost continuously by U.S. Fish and Wildlife's numerous proposals under the Endangered Species Act, and [it] has now become an appropriations concern also."

Bowden said, "Uncertainty over whether our system will remain navigable in light of proposed classification of plants and/or animals as endangered and/or threatened species creates an undue burden on associations such as ours throughout the nation." He said the Tri Rivers group last year had joined other groups to emphasize the need for revisions to the Endangered Species Act. "That we would find ourselves at the epicenter of such a problem on the ACF system less than a year later, was, of course, unbeknownst to us, and an indication of how far reaching these problems are...."

The Tri Rivers leader reviewed the issue involving FWS' proposal to list five mussels as endangered, and explained that, according to the agency's own statements, the listing "not only has the potential to affect navigation but also the timber industry, gravel mining operations, all municipalities and industries along the waterway, farmers, poultry industry, flood control and hydroelectric power."

Bowden told the committee that after a series of public hearings were held, Fish & Wildlife "initiated a series of newspaper articles and editorials stating, in spite of the proposal, the listing would have no impact on any commercial or industrial activities in the region."

According to Bowden, though the Corps met with Wildlife personnel several times to discuss the impact of the proposed listings, and apparently had reached some conclusions, the "agencies have not shared the information with us." He said, "It is anticipated that many of the costs incurred by the Corps in satisfying FWS will be passed on to the users, perhaps destroying the economic viability of the system."

Internal Memo

Bowden also told of the discovery of an internal Wildlife Service memo that revealed that the service made substantial changes to the draft proposal prior to publication. "These changes were clearly made to soften the science and thereby defuse any public outcry." Among the omissions, he said, FWS deleted its conclusions that additional extinctions may be expected if watershed and particularly riparian protection plans are not implemented to preserve and enhance habitat quality.

"Throughout the documentation...there were numerous examples of changes made to scientific conclusions, to mitigate the impact such listings would have on the ACF system and the region," Bowden said.

After updating the committee on related activities, Bowden said his organization believes "that the Fish & Wildlife Service should withdraw their proposal based on incomplete science and the potential impacts to navigation and the economy of our region."

Other Issues

Bowden's testimony also touched upon other waterway system issues, including (1) the overflow of existing dredge sites on the Apalachicola River, (2) ownership of adjacent lands by the state of Florida, which precludes the acquisition of new land by the Corps, and (3) a request that the Mobile Engineer District assure users of an adequate channel depth for at least 250 days of the year on the ACF system, so that economic development groups in the tri-state area can utilize the inland waterway as a unique marketing tool to attract industry.

Bowden said House Report 103-533, which accompanied the fiscal year 1995 energy and water development appropriations bill, included $100,000 for a study of obstacles that would have to be overcome in order to achieve a 250-day navigation season on the system. The final version is expected to be completed in the next 60 days, he said. It is now being reviewed by the Office of the Chief of Engineers in Washington. He asked that the committee review the report when it comes out and urged the Corps to implement its findings.

On the matter of the dredge disposal problem, Bowden explained that of the states through which the system flows, Alabama, Georgia and Florida, Florida is the only one that requires local sponsorship instead of federal. The six Florida counties along the waterway have been unable, financially, to act as sponsors, and the state of Florida has refused, he said. He urged passage of an amendment that would allow the federal government to take over sponsorship.

"By modifying the act, the Apalachicola River segment of the ACF would be consistent with the other inland waterways in the nation," Bowden said. "But most importantly, by achieving federal sponsorship, we could solve many of our disposal problems."

DOTHAN PROGRESS
February 1, 1995

Area governments oppose mussels endangerment listing

The Dothan and Houston County commissions are firmly on record as wanting the U.S. Fish and Wildlife Service to recant its current plans to declare certain mussels found in the Apalachicola, Chattahoochee, Flint, Chipola and Ochlocknee Rivers and tributaries as endangered.

Such action, according to resolutions unanimously adopted by both commissions, could seriously curtail farming, industrial and other activities in areas served by these streams.

Both commissions contended public hearings showed the decision was the result of specifications that "are not based on the best scientific and commercial data available."

The governments contend "FWS has failed to document the connection between the adverse impacts described and the reported decline in mussels."

The resolutions request FWS with draw its listing until better definitive information is publicly presented.

Tri Rivers Waterway Development Association has declared such a listing can be detrimental to all ACF "timber industry, gravel mining, municipalities and industries (waste and industrial discharge) along the waterway, farmers, poultry industry and hydroelectric power."

While there have been some public hearings, written comments can be sent to FWS. These must be in the agency's office by Feb. 10.

The address is U.S. Fish and Wildlife Service, 6620 Southpoint Drive South, Suite 310, Jacksonville, Fl. 32216.

Faxes will not be accepted, according to Sandra Vandagriff, Tri Rivers executive director.

BIRMINGHAM POST HERALD
Birmingham, Alabama
March 23, 1995

Fish service attack

WASHINGTON — Southeastern lawmakers and waterway users blasted the Fish and Wildlife Service yesterday, telling a House panel that the agency's efforts to protect endangered species could undermine the region's economy. The targets of the attacks were the agency's proposal last year to list seven fresh water mussels in the Apalachicola-Chattahoochee-Flint river system as endangered and its decision to spend $100,000 this year searching for the Alabama sturgeon. Ben F. Bowden, president of the Tri Rivers Waterway Development Association, said listing the mussels as endangered would cause "grievous harm to a vast number of economic activities" in Southwest Georgia, Southeast Alabama and the Florida panhandle. Testifying before the House appropriations energy and water subcommittee, Bowden accused the Fish and Wildlife Service of using faulty science to develop a listing proposal, even though the agency has no idea how to implement a recovery plan to save the mussels. Fish and Wildlife officials have insisted that a decision to list the mussels as endangered would not harm economic activity in the tri-rivers region.

— *Associated Press*

United States Senate

WASHINGTON, D.C. 20510

March 24, 1995

COPY

The Honorable Bruce Babbitt
Secretary
U. S. Department of the Interior
18th & C Streets, N.W.
Washington, D.C. 20240

Dear Mr. Secretary:

In a February 2, 1995, letter to you, we expressed several concerns about an August 3, 1994, proposal to list five freshwater mussels found in Alabama, Florida, and Georgia as endangered species and two as threatened species. As we pointed out in that letter, there exists considerable controversy regarding the U.S. Fish and Wildlife Service's public assurances that this listing would have no effect on the economy of this region. We and many of our constituents believe that these assurances are contrary to the clear language of the proposed rule and supporting documents. Until such time as the Service is able to address these inconsistencies and other problems related to the proposal, we continue to believe that the Service should withdraw its proposed rule.

We are aware, however, that the Service has offered to meet with members of the Tri-State Mussels Coalition to discuss their concerns. On behalf of our constituents, we request that you encourage the Service to respond favorably to the Coalition's request for a meeting to discuss this proposal. It is our understanding that the Fish and Wildlife Service is currently reviewing public comments received at the public hearings and during the public comment period. We trust that the Service will not proceed with a final rule implementing this proposal until such time as it is able to schedule a meeting with the Coalition.

Please contact one of us if we can assist you in setting up that meeting.

Sincerely yours,

Richard Shelby

Howell Heflin

Mac Pilkins Gr. 3

Glen Browder

Terry Everett

Sanford D. Bishop Jr.

Joe Sisk

United States Department of the Interior

FISH AND WILDLIFE SERVICE
1875 Century Boulevard
Atlanta, Georgia 30345

IN REPLY REFER TO:

MAR 31 1995

Ms. Sandra L. Vandagriff, Chairman
Tri State Mussels Coalition
Post Office Box 2232
Dothan, Alabama 36302

Dear Ms. Vandagriff:

Thank you for your letter of March 13, 1995, regarding the proposed rule to list five mussels as endangered and two as threatened, published on August 3, 1994. The purpose of your letter was to request a meeting with representatives of the Fish and Wildlife Service (Service) in order to discuss the scientific basis for the listing proposal and to explore means to avoid potential adverse impacts to the activities of the Tri State Mussels Coalition (Coalition) members should these mussel species become federally listed. The Service would be very pleased to meet with Coalition members to discuss the proposed listing further. A meeting location of Columbus, Georgia, or Atlanta, Georgia, would be acceptable to the Service. We, however, must share with you our concerns regarding the timing and format of such a meeting.

We would have preferred the meeting to have been held during the open comment period (December 12, 1994 to February 10, 1995) so that a summary of the meeting could have been made a part of the public record during that time. This would have provided other interested parties the greatest opportunity to review and comment on the information.

During the informal rulemaking process, the Service must remain cognizant of the ramifications of ex parte contacts. The Service is aware that ex parte contacts during informal rulemaking are not prohibited by the Administrative Procedures Act. (See, e.g., Sierra Club v. Costle, 657 F.2d 298 (D.C. Cir. 1981)). Service policy, however, requires that we receive and consider information on a proposed listing rule during the public comment period only (see enclosure). Your letter indicates that the Coalition utilized the public comment period to provide both oral and written comments. Your letter does not suggest that the Coalition has any information not already in the possession of the Service. In addition, as you no doubt are aware, the Service has consistently stated during the public meetings and hearings that it does not anticipate adverse impacts to activities of Coalition members in the event that these mussel species are listed. Nonetheless, we would like to accommodate your request that a meeting be held as soon as possible. The Service,

therefore, will reopen the comment period for 2 weeks in the near future to accommodate your request and to consider other information submitted after close of the previous comment period.

We look forward to meeting with you during the 2-week comment period. We will contact you when the comment period opens and set up a time and place for a meeting. If you have any questions concerning this response, please contact David P. Flemming, Chief, Division of Endangered Species, at 404/679-7096. We look forward to a continuing dialogue with the Coalition on this and other wildlife issues of concern.

