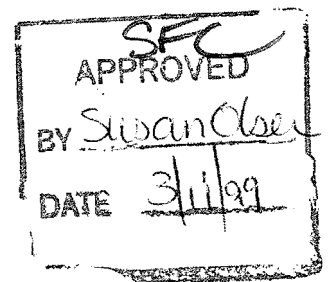


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**Final Report for the period August 1, 1993 to September 30, 1998
for the project:**

**Anadromous Fish Restoration -
State of Virginia**

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Objectives

The main objectives of the study "Anadromous Fish Restoration" are to supplement existing state, federal, and local efforts to restore anadromous fish populations throughout Virginia. Direct components of this study are:

1. To provide funding for a Virginia Fish Passage Coordinator position to facilitate the projects under this grant agreement (Coordinator, Alan Weaver, hired on December 1, 1993).
2. To provide funding for the design and construction of a notch at Williams Island Dam on the James River in Richmond (completed in November 1993).
3. To provide a portion of the funding needed for construction of a vertical slot fishway on Boshier Dam (James River). NOTE: Original objective before modifications was to provide a Denil fishway at Ashland Mill Dam on the South Anna River. This grant was then amended for the design and construction of a Denil fishway on Ruffins Pond Dam (Massaponax Creek, a tributary of the Rappahannock River). This grant was amended again to fund a portion of the Boshier fishway project which was near completion at the end of this grant period.
4. To provide funding support for monitoring activities by the Virginia Department of Game & Inland Fisheries (VDGIF) for anadromous fishes within waters of the state.
5. To provide funding support for other related restorative activities by the VDGIF, such as trap and transport of river herring, and American shad brood collection, rearing, transport, and stocking throughout the state.

Job I: Williams Island Dam Notch

Job Objective: To provide a fish passage notch at Williams Island Dam (3' to 7') on the James River.

The VDGIF acted in an advisory capacity and the City of Richmond hired Greely and Hansen Engineers to complete the final design of a 30' wide by 2.5' deep notch using a conceptual plan provided by the USFWS. Final design costs were \$17,000. All necessary permits were received and the lowest bidder, Southwood Builders of Ashland, began construction of the notch on October 12, 1993. This required the use of a "porta-dam" to control water in the work area so that the notch could be cut into the dam where it is 5' in height. The project was completed on November 12, 1993 for a total construction cost of \$110,000 (\$70,000 of which was from this grant). Stainless steel stop log slots were included in case low water conditions ever threaten the City's water supply.

A dedication ceremony hosted by the VDGIF, the City of Richmond, and the Lower James River Association was held on December 13, 1993. Speakers for the event were the Secretary of Natural Resources, the Mayor of Richmond, the City Manager of Richmond, the Executive Director of the Lower James River Association, and the Deputy Director of the VDGIF. Funding and research efforts (e.g. Virginia Commonwealth University) leading to the completion of this project were recognized. Other government officials and private citizens who supported this project were also present at the ceremony.

American shad were found in small numbers above Williams Island Dam at Boshier Dam prior to notch construction, but only at a small window of flow conditions that would allow shad to find their way over the dam. Now, with the notch, migratory fish can pass Williams Island Dam at all normal spring flow conditions. Since construction of the notch, American shad, and a few herring, continue to be found at Boshier Dam each spring. The notch reopened 2.6 miles of historic spawning habitat on the James River.

Job II: Ashland Mill Dam Fishway

Job Objective: To construct a fish passage facility on the South Anna River at Ashland Mill Dam.

Amendment No. 1: Amended January 1, 1995 to use the funding for design and construction of a fishway at Ruffins Pond Dam on Massaponax Creek (Rappahannock Basin) and to extend the funding through December 31, 1995.

Amendment No. 2: Amended on January 1, 1996 to extend the funding through December 31, 1996.

Amendment No. 3: Amended on January 1, 1997 to extend the funding through June 30, 1997. Design and permitting costs were approximately \$27,500.

