Biological Resources Division
U.S. Geological Survey

Leetown Science Center
S. O. Conte Anadromous Fish Research Laboratory
1 Migratory Way/P.O. Box 796
Turners Falls, MA 01376 USA

29 December, 2005

Mr. Friedman,

Per your request, I am providing you with some general information on eel migration, passage and mortality, based on my knowledge of the scientific literature and my past research involving migration and passage of eels at dams and hydroelectric facilities.

I am currently an Ecologist with the U.S. Geological Survey (Biological Resources) S.O. Conte Anadromous Fish Research Laboratory in Turners Falls, Massachusetts. I have conducted research on fish passage (evaluation, technology, and engineering) for the past 13 years, and on eel biology and migration for the past 23 years.

Migration of juvenile eels to upstream freshwater habitats in the northeastern US occurs primarily in the spring and summer months, and can continue for several years during the initial period in freshwater. Juvenile eels often encounter natural or man-made barriers to migration, the latter being in the form of physical structures (dams, culverts) or zones of high water velocity that eels cannot ascend, or ascend only with difficulty. Provision of specialized eel passage structures can facilitate passage of these barriers; traditional fishways can also be used by eels, but are generally inefficient. Eels that are unsuccessful in passing an upstream barrier may be subject to increased competition, predation, and disease, but the effects of these factors on overall survival is not well documented.

Generally, the main migration of pre-spawning adult eels from freshwater habitats to the ocean in the northeastern US takes place in the late summer and fall months, primarily at night, and often associated with increased river flows caused by precipitation events. However, eels can migrate in smaller numbers during other periods as well.

Downstream migrant eels passing hydroelectric projects are at risk of turbine-induced mortality, primarily by turbine blade strikes. Direct turbine mortality rates for eels are quite variable, from less than 5% to 100%, depending on the project characteristics (turbine size, speed, number and design of blades, etc). Larger eels are generally subject to higher mortality rates than smaller eels. Eels may also suffer from delayed mortality from nonlethal turbine-induced injuries; these effects are not well documented. Eels that do not pass projects via turbines may pass via spillways or sluices; mortalities/injuries incurred from passage via these routes are also not well documented. There also can be significant delays in migration of eels (days) if they are not able to immediately locate a passage route past a project; effects of delays

on successful reproduction of eels are unknown. Obviously, any eel that is prevented from passing a downstream migratory barrier is effectively lost from the reproducing population.

Please also find attached a copy of my CV for your reference.

Sincerely,

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