Sincerely yours,

for Noreen K. Clough
Regional Director

Enclosure

JOSEPH M. FARLEY NUCLEAR PLANT

Environmental Non-Radiological Monitoring of Aquatic Communities In The Chattahoochee River

1975 - 1978

ALABAMA POWER COMPANY
JOSEPH M. FARLEY NUCLEAR PLANT

Environmental Non-Radiological Monitoring
of Aquatic Communities in the Chattahoochee River

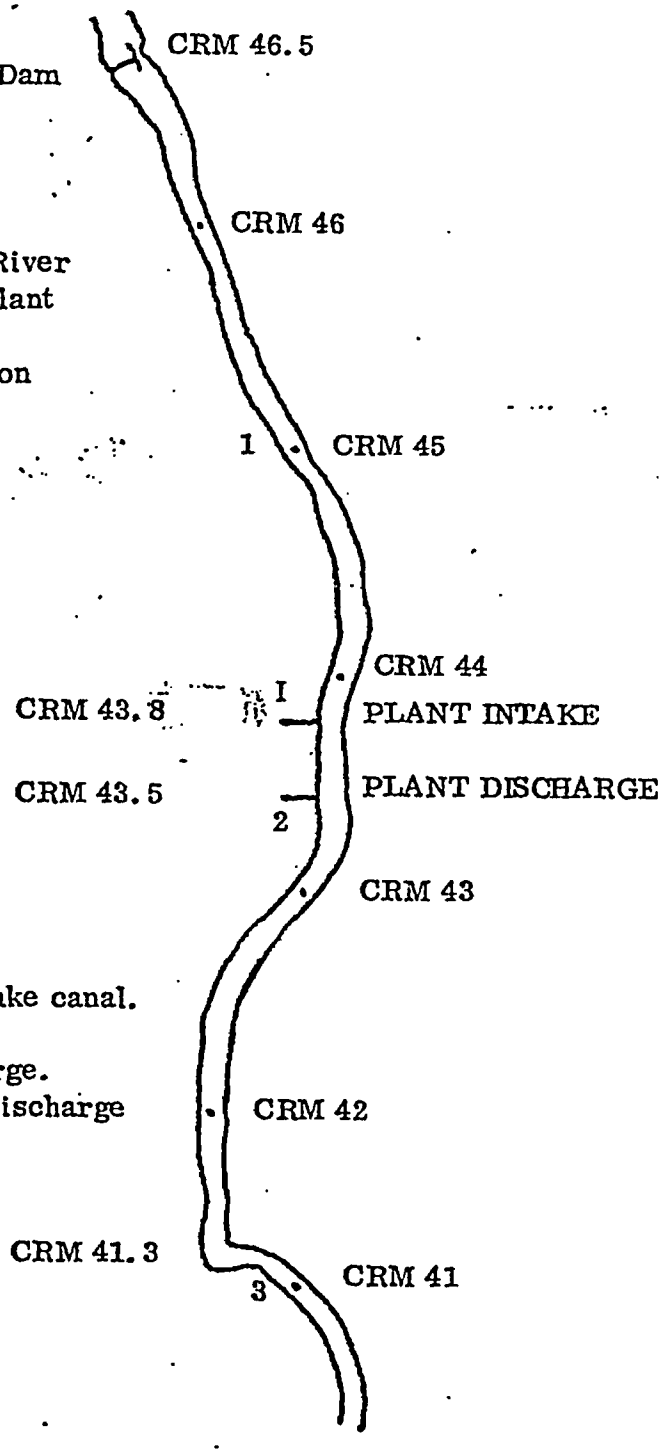
TABLE OF CONTENTS

BIOLOGICAL CONCLUSIONS

1. An analysis of macroinvertebrate populations, using density, diversity and equitability values, did not indicate any significant differences in populations of these organisms which could be contributed to the operation of Farley Nuclear Plant.
2. The concentrations of a majority of the water quality parameters associated with biological studies varied seasonally; however, no differences that would have biological significance were detected between upstream control and downstream discharge sites.
3. Variations in phytoplankton and zooplankton densities occurred over the course of the study; however, there were no qualitative or quantitative changes in plankton communities of the adjacent Chattahoochee River that were attributable to the operation of the Farley Nuclear Plant.
4. Larval fish studies in the vicinity of the plant failed to indicate any noticeable changes in larval fish densities or spawning periods during the four-year study.
5. Studies of adult fish populations, using relative abundance and condition values, did not indicate any major changes in fish populations had occurred as a result of the operation of Farley Nuclear Plant.
6. Impingement studies at the Farley Nuclear Plant intake indicated low impingement rates were occurring relative to game and commercial species. Impingement rates for other species were also considered insignificant relative to any effect on fish populations existing in the Chattahoochee River.
7. The results of the four-year biological study of the Chattahoochee River near Farley Nuclear Plant failed to indicate any significant changes in biological communities which could be associated with plant operation.

Figure 5

Schematic Diagram of Chattahoochee River Near the Joseph M. Farley Nuclear Plant with Indicated Locations of Water-Plankton Sampling Stations



CRM - Chattahoochee River Miles

(1) Sampling station upstream from intake canal.
(I) Sampling station in intake canal.
(2) Sampling station below plant discharge.
(3) Sampling station downstream from discharge structure.

Larval Fish

Fishes in the Chattahoochee River near Farley Nuclear Plant can be classified generally as warm-water species, which will spawn anywhere the habitat is suitable. Studies to determine the densities and types of larvae in the vicinity of the plant were conducted annually from 1975 through 1978. Samples were collected every two weeks during the period March through June, with the exception of 1975 when studies were started in April because of flood conditions.

Larval fish collected during the four-year study were obtained from four sample areas in the vicinity of Farley Nuclear Plant. Sample stations included: (1) an upstream station located approximately 0.9 miles above the plant intake, (2) an intake canal sample station, (3) a discharge sample station, and (4) a downstream station located approximately 2 miles below the plant discharge. Larval fish were collected from the intake canal station only during 1978, which was the first sample season following commercial operation of Farley Unit 1. Samples were collected at depths of 1.5, 3.0 and 4.6 meters. Sampling at the 4.6 meter depth was infrequent due to insufficient water depth. Each sample was obtained by towing a plankton net with attached flowmeter and represented larvae obtained from approximately 100 cubic meters of water.

Larval fish densities were computed for each sample area and sample period during the four-year study. Tables 38 through 41 provide the results of larval fish monitoring during each of the study years. The previously referenced tables provide the number of cubic meters sampled, total larvae per cubic meter and the taxonomic identification of larvae for each sample area and depth.

Table 38

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1975

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream[1]	4/21/75	1.5	117.3	0.017	Clupeidae	2
	4/21/75	3.0	144.2	0.007	Clupeidae	1
Discharge[2]	4/21/75	1.5	144.9	0		
	4/21/75	3.0	133.6	0.015	Clupeidae	2
Downstream[3]	4/21/75	1.5	105.3	0.009	Clupeidae	1
	4/21/75	3.0	125.1	0.016	Clupeidae	2
Upstream	5/9/75	1.5	95.9	0.042	Clupeidae	4
Discharge	5/9/75	1.5	114.3	0.017	Cyprinidae	1
					Unidentified	1
Downstream	5/9/75	1.5	98.1	0.031	Clupeidae	3
	5/9/75	3.0	116.7	0.009	Clupeidae	1
Upstream	5/19/75	1.5	104.5	0		
	5/19/75	3.0	106.9	0		
Discharge	5/19/75	1.5	97.1	0.010	Clupeidae	1
	5/19/75	3.0	100.1	0.020	Clupeidae	2
Downstream	5/19/75	1.5	102.6	0.010	Unidentified	1
	5/19/75	3.0	115.5	0.017	Clupeidae	1
					Unidentified	1

Table 38 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1975

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	6/6/75	1.5	98.9	0		
	6/6/75	3.0	105.9	0		
Discharge	6/6/75	1.5	81.1	0		
	6/6/75	3.0	93.2	0		
Downstream	6/6/75	1.5	108.7	0.009	Clupeidae	1
Upstream	6/19/75	1.5	120.9	0		
	6/19/75	3.0	113.5	0		
Discharge	6/19/75	1.5	115.9	0		
	6/19/75	3.0	114.6	0.009	Clupeidae	1
Downstream	6/19/75	1.5	105.2	0		
	6/19/75	3.0	109.8	0.009	Clupeidae	1
Upstream	7/1/75	1.5	101.2	0		
	7/1/75	3.0	120.8	0		
Discharge	7/1/75	1.5	103.6	0.010	Pomoxis	1
	7/1/75	3.0	105.1	0		
Downstream	7/1/75	1.5	94.9	0		
	7/1/75	3.0	98.9	0		

1. Upstream Sample Area.....CRM 44.7 - 45.2
2. Discharge Sample Area.....CRM 43.0 - 43.5
3. Downstream Sample Area.....CRM 41.0 - 41.5

Table 39

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1976

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream[1]	3/1/76	1.5	115.1	0		
	3/1/76	3.0	132.1	0		
Discharge[2]	3/1/76	1.5	93.5	0		
	3/1/76	3.0	106.6	0		
Downstream[3]	3/1/76	1.5	106.3	0		
	3/1/76	3.0	112.3	0		
Upstream	3/24/76	1.5	88.3	0		
	3/24/76	3.0	110.8	0		
Discharge	3/24/76	1.5	100.0	0		
	3/24/76	3.0	90.5	0		
Downstream	3/24/76	1.5	90.9	0		
	3/24/76	3.0	115.2	0		
Upstream	4/7/76	1.5	110.9	0		
	4/7/76	3.0	118.3	0		
Discharge	4/7/76	1.5	99.6	0		
	4/7/76	3.0	98.9	0		
Downstream	4/7/76	1.5	95.3	0		
	4/7/76	3.0	98.7	0		

Table 39 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1976

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	4/22/76	1.5	99.1	0		
	4/22/76	3.0	109.9	0		
Discharge	4/22/76	1.5	93.7	0		
	4/22/76	3.0	109.6	0		
Downstream	4/22/76	1.5	94.8	0		
	4/22/76	3.0	105.6	0		
Upstream	5/17/76	1.5	97.2	0.093	Clupeidae	7
					Unidentified	2
	5/17/76	3.0	102.6	0.049	Clupeidae	5
Discharge	5/17/76	1.5	88.6	0.192	Clupeidae	17
	5/17/76	3.0	93.3	0.096	Clupeidae	5
					Unidentified	4
Downstream	5/17/76	1.5	94.4	0.032	Clupeidae	3
	5/17/76	3.0	115.3	0.069	Clupeidae	5
					Unidentified	3
Upstream	6/1/76	1.5	108.9	0		
	6/1/76	3.0	116.5	0		
Discharge	6/1/76	1.5	99.4	0		
	6/1/76	3.0	103.8	0.019	Clupeidae	2
Downstream	6/1/76	1.5	85.6	0.023	Clupeidae	2
	6/1/76	3.0	87.7	0		