Amendment No. 4: Amended on July 1, 1997 to use the remaining funds for this job toward construction of a vertical slot fishway at Boshier Dam on the James River. Funding was also extended through September 30, 1998.

Ashland Mill Dam, 13', South Anna River (York), Hanover County

The dam provides direct hydropower for the operation of Ashland Roller Mills. The VDGIF attempted to work cooperatively with the owner of this facility to design and construct a Denil fishway. The design was to be based on a conceptual plan provided by USFWS engineers. Unfortunately, the owner was unwilling to cooperate and claimed financial difficulty to the point that he could not even spend the necessary time to participate in the design and construction process. Additionally, the VDGIF could not guarantee coverage of 100% of final costs which was unacceptable to the owner. Because of these major difficulties, the VDGIF

requested, and was granted, permission in 1995 to use the funding toward another priority fish passage project at Ruffins Pond Dam on Massaponax Creek.

During the course of the effort at Ashland Mill Dam, the Center for Historic Preservation at Mary Washington College conducted an historical survey of the dam for the VDGIF. If this project were ever to proceed, fishway construction would not interfere with any historically significant sites and/or structures. The VDGIF does plan to pursue this project in the future. Passage at Ashland Mill Dam would reopen nine miles of the South Anna River up to the Ashland water supply dam which blocks and additional 28 miles up to the next dam.

Ruffins Pond Dam, 16', tidal tailwater, Massaponax Creek, Spotsylvania County

When Amendment No. 2 was completed, the VDGIF executed a Grant Contract with Tarmac America, Inc., owner of the dam, to begin the design phase. Tarmac hired J.K. Timmons & Associates to complete the design and to perform construction management duties. Design and permitting costs were approximately \$27,500. The VDGIF and the USFWS approved the design and construction bids were received in April 1997. Unfortunately, both bids were almost twice the budgeted amount for the fishway. Several revisions to the plans were discussed that could significantly reduce construction costs and the bidding companies offered new cost estimates based on potential modifications.

The lowest final bid for construction (approximately \$370,000) of the Denil fishway exceeded the project budget by \$162,000. Tarmac America, Inc. was willing to donate construction materials but there was still a funding shortfall of approximately \$125,000 which Tarmac was unable to provide at that time. With no additional funding sources available, this project was postponed until sufficient funding strategies can be developed. Tarmac is willing to work with the VDGIF in the future to complete this project which would reopen a total of eight miles of historic herring spawning habitat (3.5 on Massaponax Creek and 4.5 on a significant tributary).

This grant was due to expire on June 30, 1997. The Boshier Dam vertical slot fishway project, at that time, still required additional funding to award a contract so the VDGIF filed a grant extension and amendment request to move the remaining unobligated federal balance to the Boshier project. Both the EPA Bay Program and the National Marine Fisheries Service agreed to honor this request and the amendment and extension was obtained. The remaining funds were used for a portion of the total construction cost of the Boshier fishway prior to the expiration date of this grant.

Boshier Dam Vertical Slot Fishway, 10', James River, Henrico County

The process leading up to the construction phase is discussed in the final report for Grant NA46FU0284 (March 31, 1998). When Amendment No. 4 was completed, remaining funds (\$215,283) under this job became available for use on the construction phase of the Boshier fish passage facility. Fishway construction at Boshier Dam officially began on June 23, 1997.

is much more difficult to measure the contribution of this project to the recovery effort other than to collect juvenile herring above Boshier Dam prior to the fishway being opened. While no juvenile herring were collected above the dam in 1994 or 1995, there was some initial success collecting a few juvenile herring above the dam in 1996 and 1997 (further detail can be found in final reports for subsequent grant periods).

Job IV: Anadromous Fish Monitoring

Job Objective: To monitor anadromous fish populations of coastal and piedmont streams.

