

Roanoke Rapids and Gaston Hydropower Project  
FERC No. 2009

Article 401 Fish Passage Schedule

Sampling, marking, and transport of American eel at Roanoke Rapids  
in 2005

Revised September 9, 2004

Proposed Approach

Attempts will be made to visually locate concentrations of American eels at the base of Roanoke Rapids Dam during April, May, and June. At least two surveys per month will be conducted in the bypass and tailrace at night when weekly trapping (see below) indicates eels are relatively abundant. An attempt will be made to conduct surveys during relatively warm conditions that may be most conducive to elver movement. In the bypass, the dam ogee will be traversed on foot. The tailrace will be inspected with a floodlight and binoculars from the powerhouse walkway. Congregations of eels relative to outstanding seeps or structures will be noted for both the bypass and tailrace.

Traps patterned after those used in the Thames River Basin, CT, and intended for use at Holyoke Dam, MA, in 2004 (Tomichek, personal communication) will be constructed for the purpose of collecting American eels in the bypass at the base of Roanoke Rapids Dam. Two types of ramp materials (Aquadrain, or a similar geotex product) will be used. One type of ramp material will be similar in size and spacing as that used in CT (10 cones/foot). These traps were designed for eels about 450 mm TL on average (Tomichek, personal communication). The other type of ramp material will have 20 cones/foot, and should be more amenable to use by smaller eels. Surveys conducted by Dominion in 1999 and 2000 indicated most eels in the lower Roanoke River upstream of I-95 were 125-350 mm TL, with the approximate range in eel lengths 75-600 mm TL (Graham 2001). For each trap, ramps will lead to partially submerged collection buckets with fine-screen mesh.

Five pairs of traps (each pair consisting of one trap with 10 cones/foot ramp material, and one trap with 20 cones/foot ramp material) will be set at the base of the dam ogee near seeps and structures that could guide eel movements. Information obtained from visual surveys will also be used to help locate traps. A small attraction flow will be provided to each ramp via siphon from the dam ogee.

Because physical characteristics of the tailrace are very different from those of the bypass, a different sampling gear is required to sample the tailrace. In the tailrace a ramp with the two types of ramp materials described above (one with 10 and one with 20

cones/foot) will be fixed to the powerhouse or tailrace wall. The ramp will extend at least 2 feet below the low flow (2,000 cfs) water elevation, and will lead to a collection bucket with an aeration or fresh water system. Because of the tailrace's steep sides, the ramp will likely need to be constructed in "stairwell" fashion. Each leg of the ramp will be no more than 30 feet long and elevated no more than 40° from horizontal. The exact location of the ramp will be determined in consultation with the DFRTAC and Dominion engineers. The best means of providing attractant flow will be determined by trial.

Weekly sampling will be conducted during the time most eels are expected to be moving upstream (March – September), and biweekly (every two weeks) for the remainder of the year (October – February). Few if any YOY American eels are expected to arrive at Roanoke Rapids prior to March because Roanoke Rapids is located 137 km upstream from Albemarle Sound, and the YOY will not have the benefit of tidal transport in their upstream migration within the river (McCleave and Wippelhauser 1987). Tarplee and Partin (1981) reported most entrainment of young American eels at the H.F. Lee Steam Electric Plant on the nearby Neuse River near Goldsboro, NC, occurred from mid-March to mid-April, with one specimen collected in June. Munger (personal communication) noted at an ASMFC workshop that sampling for YOY American eels is undertaken during the periods of mid-January to mid-February in Goose Creek (north of Charleston), South Carolina; February to mid-March in coastal tributaries to the Cape Fear and Newport rivers, North Carolina; and late February – early March a short distance up the York River, Virginia.

Each trap deployed in the bypass will be fished for 48 – 72 hours during each weekly or biweekly sample, depending on the number of eels collected. A maximum set of 72 hours was recommended by Scott Ault of KleinschmidtUSA. The exact number of hours each trap is fished during each survey will be determined by environmental conditions and the number of eels being collected at the time of sampling.

Flow conditions in the bypass will be documented by dam operators. Water temperature in the bypass will be recorded at hourly intervals by in-situ instruments during the entire sampling period. The instruments will be placed in areas of constant flow. The effect of lunar phase on numbers of eels collected will be examined for the March – September period.

It may be unproductive to sample during the winter months because most fish in freshwater environments are attempting to conserve energy during extremely cold periods, and typically exhibit little movement in river systems during these times (see literature review pp. 8 – 14 of Sheehan et al. 1990). Further, it is unlikely the traps can effectively be fished when temperatures fall below freezing, and the pipes used to deliver attractant flow will be susceptible to blockage and breaking during freezing conditions. Therefore, if no eels are collected for three consecutive samples during the biweekly sampling period October – February, and water temperatures in the bypass have fallen below 10°C, Dominion will request that the DFRTAC consider suspending sampling until a later date to be determined by the DFRTAC.

American eels collected in traps will be anesthetized with clove oil, weighed, measured, checked for tags, and tagged as required (see below). Following processing, collected eels will be transported to Roanoke Rapids Lake or one or more of its tributaries for release. Eels will be measured to the nearest mm TL, and 1-5 g depending on eel size. Dominion expects to retain a consultant to advise on tagging as money becomes available. Preliminary data gathered regarding the use of Coded Wire Tags indicate CWTs may be used in eels as small as 3 g with relatively small (3%) tag loss ([www.nmt-inc.com/references/abstracts/Thomassen.htm](http://www.nmt-inc.com/references/abstracts/Thomassen.htm); [www.nmt.us](http://www.nmt.us)). Passive Integrated Transponders have been effectively used on eels as small as 150 mm ([www.biomark.com](http://www.biomark.com); LaRoche and Dolloff, personal communications). Eels will be transported to release points in wet vegetation or worm bedding. An attempt will be made to minimize temperature fluctuations during transport. Release points will be determined by the DFRTAC, but transport distance is expected to be short (<15 miles).

The numbers of eels to be tagged, what tags should be used, how tags should be distributed by size class, when tagging and eel transport upstream of Roanoke Rapids Dam is to begin, and where the eels will be released will be determined by the DFRTAC.

References

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