Table 39 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1976

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	6/16/76	1.5	110.4	0		
	6/16/76	3.0	111.5	0		
Discharge	6/16/76	1.5	93.8	0		
	6/16/76	3.0	94.7	0		
Downstream	6/16/76	1.5	100.9	0		
	6/16/76	3.0	97.6	0.010	Clupeidae	1
Upstream	6/29/76	1.5	100.6	0		
	6/29/76	3.0	105.9	0		
Discharge	6/29/76	1.5	101.6	0		
	6/29/76	3.0	108.1	0		
Downstream	6/29/76	1.5	111.1	0		
	6/29/76	3.0	108.1	0		
Upstream	7/12/76	1.5	116.6	0		
	7/12/76	3.0	118.4	0		
Discharge	7/12/76	1.5	94.7	0		
	7/12/76	3.0	99.8	0		
Downstream	7/12/76	1.5	101.0	0		
	7/12/76	3.0	105.0	0		

1. Upstream Sample Area.....CRM 44.7 - 45.2
2. Discharge Sample Area.....CRM 43.0 - 43.5
3. Downstream Sample Area.....CRM 41.0 - 41.5

Table 40

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1977

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream[1]	3/16/77	1.5	99.9	0		
	3/16/77	3.0	115.5	0		
Discharge[2]	3/16/77	1.5	83.9	0		
	3/16/77	3.0	135.6	0		
Downstream[3]	3/16/77	1.5	99.6	0		
	3/16/77	3.0	106.6	0		
Upstream	3/29/77	1.5	95.9	0		
	3/29/77	3.0	101.3	0		
Discharge	3/29/77	1.5	90.6	0		
	3/29/77	3.0	103.1	0		
Downstream	3/29/77	1.5	89.3	0		
	3/29/77	3.0	89.9	0		
Upstream	4/12/77	1.5	93.1	0.032	Clupeidae	3
	4/12/77	3.0	103.8	0		
Discharge	4/12/77	1.5	95.0	0.053	Clupeidae	3
					Catostomidae	1
					Unidentified	1
	4/12/77	3.0	99.3	0.020	Clupeidae	2
Downstream	4/12/77	1.5	97.5	0.010	Clupeidae	1
	4/12/77	3.0	104.4	0.010	Clupeidae	1

Table 40 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1977

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	4/25/77	1.5	90.2	0.078	Clupeidae	7
	4/25/77	3.0	98.0	0.031	Clupeidae	3
Discharge	4/25/77	1.5	106.4	0.028	Clupeidae	3
	4/25/77	3.0	105.5	0.076	Clupeidae	7
					Unidentified	1
Downstream	4/25/77	1.5	115.9	0.026	Clupeidae	3
	4/25/77	3.0	120.3	0.050	Clupeidae	6
Upstream	5/9/77	1.5	76.3	0.026	Clupeidae	2
	5/9/77	3.0	82.6	0.121	Clupeidae	9
					Cyprinidae	1
Discharge	5/9/77	1.5	72.4	0.014	Clupeidae	1
	5/9/77	3.0	90.1	0.022	Catostomidae	2
Downstream	5/9/77	1.5	98.1	0.041	Clupeidae	4
	5/9/77	3.0	105.3	0		
Upstream	5/24/77	1.5	109.5	0.018	Clupeidae	2
	5/24/77	3.0	116.1	0		
Discharge	5/24/77	1.5	83.2	0.048	Clupeidae	4
	5/24/77	3.0	106.6	0.009	Percidae	1
Downstream	5/24/77	1.5	69.5	0		
	5/24/77	3.0	74.2	0		

Table 40 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1977

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	6/6/77	1.5	122.5	0		
	6/6/77	3.0	106.7	0.037	Clupeidae	3
					Unidentified	1
Discharge	6/6/77	1.5	90.5	0.033	Clupeidae	2
					Catostomidae	1
	6/6/77	3.0	97.9	0.010	Clupeidae	1
Downstream	6/6/77	1.5	89.6	0.033	Clupeidae	3
	6/6/77	3.0	101.6	0.020	Clupeidae	1
					Ictaluridae	1
Upstream	6/20/77	1.5	94.4	0.011	Clupeidae	1
	6/20/77	3.0	91.1	0		
Discharge	6/20/77	1.5	91.5	0		
	6/20/77	3.0	108.0	0.019	Clupeidae	1
					Cyprinidae	1
Downstream	6/20/77	1.5	93.9	0		
	6/20/77	3.0	102.7	0.010	Clupeidae	1

1. Upstream Sample Area.....CRM 44.7 - 45.2
2. Discharge Sample Area.....CRM 43.0 - 43.5
3. Downstream Sample Area,.....CRM 41.0 - 41.5

Table 41

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1978

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream[1]	3/20/78	1.5	60.9	0		
	3/20/78	3.0	69.1	0		
Discharge[2]	3/20/78	1.5	66.3	0		
	3/20/78	3.0	71.4	0		
Downstream[3]	3/20/78	1.5	71.0	0		
	3/20/78	3.0	67.0	0		
Intake[4]	3/20/78	-	-			
Upstream	4/6/78	1.5	107.7	0		
	4/6/78	3.0	119.1	0.008	Clupeidae	1
Discharge	4/6/78	1.5	89.7	0		
	4/6/78	3.0	101.6	0		
Downstream	4/6/78	1.5	88.4	0		
	4/6/78	3.0	96.8	0.010	Percidae	1
Intake	4/6/78	1.5	96.8	0		
Upstream	4/19/78	1.5	118.1	0.017	Clupeidae	2
	4/19/78	3.0	118.3	0.042	Clupeidae	5
Discharge	4/19/78	1.5	112.7	0.009	Percidae	1
	4/19/78	3.0	120.1	0		
Downstream	4/19/78	1.5	110.8	0.018	Clupeidae	2
	4/19/78	3.0	108.5	0		
Intake	4/19/78	1.5	88.6	0.011	Clupeidae	1
	4/19/78	3.0	4.7	0.211	Clupeidae	1

Table 41 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1978

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	5/2/78	1.5	119.9	0.050	Clupeidae	5
	5/2/78	3.0	120.5	0.041	Clupeidae	5
	5/2/78	4.6	115.6	0.121	Clupeidae	14
Discharge	5/2/78	1.5	104.1	0.067	Clupeidae	7
	5/2/78	3.0	108.0	0.111	Clupeidae	11
					Catostomidae	1
	5/2/78	4.6	118.1	0.051	Clupeidae	5
					Catostomidae	1
Downstream	5/2/78	1.5	98.0	0.102	Clupeidae	2
	5/2/78	3.0	112.4	0.027	Clupeidae	2
	5/2/78	4.6	108.3	0.046	Clupeidae	5
Intake	5/2/78	1.5	74.0	0		
	5/2/78	3.0	52.4	0.172	Clupeidae	9
Upstream	5/15/78	1.5	101.6	0.167	Clupeidae	17
	5/15/78	3.0	115.9	0.285	Clupeidae	32
					Percichthyidae	1
	5/15/78	4.6	122.3	0.352	Clupeidae	43
Discharge	5/15/78	1.5	108.7	0.166	Clupeidae	18
	5/15/78	3.0	117.0	0.239	Clupeidae	27
					Unidentified	1
Downstream	5/15/78	1.5	104.3	0.278	Clupeidae	29
	5/15/78	3.0	112.6	0.373	Clupeidae	41
					Catostomidae	1
Intake	5/15/78	1.5	60.1	0.649	Clupeidae	36
					Unidentified	3

Table 41 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1978

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	5/30/78	1.5	137.6	0.211	Clupeidae	29
	5/30/78	3.0	145.4	0.131	Clupeidae	17
					Cyprinidae	1
					Catostomidae	1
Discharge	5/30/78	1.5	120.0	0.075	Clupeidae	8
					Cyprinidae	1
	5/30/78	3.0	128.4	0.187	Clupeidae	21
					Percidae	1
					Cyprinidae	1
					Catostomidae	1
Downstream	5/30/78	1.5	108.5	0.166	Clupeidae	17
					Catostomidae	1
	5/30/78	3.0	107.7	0.223	Clupeidae	24
Intake	5/30/78	1.5	42.3	0		
Upstream	6/13/78	1.5	118.3	0.042	Clupeidae	5
	6/13/78	3.0	127.1	0.031	Clupeidae	3
					Catostomidae	1
Discharge	6/13/78	1.5	103.3	0.019	Clupeidae	2
	6/13/78	3.0	124.6	0.064	Clupeidae	8
Downstream	6/13/78	1.5	107.1	0.056	Clupeidae	6
	6/13/78	3.0	114.6	0.044	Clupeidae	5
Intake	6/13/78	1.5	101.7	0		

Table 41 - cont'd

Number of Larval Fish Per Cubic Meter of Water
at Each Sample Station and Depth for Each Sample Period
1978

Station	Date	Depth (m)	Cubic Meters Sampled	Total Fish Per Cubic Meter	Family	Number
Upstream	6/26/78	1.5	126.7	0.008	Clupeidae	1
Discharge	6/26/78	1.5	105.2	0.010	Clupeidae	1
	6/26/78	3.0	118.2	0.042	Clupeidae	5
Downstream	6/26/78	1.5	93.6	0		
	6/26/78	3.0	101.4	0.020	Clupeidae	2
Intake	6/26/78	1.5	147.8	0.007	Clupeidae	1

1. Upstream Sample Area.....CRM 44.7 - 45.2
2. Discharge Sample Area.....CRM 43.0 - 43.5
3. Downstream Sample Area.....CRM 41.0 - 41.5
4. Intake Sample Area.....CRM 43.8

Tables 38 through 41 show that the Clupeidae (herring family), which includes the shad, represented the dominant taxonomic group in all sample areas throughout the study. The lesser groups represented during the study were the Cyprinidae, Catostomidae, Percidae, Ictaluridae, Percichthyidae and Pomoxis. A total of 662 larvae were collected during the four-year study. The number and percent of the total represented by each of the previously mentioned groups is as follows; Clupeidae 619/93.5%, Catostomidae 11/1.7%, Cyprinidae 6/0.9%, Percidae 4/0.6%, Ictaluridae 1/0.2%, Percichthyidae 1/0.2%, Pomoxis, 1/0.2%, and unidentified 19/2.9%. Any attempt to describe the distribution of larvae in each of the three sample areas based on taxonomic differences would be less than conjectural based on the numbers previously described. The low densities of non-Clupeids is most probably due to lack of suitable spawning habitat in the vicinity of the plant. The extremely unstable sand and gravel bottom of the Chattahoochee River in the vicinity of the plant and the 0.6 to 0.9 meter per second velocities resulting from a narrow river channel and operation of Andrews Dam (approximately 0.5 miles above the upstream sample station) make that portion of the river under study poor spawning habitat especially for those species which build nest or require semi-lentic spawning conditions.