This report covers the 1994 spawning run and juvenile outmigration season.

American shad data collected from egg taking procedures is covered in detail in the 1994 annual report for the American shad project (Attachment A). Data includes total number collected, sex ratio, spawning condition, length and weight, etc.

A limited amount of effort was expended on monitoring alone for shad and herring runs on Virginia tributaries. Most of the effort in 1994 was expended on the new shad hatchery operation and on trap and transport of river herring. Outside of trap and transport, limited electrofishing efforts resulted in the collection of blueback herring on the James and Rappahannock rivers. Additionally, one American shad was collected on the South Anna River below Ashland Mill Dam. The 1994 effort simply documented the presence of the anadromous runs but did not supply sufficient data to comment on the relative "strength" of the 1994 runs. The data are electronically stored and will be used in trend analysis along with data from subsequent years.

Other Fish Passage Projects

Embrey Dam, 22', Rappahannock River, Stafford County

In 1994, an historical assessment of the dam and surrounding area was conducted by the Center for Historical Preservation of Mary Washington College (hired by the VDGIF). The Virginia Department of Historic Resources eventually approved this report which is a vital document in the decision making process for fish passage at Embrey Dam. Essentially, the report highlights the historical significance of Embrey Dam and the crib dam that preceded it. The report does not directly prohibit removal of the dam. Some form of historical mitigation will need to be determined as final fish passage plans are developed.

In 1994, the VDGIF worked with the Virginia Department of Environmental Quality (VDEQ) to test the sediments trapped by Embrey Dam. The original contractor was unable to perform the work. Universal Laboratories acquired Bionetics (original contractor) and subcontracted the work to Exmar. Exmar, using a vibracorer sampler to assure that the entire depth of sediment was sampled in each core, took sediment cores in October 1994. Six randomly

selected cores were processed by Universal Laboratories and shipped to Spectralytix Laboratories for analysis. The results were analyzed by the VDEQ and it was determined that the sediments behind Embrey Dam are non-toxic and would not be classified as hazardous material. This information has played a vital role in the ongoing decision making process concerning fish passage at Embrey Dam. More information on this project can be found in subsequent grant final reports.

Abutment Dam, 3' to 10', Appomattox River, Chesterfield and Dinwiddie counties

The Abutment Dam is located 5.7 miles upstream of Harvell Dam on the Appomattox River. The existing fishway is a pool and weir design and is therefore non-functional for shad and herring. Passage at this dam would reopen 1.3 miles of the river up to Brasfield Dam (Lake Chesdin). A fish elevator (FERC requirement) is 90% complete at Brasfield and completed passage would reopen an additional 120.1 miles of the Appomattox. In September 1994, the Fish Passage Coordinator and the VDGIF Surveyor conducted a survey of the Abutment Dam. The survey was submitted to the USFWS fish passage engineers and was used in the preparation of a conceptual fish passage plan.

Training

Alan Weaver, Price Smith, Dean Fowler and David Dowling of the VDGIF Fish Division attended the Fish Passage Workshop sponsored by the USFWS in Holyoke Massachusetts from June 13 to June 17, 1994. These VDGIF personnel received training in fish passage design, operation and monitoring techniques and they toured several fish passage facilities in the area.

Alan Weaver and Price Smith attended the Fish Passage Workshop hosted by the Maryland Department of Natural Resources in Baltimore, MD. Along with classroom training, the participants toured several Maryland fish passage facilities.

Public Relations

In the fall of 1994, Price Smith, Tom Gunter and Alan Weaver began preparing articles for the Virginia Wildlife Magazine January 1995 issue. The January issue was dedicated to anadromous fish restoration efforts (past, present, and future) in Virginia (copy attached).

Public relations and education opportunities are very important to the overall success of anadromous fish restoration projects in Virginia. As the fish passage and shad restoration projects develop, more opportunities to educate the public will arise and the VDGIF staff will try to meet those needs.