The average number of larvae collected from each sample area, during each sample period, is presented in Table 42. Data presented in the previously referenced table indicates peak spawning (at least for the Cyprinidae) occurs during the months of May and June. Temperature and dissolved oxygen data collected during each of the larval fish sample periods are presented in Tables 43 through 46.

Table 42

Average Number of Larvae at Each Sample Station
for Each Sample Period on the
Chattahoochee River near Farley Nuclear Plant
1975 - 1978

Sample Date	Average Number of Larvae Per Cubic Meter			
	Upstream[1]	Discharge[2]	Downstream[3]	Intake[4]
4/21/75	0.011	0.007	0.013	
5/9/75	0.042	0.017	0.019	
5/19/75	0	0.015	0.014	
6/6/75	0	0	0.005	
6/19/75	0	0.004	0.005	
7/1/75	0	0.005	0	
3/1/76	0	0	0	
3/24/76	0	0	0	
4/7/76	0	0	0	
4/22/76	0	0	0	
5/17/76	0.070	0.143	0.052	
6/1/76	0	0.010	0.012	
6/16/76	0	0	0.005	
6/29/76	0	0	0	
7/12/76	0	0	0	
3/6/77	0	0	0	
3/29/77	0	0	0	
4/12/77	0.015	0.036	0.010	
4/25/77	0.053	0.052	0.038	
5/9/77	0.076	0.018	0.020	
5/24/77	0.009	0.026	0	
6/6/77	0.017	0.021	0.026	
6/20/77	0.005	0.010	0.005	
3/20/78	0	0	0	0
4/6/78	0.004	0	0.005	0
4/19/78	0.030	0.004	0.009	0.021
5/2/78	0.067	0.076	0.028	0.071
5/15/78	0.274	0.204	0.327	0.649
5/30/78	0.170	0.133	0.194	0
6/13/78	0.037	0.044	0.050	0
6/26/78	0.008	0.027	0.010	0.007

1. Upstream Sample Area.....CRM 44.7 - 45.2
2. Discharge Sample Area.....CRM 43.0 - 43.5
3. Downstream Sample Area.....CRM 41.0 - 41.5
4. Intake Sample Area.....CRM 43.8

Table 43

Temperature and Dissolved Oyxgen Data for Larval Fish
Sample Periods on the Chattahoochee River near Farley Nuclear Plant
1975

Date	Time	Location	Temperature (c)/Dissolved Oxygen (ppm) 0 ft.	5 ft.	10 ft.	15 ft.	20 ft.
4/21/75	1520	Upstream	17.4/-	17.5/9.50	17.5/9.50	17.7/9.40	
4/21/75	1545	Discharge	17.4/-	17.4/9.55	17.4/9.55	17.3/9.50	
4/21/75	1800	Downstream	17.9/-	18.0/9.45	18.0/9.40	18.0/9.40	18.0/9.30
5/19/75	1750	Upstream	22.5/-	22.5/7.60	22.5/7.60	22.5/7.60	
5/19/75	1620	Discharge	22.2/-	22.2/8.00	22.5/7.90	22.8/7.90	
5/19/75	1610	Downstream	22.1/-	22.2/7.90	22.1/7.85	22.1/7.85	
6/6/75	1100	Upstream	25.0/-	25.0/6.85	25.0/6.70		
6/6/75	1105	Discharge	25.0/-	25.0/6.85	25.0/6.85		
6/6/75	1250	Downstream	25.2/-	25.2/7.05	25.2/7.05		
6/19/75	1230	Upstream	26.0/7.10	26.0/7.10	26.0/7.10	26.0/7.30	
6/19/75	1200	Discharge	26.9/7.45	25.9/7.45	26.9/7.40	27.0/7.35	
6/19/75	1050	Downstream	26.5/8.25	26.5/8.25	26.5/8.20	26.5/8.15	
7/1/75	1550	Upstream	27.9/7.55	27.9/7.50	27.9/7.55	27.9/7.45	
7/1/75	1540	Discharge	28.1/7.45	28.1/7.45	28.1/7.45	28.1/7.50	
7/1/75	1445	Downstream	28.0/7.75	28.0/7.70	28.0/7.60	28.1/7.60	

Table 44

Temperature and Dissolved Oyxgen Data for Larval Fish
Sample Periods on the Chattahoochee River near Farley Nuclear Plant
1976

Date	Time	Location	Temperature (c)/Dissolved Oxygen (ppm) 0 ft.	3 ft.	5 ft.	10 ft.	15 ft.	20 ft.
3/1/76	1415	Upstream	15.0/11.40	15.0/11.40	15.0/11.40	15.0/11.40		
3/1/76	1425	Discharge	14.5/11.80	14.5/11.80	14.5/11.80	14.5/11.80		
3/1/76	1625	Downstream	15.0/11.60	15.0/11.60	15.0/11.60	15.0/11.40		
3/24/76	1000	Upstream	15.8/10.20	15.8/10.20	15.8/10.20	16.0/10.20		
3/24/76	1010	Discharge	15.8/10.00	15.8/10.00	15.8/10.00	15.8/10.00		
3/24/76	1205	Downstream	15.5/10.30	15.5/10.20	15.5/10.20	15.5/10.10		
4/7/76	1405	Upstream	63.5 (°F)					
4/7/76	1450	Discharge	63.5 (°F)					
4/7/76	-	Downstream	-					
4/22/76	1405	Upstream	20.0/8.10	20.0/8.00	20.2/8.00	20.2/7.90		
4/22/76	1410	Discharge	20.0/8.00	20.0/8.00	20.0/8.00	20.0/8.10		
4/22/76	1500	Downstream	20.0/7.90	20.0/7.90	20.0/7.80	20.0/7.80		
5/17/76	1750	Upstream	21.9/8.90	21.9/8.90	21.9/8.90	21.9/8.90	21.9/8.90	21.9/8.90
5/17/76	1740	Discharge	22.1/8.90	22.1/8.90	22.1/8.90	22.1/8.90	22.1/8.90	22.1/8.90
5/17/76	1730	Downstream	22.1/8.85	22.1/8.85	22.1/8.85	22.1/8.85	22.1/8.85	22.1/8.85
6/1/76	1400	Upstream	22.8/-					
6/2/76	0815	Discharge	22.8/-					
6/2/76	0900	Downstream	22.8/-					
6/16/76	1000	Upstream	24.2/-					
6/16/76	1030	Discharge	24.2/-					
6/17/76	1110	Downstream	24.4/-					
6/29/76	1345	Upstream	25.0/-					
6/29/76	1420	Discharge	25.5/-					
6/29/76		Downtream	-					
7/12/76	1300	Upstream	27.0/7.7	27.0/7.8	27.0/7.8	27.0/8.0	27.0/8.0	
7/12/76	1350	Discharge	27.1/7.4	27.1/7.5	27.3/7.4	27.4/7.5	27.4/7.5	
7/12/76	1400	Downstream	27.5/7.5	27.5/7.5	27.8/7.5	27.8/7.5	27.8/7.6	

Table 45

Temperature and Dissolved Oyxgen Data for Larval Fish
Sample Periods on the Chattahoochee River near Farley Nuclear Plant
1977

Date	Time	Location	Temperature (c)/Dissolved Oxygen (ppm) 0 ft.	3 ft.	5 ft.	10 ft.	15 ft.	20 ft.
3/16/77	0820	Upstream	14.0/10.90	14.0/10.90	14.0/10.90	14.0/10.90	14.0/1090	
3/16/77	0905	Discharge	14.1/11.20	14.1/11.20	14.1/11.20	14.1/11.20	14.1/11.20	
3/16/77	1045	Downstream	14.5/11.20	14.5/11.20	14.5/11.20	14.5/11.10	14.5/11.05	14.5/11.10
3/29/77	1500	Upstream	16.8/8.90	16.8/8.90	16.8/8.90	16.8/8.90	16.8/8.90	
3/29/77	1505	Discharge	16.8/8.80	16.8/8.80	16.8/8.80	16.8/8.70	16.8/8.90	
3/29/77	1700	Downstream	16.9/8.60	16.9/8.70	16.9/8.70	16.9/8.50	16.9/8.50	
4/12/77	1655	Upstream	19.8/9.40	19.8/9.35	19.8/9.40	19.8/9.40	19.8/9.30	
4/12/77	1630	Discharge	19.8/9.60	19.8/9.50	19.8/9.50	19.8/9.55	19.8/9.50	
4/12/77	1615	Downstream	19.9/9.30	19.9/9.30	19.9/9.25	19.9/9.30	19.9/9.15	19.9/9.15
4/25/77	1615	Upstream	19.3/8.80	19.5/8.80	19.7/8.80	19.7/8.70	19.8/8.70	20.0/8.60
4/25/77	1600	Discharge	20.6/8.80	20.7/8.70	20.7/8.70	20.7/8.70	20.7/8.80	20.8/8.60
4/25/77	1445	Downstream	20.5/8.70	20.5/8.60	20.5/8.60	20.5/8.60	20.7/8.60	21.0/8.60
5/9/77	1630	Upstream	23.3/8.90	23.3/8.80	23.3/8.8	23.3/8.7	23.3/8.6	
5/9/77	1540	Discharge	23.0/9.10	23.0/9.10	23.0/9.10	23.1/9.10	23.8/8.8	
5/9/77	1450	Downstream	23.8/8.6	23.8/8.70	23.8/8.70	23.8/8.60	23.8/8.60	
5/24/77	1545	Upstream	24.0/7.70	24.0/7.65	24.0/7.65	24.0/7.65	24.0/7.50	
5/24/77	1550	Discharge(5')	24.1/7.75	24.1/7.75	24.0/7.75	24.0/7.80	24.0/7.80	
5/25/77	1100	Discharge(10')	23.8/8.60	23.2/8.50	23.2/8.50	23.2/8.45	23.2/8.45	
5/25/77	1055	Downstream	23.8/8.05	23.8/7.95	23.8/7.95	23.8/8.10	23.8/8.10	
6/6/77	-	Upstream	-					
6/6/77	1530	Discharge	26.5/8.60	26.5/8.60	26.5/8.60	26.5/8.60	26.5/8.50	26.5/8.50
6/6/77	1510	Downstream	27.0/8.50	27.0/8.50	27.0/8.50	27.0/8.40	27.0/8.40	
6/20/77	1550	Upstream	28.0/7.80	28.0/7.75	28.0/7.75	28.0/7.70	28.0/7.70	
6/20/77	1540	Discharge	28.0/7.75	28.0/7.70	28.0/7.75	28.0/7.70	28.0/7.65	
6/20/77	1530	Downstream	28.1/8.80	28.1/8.75	28.1/8.70	28.1/8.50	28.1/8.55	

Table 46

Temperature and Dissolved Oyxgen Data for Larval Fish
Sample Periods on the Chattahoochee River near Farley Nuclear Plant
1978

Date	Time	Location	Temperature (c)/Dissolved Oxygen (ppm) 0 ft.	3 ft.	5 ft.	10 ft.	15 ft.	20 ft.
3/21/78	1500	Upstream	12.5/10.60	12.5/10.40	12.5/10.40	12.5/10.40	12.5/10.30	
3/21/78	1115	Discharge	12.5/10.50	12.5/10.40	12.5/10.40	12.5/10.40	12.5/10.20	
3/21/78	1100	Downstream	12.7/10.60	12.7/10.60	12.7/10.50	12.7/10.50	12.7/10.40	
4/6/78	1630	Upstream	16.8/9.70	16.8/9.70	16.9/9.65	16.9/9.65		
4/6/78	1720	Discharge	16.8/9.70	16.8/9.70	16.8/9.65	16.8/9.60	16.8/9.60	
4/6/78	1445	Downstream	17.3/9.40	17.3/9.40	17.3/9.40	17.3/9.35	17.3/9.30	
4/19/78	1222	Upstream	18.0/8.60	18.0/8.60	18.0/8.60	18.0/8.55	18.0/8.50	
4/19/78	1236	Discharge	18.0/8.70	18.0/8.70	18.0/8.70	18.0/8.70	18.0/8.60	
4/19/78	1245	Downstream	18.0/8.70	18.0/8.70	18.0/8.75	18.0/8.70	18.0/8.50	
5/2/78	1950	Upstream	18.5/-	18.5/-	18.5/-	18.4/-	18.4/-	18.4/-
5/2/78	1945	Intake	18.5/-	18.5/-	18.5/-	18.5/-	18.5/-	18.5/-
5/2/78	1940	Discharge	18.5/-	18.5/-	18.5/-	18.5/-	18.5/-	18.5/-
5/2/78	1915	Downstream	18.5/-	18.5/-	18.5/-	18.5/-	18.5/-	18.5/-
5/15/78	1608	Upstream	21.5/9.25	21.5/9.25	21.5/9.35	21.5/9.3	21.5/9.25	
5/15/78	1600	Intake	21.5/9.25	21.5/9.25	21.5/9.2	21.8/9.2		
5/15/78	1517	Discharge	21.8/9.2	21.8/9.2	21.8/9.2	21.8/9.2	21.8/9.2	
5/15/78	1505	Downstream	22.0/9.0	22.0/9.0	22.0/9.0	22.0/9.0	22.0/9.0	
5/30/78	1300	Upstream	23.0/8.30	23.0/8.30	23.0/8.30	23.0/8.30		
5/30/78	1515	Intake	23.0/8.10	23.0/7.9	23.0/8.0	23.0/8.0		
5/30/78	1342	Discharge	23.1/8.50	23.1/8.40	23.1/8.40	23.1/8.40	23.1/8.40	
5/30/78	1435	Downstream	23.9/9.20	23.9/9.20	23.9/9.20	23.9/9.05	23.9/9.00	
6/13/78	1700	Upstream	24.0/7.2	24.0/7.2	24.0/7.2	24.0/7.2		
6/13/78	1910	Intake	23.8/7.2	23.8/7.2	23.8/7.2	23.8/7.2		
6/13/78	1615	Discharge	24.7/7.5	24.7/7.5	24.7/7.5	24.7/7.5		
6/13/78	1530	Downstream	24.8/8.3	24.8/8.3	24.8/8.3	24.8/8.3		
6/26/78	1305	Upstream	27.5/7.90	27.5/7.70	27.5/7.70	27.5/7.70	27.5/7.70	
6/26/78	1600	Intake	27.5/7.50	27.5/7.50	27.5/7.45			
6/26/78	1347	Discharge	27.5/7.70	27.5/7.80	27.5/7.80	27.5/7.70	27.5/7.70	
6/26/78	1515	Downtream	27.8/7.90	27.8/7.80	27.8/7.80	27.8/7.80	27.8/7.70	

Conclusions

Larval fish studies conducted in the Chattahoochee River near Farley Nuclear Plant, during the period 1975 through 1978, indicated poor spawning success for fishes other than the Cyprinidae or Shad. Unstable bottom conditions resulting from high river velocities and associated operation of Andrews Lock and Dam are expected to be the primary contributing factors for low larval densities. Data collected during the study did not indicate that any differences among the three areas could be contributed to plant operation, but were closely tied to variations in natural environmental conditions in that portion of the river under study.

Impingement Studies

Impingement monitoring at Farley Nuclear Plant began on December 1, 1977 and extended through November 28, 1978. Fish and other aquatic organisms impinged on intake screens were collected for one continuous 24-hour period every two weeks during the study. Organisms impinged during the 24-hour sample periods were obtained by passing the effluent from the screen wash system through a collection basket. Fish collected during the study were identified and individually counted, wieghed and measured. The weights of fish were obtained as previously noted, with the exception of small shad (Dorosoma sp.). Small shad were weighed in aggregate in order to increase the accuracy of weight determinations for this species.

Impingement data were collected on 27 sample periods during the 12-month study. Impingement data collected during the study are presented in Table 58, which includes the number and weight of each species collected during each of the 24-hour sample periods. Impingement monitoring at Farley Nuclear Plant resulted in the collection of 2,537 aquatic organisms (see totals Table 58). The clam Corbicula Fluminea and the shad (both gizzard and threadfin) were the most numerous of the organisms collected. The Corbicula and shad accounted for 88.37% and 7.96%, respectively, of the total organisms collected during the study. Thus, these two groups represented 96.33% of all organisms collected during the 12-month study.

Aquatic organisms collected during the impingement study were divided into three general categories, which included game species, commercial species and other species. Organisms collected during impingement studies, and classified as previously described, are presented in Table 59.

Table 58

Farley Nuclear Plant

Impingement Record by Sampling Date for Sampling Period December 1, 1977 - November 28, 1978

	1977			1978										
SPECIES	12-01	12-14	12-29	01-11	01-23	02-06	02-20	03-07	03-20	04-03	04-17	05-02	05-15	05-31
BLUEGILL SUNFISH	0*	0	1	0	0	0	2	3	2	0	2	1	2	2
	0.00	0.00	0.02	0.00	0.00	0.00	0.01	0.02	0.01	0.00	0.03	0.01	0.07	0.10
GREEN SUNFISH	0	0	0	1	0	0	0	0	0	0	0	0	0	0
	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
LONGEAR SUNFISH	0	0	0	0	0	0	0	1	0	0	0	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
REDEAR SUNFISH	0	0	0	0	0	0	0	0	1	0	0	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
TOTALS GAME SPECIES	0	0	1	1	0	0	2	4	3	0	2	1	2	2
	0.00	0.00	0.02	0.01	0.00	0.00	0.01	0.03	0.02	0.00	0.03	0.01	0.07	0.10
CHANNEL CATFISH	1	0	0	0	1	0	0	0	1	4	0	2	0	0
	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.02	0.12	0.00	0.04	0.00	0.00
BLUE CATFISH	0	0	0	0	0	0	0	0	0	0	6	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.44	0.00	0.00	0.00
BULLHEAD (SPOTTED)	0	0	0	0	0	0	0	1	3	3	1	8	6	2
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.21	0.46	0.05	0.63	0.48	0.15
WHITE CATFISH	0	0	0	0	0	0	0	0	0	0	0	0	6	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.33	0.00
UNIDENTIFIED CATFISH	0	0	0	0	0	0	0	0	0	0	0	0	3	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.00
TOTALS COMMERCIAL SPECIES	1	0	0	0	1	0	0	1	4	7	7	10	15	2
	0.07	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.23	0.58	0.49	0.67	0.88	0.15
GIZZARD SHAD	1	1	0	1	0	2	20	5	7	1	0	0	0	0
	0.18	0.06	0.00	0.27	0.00	0.02	1.30	0.35	0.83	0.09	0.00	0.00	0.00	0.00
THREADFIN SHAD	5	10	4	1	22	56	43	5	11	0	0	1	0	0
	0.04	0.12	0.02	0.01	0.17	1.03	1.01	0.18	0.36	0.00	0.00	0.02	0.00	0.00
GOLDEN SHINER	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
TREE FROG	1	0	0	1	0	0	0	0	0	0	0	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
FRESHWATER MUSSEL	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
CORBICULA	106	562	299	6	11	1	6	0	2	0	3	0	29	44
	0.56	3.14	1.71	0.03	0.05	0.01	0.03	0.00	0.01	0.00	0.05	0.04	0.17	0.17
TOTALS OTHER SPECIES	113	573	303	9	33	59	69	10	20	1	3	9	29	44
	0.78	3.32	1.73	0.31	0.22	1.06	2.34	0.53	1.20	0.09	0.05	0.06	0.17	0.17

*Upper and lower values in each column represent total numbers and weight (lbs.), respectively.

Table 58 - cont'd

Farley Nuclear Plant

Impingement Record by Sampling Date for Sampling Period December 1, 1977 - November 28, 1978

1978

SPECIES	06-13	06-26	07-12	07-25	08-09	08-22	09-05	09-19	10-02	10-17	10-31	11-13	11-28	TOTAL
BLUEGILL SUNFISH	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.10	0 0.00	16 0.17
GREEN SUNFISH	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.01
LONGEAR SUNFISH	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.01
REDEAR SUNFISH	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.01
TOTALS GAME SPECIES	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.10	0 0.00	19 0.19
CHANNEL CATFISH	0 0.00	0 0.00	0 0.00	0 0.00	2 0.11	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	11 0.17
BLUE CATFISH	8 0.35	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	14 0.79
BULLHEAD (SPOTTED)	0 0.00	3 0.12	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.09	24 2.20
WHITE CATFISH	0 0.00	1 0.07	0 0.00	0 0.00	0 0.00	0 0.00	2 0.23	0 0.00	0 0.00	1 0.01	1 0.10	0 0.00	0 0.00	11 0.74
UNIDENTIFIED CATFISH	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	3 0.07
TOTALS COMMERCIAL SPECIES	8 0.35	4 0.19	0 0.00	0 0.00	2 0.11	0 0.00	2 0.23	0 0.00	0 0.00	1 0.01	1 0.10	0 0.00	1 0.09	67 4.17
GIZZARD SHAD	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	39 3.10
THREADFIN SHAD	0 0.00	2 0.01	0 0.00	1 0.01	0 0.00	0 0.00	3 0.03	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	164 3.01
GOLDEN SHINER	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.03	0 0.00	0 0.00	1 0.01
TREE FROG	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.00	0 0.00	1 0.00	0 0.00	4 0.00
FRESHWATER MUSSEL	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	0 0.00	1 0.03	1 0.01	2 0.04
CORBICULA	50 0.26	308 1.11	56 0.15	31 0.07	424 0.94	19 0.05	12 0.03	243 1.15	16 0.07	1 0.01	1 0.01	3 0.01	1 0.01	2242 9.94
TOTALS OTHER SPECIES	50 0.26	310 1.12	56 0.15	32 0.08	424 0.94	19 0.05	15 0.06	243 1.15	16 0.07	2 0.01	2 0.04	5 0.04	2 0.02	2451 14.02

Table 59

Summary of Impingement Data for
Farley Nuclear Plant Including Total Numbers
and Weights of Species Collected
Percent by Number, Percent by Weight and
Estimated Daily and Annual Impingement Rates
December, 1977 - November, 1978

COMMON NAME	SCIENTIFIC NAME	IMPINGEMENT SAMPLE DATA TOTAL NUMBER	TOTAL POUNDS	WEIGHT GRAMS	% BY NUMBER	% BY WEIGHT	ESTIMATED IMPINGEMENT RATE BY NUMBER DAILY	ANNUAL	BY WEIGHT (LBS) DAILY	ANNUAL
BLUEGILL SUNFISH	LEPOMIS MACROCHIRUS	16	0.37	168.	0.63	1.80	0.62	228.	0.01	5.29
GREEN SUNFISH	LEPOMIS GULOSUS	1	0.01	5.	0.04	0.05	0.03	13.	0.00	0.13
LONGEAR SUNFISH	LEPOMIS MEGALOTIS	1	0.01	5.	0.04	0.05	0.04	14.	0.00	0.14
REDEAR SUNFISH	LEPOMIS MICROLOPHUS	1	0.01	5.	0.04	0.05	0.04	14.	0.00	0.14
TOTALS GAME SPECIES		19	0.40	181.	0.75	1.94	0.73	268.	0.02	5.69
CHANNEL CATFISH	ICTALURUS PUNCTATUS	11	0.37	168.	0.43	1.80	0.40	147.	0.01	4.72
BLUE CATFISH	ICTALURUS FURCATUS	14	0.79	358.	0.55	3.84	0.54	197.	0.03	11.20
BULLHEAD (SPOTTED)	ICTALURUS SERRACANTHUS	28	2.20	998.	1.10	10.69	1.06	388.	0.08	30.46
WHITE CATFISH	ICTALURUS CATUS	11	0.74	336.	0.43	3.59	0.42	155.	0.03	10.33
UNIDENTIFIED CATFISH	ICTALURUS SP	3	0.07	32.	0.12	0.34	0.12	42.	0.00	0.99
TOTALS COMMERCIAL SPECIES		67	4.17	1892.	2.64	20.25	2.54	929.	0.16	57.69
GIZZARD SHAD	DOROSOMA CEPEDIANUM	38	3.10	1406.	1.50	15.06	1.46	535.	0.12	42.30
THREADFIN SHAD	DORSOMA PETENENSE	164	3.01	1365.	6.46	14.62	6.22	2270.	0.12	42.34
GOLDEN SHINER	NOTEMIGONUS CRYSOLEUCAS	1	0.03	14.	0.04	0.15	0.04	14.	0.00	0.41
TREE FROG	HYLA CINEREA	4	0.	0.	0.16	0.	0.13	48.	0.	0.
FRESHWATER MUSSEL		2	0.04	19.	0.08	0.19	0.06	22.	0.00	0.50
CORBICULA	CORBICULA FLUMINEA	2242	9.84	4463.	88.37	47.79	84.57	30891.	0.37	134.62
TOTALS OTHER SPECIES		2451	16.02	7267.	96.61	77.80	92.48	33779.	0.60	220.16
TOTALS ALL SPECIES		2537	20.59	9340.	100.00	100.00	95.76	34976.	0.78	283.55

The previously referenced table includes the total number and weight of each species collected, as well as the estimated daily and annual impingement rates for species identified. Data presented in Table 59 shows that estimated annual impingement rates for game, commercial, and other species were determined to be 268, 929 and 33,779, respectively. The estimated annual impingement rate of 33,779 organisms, as shown for the classification of other species, includes an impingement estimate of 30,891 for Corbicula. Thus, the estimated annual impingement rate for all species of fish is 4,016. The estimated annual weight of fish impinged on intake screens was determined to be 5.69 pounds (2.58 Kg) for game species, 57.69 pounds (26.22 Kg) for commercial species, and 220.16 pounds (99.86 Kg) for other species. The estimated annual weight for all organisms impinged on intake screens was determined to be 283.55 pounds (128.62 Kg).

The distribution of fishes and shellfish over the 27 sample periods is presented in Figure 23. Most of the fish collected during the impingement study occurred during the late winter and spring. The impingement of fish during the previously mentioned period has been seen at other power plants throughout the State and is thought to be related to increased movement of fishes associated with feeding and spawning behavior. Variations in impingement rates for Corbicula (see Figure 53) were very pronounced over the 12-month study and are without explanation.

The withdrawal of water through the intake system at Farley Nuclear Plant is characterized in Figure 54. Data presented in the previously referenced table indicates the minimum and maximum rates of water withdrawal which could have occurred during each of the impingement sample periods. Average flow rates for each 24-hour period could not be obtained since available information on pump operation indicated the number of pumps running in continuous mode and the number of pumps set in the automatic mode. Thus,

Table 53

FISH AND SHELLFISH COLLECTED DURING
EACH 24-HOUR SAMPLE PERIOD

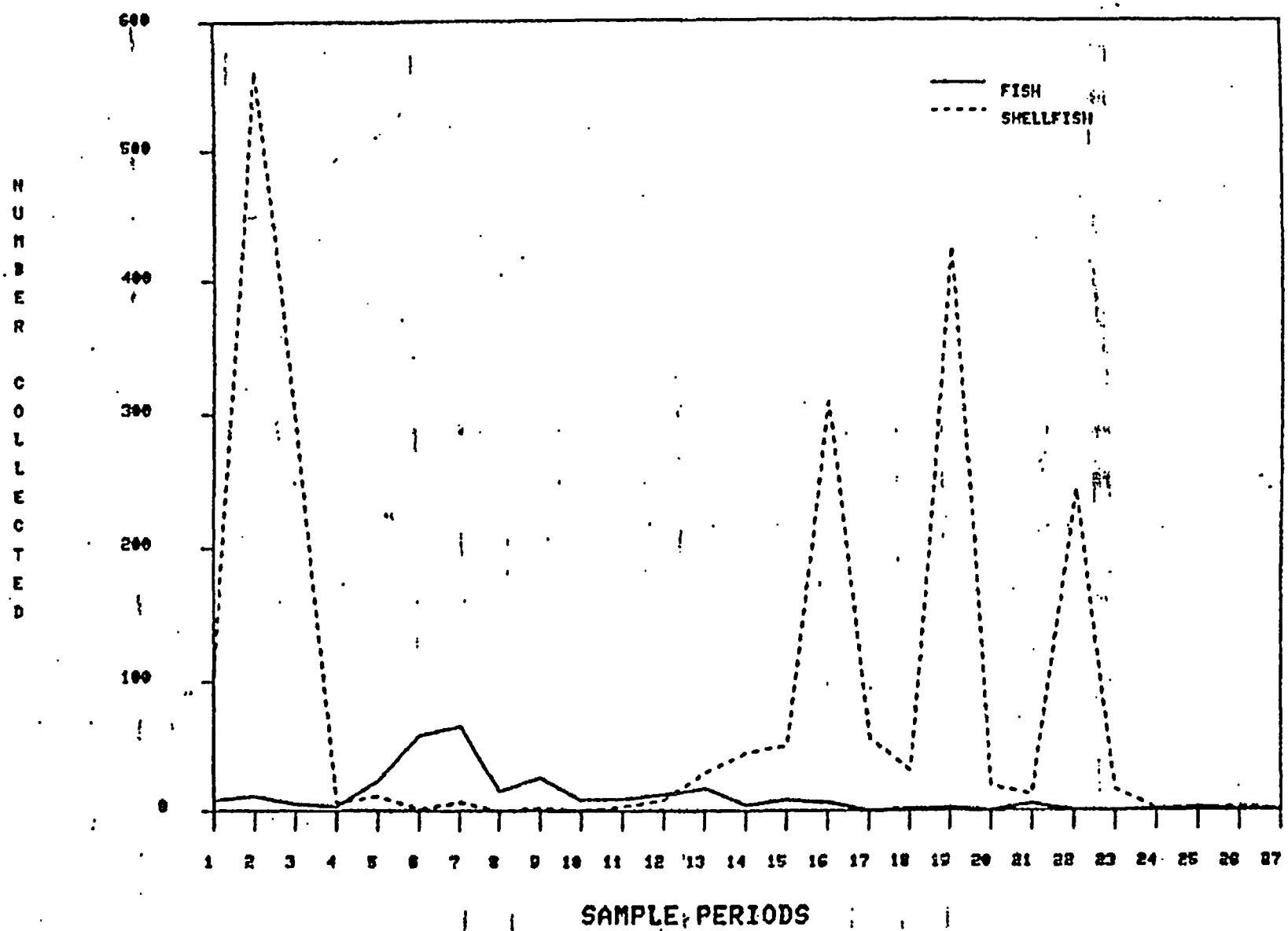
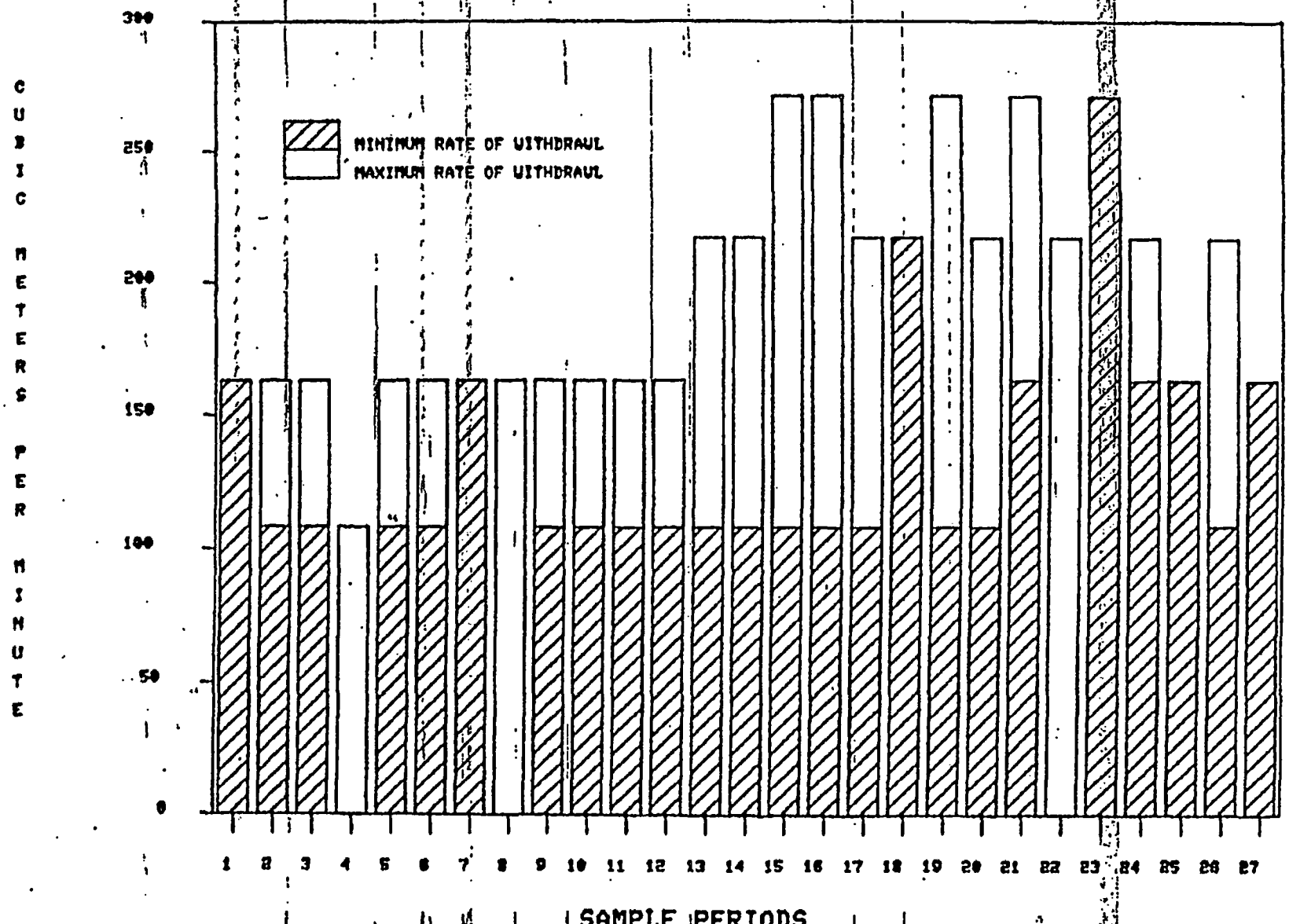


Table 54

MINIMUM AND MAXIMUM RATES OF RIVER WATER WITHDRAWL
DURING IMPINGEMENT SAMPLE PERIODS



data in Figure 54 shows flows known to occur (minimum flows) and flows which could have occurred (maximum flows), based on the number of pumps on automatic. Data presented in Figure 54 is also shown in Table 60, which also includes sample dates and periods. The rate of water withdrawal, as previously shown, did not appear to be related to impingement rates for fish. Periods with high flow rates typically had lower fish impingement rates. The impingement of Corbicula, especially during the latter part of the study, did coincide with periods of high flow rates. However, the peak impingement period for Corbicula occurred during the second sample period when flows were low.

The results of impingement studies at the Farley Nuclear Plant indicate that the removal of fish and other aquatic organisms from the Chattahoochee River is sufficiently low that no significant harm to the aquatic communities is expected to occur. Impingement rates for game species were determined to be extremely low. Estimated daily impingement rates for game species of 0.73 is less than 2% of the daily creel limit per fisherman for sunfish, as set by the Alabama Department of Conservation and Natural Resources. The impingement rate for commercial species was also considered to be low, with an estimated daily rate of 2.54 fish. Impingement rates for shad and Corbicula, which represented the majority of organisms collected, were lower than would be expected based on the abundance of these organisms in the vicinity of the plant.

Table 60

Intake Minimum and Maximum Flows
During Twenty-Four Hour Impingement Studies

Date Study Started	Sample Period	Minimum Flow (M^3/min)	Maximum Flow (M^3/min)
12/1/77	1	162.8	162.8
12/14/77	2	108.5	162.8
12/29/77	3	108.5	162.8
1/11/78	4	0	108.5
1/23/78	5	108.5	162.8
2/6/78	6	108.5	162.8
2/20/78	7	162.8	162.8
3/7/78	8	0	162.8
3/20/78	9	108.5	162.8
4/3/78	10	108.5	162.8
4/18/78	11	108.5	162.8
5/2/78	12	108.5	162.8
5/15/78	13	108.5	217.0
5/30/78	14	108.5	217.0
7/13/78	15	108.5	271.3
6/26/78	16	108.5	271.3
7/12/78	17	108.5	217.0
7/25/78	18	217.0	217.0
8/9/78	19	208.5	271.3
8/22/78	20	108.5	217.0
9/5/78	21	162.8	271.3
9/18/78	22	0	217.0
10/2/78	23	271.3	271.3
10/17/78	24	162.8	217.0
10/11/78	25	162.8	162.8
11/13/78	26	108.5	217.0
11/28/78	27	162.8	162.8

TABLE FP1-8 (CONT'D)

BENTHOS: CLAMS - PREOPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NO. NPF-2, HOUSTON COUNTY, ALABAMA
January, 1975 - June, 1977[c]

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Nominal LLD[a]	All Indicator Locations Mean (f)[b] Range[b]	Indicator Location with Highest Annual Mean: Name Distance and Direction	Indicator Location with Highest Annual Mean: Mean (f)[b] Range[b]	Control Locations Mean (f)[b] Range[b]
	^{208}Tl	25	< LLD	---	---	< LLD
	^{212}Pb	75	< LLD	---	---	< LLD
	^{214}Pb	80	< LLD	---	---	< LLD
	^{212}Bi	35	-	---	---	< LLD
	^{214}Bi	50	< LLD	---	---	< LLD
	^{226}Ra	750	< LLD	---	---	< LLD
	Radio-strontium 10					
	^{89}Sr	30	40 (4/5) (11 - 56)	Chattahoochee River River Mile - 14	40 (4/5) (11 - 56)	8 (2/5) (5 - 10)
	^{90}Sr	30	95 (4/5) (45 - 210)	Chattahoochee River River Mile - 14	95 (4/5) (45 - 210)	65 (5/5) (30 - 120)

(a) Mean LLD Values Using Blank Backgrounds (A Priori), Calculated Per HASL-300.
(b) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements At Specified Locations in Parenthesis (f).
(c) Semi-Annual Sampling, Preoperational Period Ending June, 1977.

TABLE FP1-8

BENTHOS: CLAMS - PREOPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NO. NPF-2, HOUSTON COUNTY, ALABAMA
January, 1975 - June, 1977[c]

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Nominal LLD[a]	All Indicator Locations Mean (f)[b] Range[b]	Indicator Location with Highest Annual Mean: Name, Distance and Direction	Indicator Location with Highest Annual Mean: Mean (f)[b] Range[b]	Control Locations Mean (f)[b] Range[b]
River Clams (Tissue) pCi/kg (Wet Weight)	Gamma Spec 10					
	^{7}Be	160	< LLD	—	—	—
	^{40}K	300	460 (3/5) (350 - 580)	Chattahoochee River River Mile - 14	460 (3/5) (350 - 580)	380 (4/5) (300 - 580)
	^{95}Zr	25	—	—	—	< LLD
	^{95}Nb	25	< LLD	—	—	< LLD
	^{106}Ru	180	< LLD	—	—	< LLD
	^{124}Sb	25	< LLD	—	—	—
	^{125}Sb	85	< LLD	—	—	—
	^{137}Cs	25	< LLD	—	—	< LLD
	^{144}Ce	400	—	—	—	< LLD

TABLE PO1-8

BENTHOS: CLAMS - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NO. NPF-2, HOUSTON COUNTY, ALABAMA
July - December, 1977[d]

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed	Nominal LLD[a]	All Indicator Locations[c] Mean (f)[b] Range[b]	Indicator Location with Highest Annual Mean: Name, Distance and Direction	Indicator Location with Highest Annual Mean: Mean (f)[b] Range[b]	Control Location Mean (f)[b] Range[b]
River Clams (Tissue) pCi/kg (Wet Weight)	Gamma Spec 2					
	^{40}K	300	340 (1/1) —	Chattahoochee River River Mile - 14	340 (1/1) —	400 (1/1) —
	^{58}Co	25	< LLD	—	—	—
	^{137}Cs	25	< LLD	—	—	18 (1/1) —
	^{212}Pb	75	< LLD	—	—	< LLD
	^{214}Pb	80	< LLD	—	—	—
	^{226}Ra	750	< LLD	—	—	< LLD
	^{228}Ac	130	—	—	—	< LLD
	Radio-strontium 2					
	^{89}Sr	30	< LLD	—	—	< LLD
	^{90}Sr	30	300 (1/1) —	Chattahoochee River River Mile - 14	300 (1/1) —	230 (1/1) —

(a) Mean LLD Values Using Blank Backgrounds (A Priori) Calculated Per HASL-300.
(b) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurement at Specified Locations in Parenthesis (f).
(c) No Nonroutine Anomalous Measurement Reports Were Made During This Operational Period.
(d) Semi-Annual Sampling, Operational Period Starting July, 1977. Samples Were Taken Subsequent to Criticality on August 9, 1977.

TABLE F02-8

BENTHOS: CLAMS - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NO. NPF-2, HOUSTON COUNTY, ALABAMA
January - December 1978

Medium or Pathway Sampled (Unit of Measurement)	Type and Total Number of Analyses Performed[d]	Nominal MDC[a]	All Indicator Locations Mean (f)[b] Range[b]	Indicator Location with Highest Annual Mean: Name, Distance and Direction	Indicator Location with Highest Annual Mean: Mean (f) Range[b]	Control Location Mean (f)[b] Range[b]
Benthos (Clams) (pCi/kg-Wet Tissue)	Gamma Spec 2					
	^{137}Cs	100	< MDC	----	---	< MDC
	Radiostrontium 2					
	^{89}Sr	10	< MDC	----	---	< MDC
	^{90}Sr	5	51 (1/1) ---	Chattahoochee River River Mile - 14	51 (1/1) ---	42 (1/1) ---

(a) Minimum detectable concentrations from Farley ETS Table 3.2-3 used as basis for reporting measurement data.
(b) Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations in parenthesis (f).
(c) No nonroutine anomalous measurements were reported during this period.
(d) Samples for first half of 1978 were lost in transit.

TABLE F03-8

BENTHOS: CLAMS - OPERATIONAL RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NO. NPF-2, HOUSTON COUNTY, ALABAMA
January - December 1979[a]

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC[b]	ALL INDICATOR LOCATIONS MEAN (f)[c] RANGE[c]	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN: NAME DISTANCE AND DIRECTION	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (f)[c] RANGE[c]	COMMUNITY LOCATIONS MEAN (f)[c] RANGE[c]	CONTROL LOCATIONS MEAN (f)[c] RANGE[c]
Benthos (Clams) (pCi/kg - Wet Tissue)	Gamma Spec 4						
	K-40	157.	< MDC	—	—	—	< MDC
	Cs-137	4.50	< MDC	—	—	—	—
	Pb-212	2.50	< MDC	—	—	—	—
	Bi-214	6.75	< MDC	—	—	—	< MDC
	Radiostrontium 4						
	Sr-89	5.55	< MDC	—	—	—	< MDC
	Sr-90	5.30	< MDC	—	—	—	4.50 (1/2)

(a) No nonroutine anomalous measurements were reported during this period.
(b) Mean minimum detectable concentrations calculated per equation 1 of this report using actual sample backgrounds (a posteriori) for gamma-ray spectroscopy and blank backgrounds (a priori) for radiostrontium.
(c) Mean and range based upon detectable measurements only. Fraction of detectable measurements at specified locations in parenthesis (f).

TABLE F04-8

BENTHOS: CLAMS - OPERATIONAL RADIOACTIVITY SUMMARY

(43)

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NO. NPF-2, HOUSTON COUNTY, ALABAMA
January - December, 1980[a]

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC[b]	ALL INDICATOR LOCATIONS MEAN (f)[c] RANGE[c]	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN: NAME DISTANCE AND DIRECTION	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (f)[c] RANGE[c]	COMMUNITY LOCATIONS MEAN (f)[c] RANGE[c]	CONTROL LOCATIONS MEAN (f)[c] RANGE[c]
Benthos (Clams) (pCi/kg - Wet Tissue)	Gamma Spec 4						
	K-40	174.	1400. (1/2) —	Chattahoochee River River Mile, 10-42	1400. (1/2) —	—	663. (1/2) —
	Cs-134	22.0	40.0 (1/2) —	Chattahoochee River River Mile, 10-42	40.0 (1/2) —	—	—
	Cs-137	34.5	< MDC	—	—	—	< MDC
	Tl-208	28.0	—	—	—	—	44.0 (1/2) —
	Pb-212	32.0	32.0 (1/2) —	Chattahoochee River River Mile, 10-42	32.0 (1/2) —	—	—
	Bi-214	50.0	—	—	—	—	59.0 (1/2) —
	Pb-214	39.0	48.0 (1/2) —	Chattahoochee River River Mile, 10-42	48.0 (1/2) —	—	—
	Radiostrontium 4						
	Sr-89	2.77	7.60 (1/2) —	Chattahoochee River River Mile, 10-42	7.60 (1/2) —	—	< MDC
	Sr-90	1.00	8.60 (2/2) (2.10 - 15.1)	Chattahoochee River River Mile, 10-42	8.60 (2/2) (2.10 - 15.1)	—	5.05 (2/2) (3.10 - 7.00)

(a) No Nonroutine Anomalous Measurements Were Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Actual Sample Backgrounds (A Posteriori) for Gamma-Ray Spectroscopy and Blank Backgrounds (A Priori) for Radiostrontium.
(c) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).

TABLE [illegible]

BENTHOS: CLAMS - OPERATI[illegible] RADIOACTIVITY SUMMARY

JOSEPH M. FARLEY NUCLEAR PLANT
LICENSE NOS. NPF-2 AND NPF-8, HOUSTON COUNTY, ALABAMA
January - December 1981[illegible]

MEDIUM OR PATHWAY SAMPLED (UNIT OF MEASUREMENT)	TYPE AND TOTAL NUMBER OF ANALYSES PERFORMED	NOMINAL MDC[b]	ALL INDICATOR LOCATIONS MEAN (f)[c] RANGE[c]	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN: NAME DISTANCE AND DIRECTION	INDICATOR LOCATION WITH HIGHEST ANNUAL MEAN: MEAN (f)[c] RANGE[c]	COMMUNITY LOCATIONS MEAN (f)[c] RANGE[c]	CONTROL LOCATIONS MEAN (f)[c] RANGE[c]
Benthos (Clams) (pCi/kg - Wet Tissue)	Gamma Spec 4						
	K-40	116.	1490. (1/2) ----	Chattahoochee River River Mile, 10-42	1490. (1/2) ----	----	1160. (2/2) (502. - 1820.)
	Nb-95	16.0	17.0 (1/2) ----	Chattahoochee River River Mile, 10-42	17.0 (1/2) ----	----	----
	Tl-208	40.0	----	----	----	----	41.0 (1/2) ----
	Pb-212	67.0	----	----	----	----	87.0 (1/2) ----
	Bi-214	38.0	60.0 (1/2) ----	Chattahoochee River River Mile, 10-42	60.0 (1/2) ----	----	----
	Pb-214	51.0	80.0 (1/2) ----	Chattahoochee River River Mile, 10-42	80.0 (1/2) ----	----	----
	Ac-228	113.	136. (1/2) ----	Chattahoochee River River Mile, 10-42	136. (1/2) ----	----	158. (1/2) ----
	Radiostrontium 2						
	Sr-89	3.10	< MDC	----	----	----	< MDC
	Sr-90	1.40	< MDC	----	----	----	< MDC

(a) No Nonroutine Anomalous Measurements Were Reported During This Period.
(b) Mean Minimum Detectable Concentrations Calculated Per Equation 1 of This Report Using Actual Sample Backgrounds (A Posteriori) for Gamma-Ray Spectroscopy and Blank Backgrounds (A Priori) for Radiostrontium.
(c) Mean and Range Based Upon Detectable Measurements Only. Fraction of Detectable Measurements at Specified Locations in Parenthesis (f).

Table 4-2

Reporting Levels (RL)

Analysis	Water (pCi/l)	Airborne Particulate or Gases (fCi/m3)	Fish (pCi/kg) wet	Milk (pCi/l)	Grass or Leafy Vegetation (pCi/kg) wet
H-3	20,000 (a)				
Mn-54	1000		30,000		
Fe-59	400		10,000		
Co-58	1000		30,000		
Co-60	300		10,000		
Zn-65	300		20,000		
Zr-95	400				
Nb-95	700				
I-131	2 (b)	900		3	100
Cs-134	30	10,000	1000	60	1000
Cs-137	50	20,000	2000	70	2000
Ba-140	200			300	
La-140	100			400	

(a) This is the 40 CFR 141 value for drinking water samples. If no drinking water pathway exists, a value of 30,000 may be used.

(b) If no drinking water pathway exists, a value of 20 pCi/l may be used.

Atmospheric nuclear weapons tests from the mid 1940's through 1980 distributed man-made nuclides around the world. The most recent atmospheric tests in the 1970's and in 1980 had a significant impact upon the radiological concentrations found in the environment prior to and during preoperation, and the earlier years of operation. Some long-lived radionuclides, such as Cs-137, continue to have some impact.

Significant upward trends also followed the Chernobyl incident, which began on April 26, 1986.

In accordance with ODCM 4.1.1.2.1, deviations from the required sampling schedule are permitted if samples are unobtainable due to hazardous conditions, unavailability, inclement weather, equipment malfunction or other just reasons. Deviations from conducting the REMP as described in Table 2-1 are summarized in Table 4-3 along with their causes and resolutions.