

United States Department of the Interior

FISH AND WILDLIFE SERVICE
400 RALPH PILL MARKETPLACE
22 BRIDGE STREET
CONCORD, NEW HAMPSHIRE 03301-4901

May 14, 1992

Gerald Eller
Division Administrator
Federal Highway Administration
279 Pleasant Street, Room 204
Concord, NH 03301

Dear Mr. Eller:

This responds to Thomas Myers' letter dated April 17, 1992 requesting formal consultation pursuant to Section 7 of the Endangered Species Act of 1973, Public Law 93-205, as amended (ESA). It is the biological opinion of the U.S. Fish and Wildlife Service that the proposed riverbank stabilization along the Connecticut River in Cornish, Sullivan County, New Hampshire will not jeopardize the continued existence of the Federally endanger dwarf mussel (Alasmidonta heterodon). This opinion was based on informal consultation that led to project modification and the development of a number of protective measures. The following outlines the history of the proposed project and informal consultations, and describes the measures required to protect the dwarf wedge mussel from adverse impacts.

Project Site

The project is located on the east bank of the Connecticut River in Cornish beginning 250 feet north of the Cornish/Windsor bridge and extending approximately 950 feet upriver. Stone fill will be placed above ordinary High Water (OHW) along the bank of the river to protect and stabilize the roadway paralleling the river, Route 12-A. This section of the roadway has experienced periodic settlement requiring extensive resurfacing and patching.

Proposed Action

The project originally called for the placement of stone fill for approximately 1600 feet along the Connecticut River. The revised project design will place 950 feet of Class B stone fill above OHW along the banks of the Connecticut River. The fill will extend to the top of the slope near Route 12-A, have a minimum 2 foot thickness and be placed over a geotextile fabric. The bank stabilization will also incorporate a five foot key at the

toe of" the riprap. Additional work includes an improved underdrain beneath the roadway, new catchment basins and pavement overlay of the road.

History of Consultation

Informal consultation between the Fish and Wildlife Service (FWS) and a non-Federal representative for the Federal Highways Administration (FHWA), the New Hampshire Department of Transportation (NHDOT), began in March, 1991 when the NHDOT requested a species list for the project area. The project at that time, consisted of 1600 feet of bank stabilization with placement of stone fill below OHW. In a letter dated April 1, 1991, the FWS identified the potential for the dwarf wedge mussel to exist in the area. On June 11, 1991, biologists from the FWS, NHDOT, New Hampshire Natural Heritage Inventory Program (NHNHIP) and the Vermont Natural Heritage Program (VTNHP) surveyed the Connecticut River in Cornish above, below and at the proposed project area. Dwarf wedge mussels were found to be distributed throughout, and below, the project area. The FWS, in a June 20, 1991 letter, determined that the proposed bank stabilization activities would likely adversely affect the dwarf wedge mussel population in the Connecticut River in Cornish.

The NHDOT requested assistance of the New Hampshire and Vermont natural resource agencies and the FWS in an intensive survey of the river for the purposes of gathering baseline information on the dwarf wedge mussel population. An approximate one-half mile stretch of the Connecticut River, including areas above and below the proposed project area, was surveyed over a three day period (July 24 and 25, August 8) by biologists from the FWS, NHDOT, NHNHIP, WTNHP, The Nature Conservancy and the New Hampshire Fish and Game Department (NHFG). A total of 38 live dwarf wedge mussels and 51 shells were discovered in this stretch of the river over 18.4 hours of search effort (+ 2 mussels/search hour).

NHDOT submitted modified designs for the bank stabilization for FWS review in a November 25, 1991 letter. The revised bank stabilization design incorporated steeper slopes in order to keep all work and stone material above OHW and shortened the project limits from 1600 feet to 950 feet. Two meetings between the FWS, NHDOT, FHWA, NHNHIP and NHFG were held on December 13, 1991 and January 28, 1992 to further discuss ways to avoid and minimize impacts to the dwarf wedge mussel. On April 21, 1992, the FWS received the FHWA's request to initiate formal consultation. The 90-day formal Section 7 consultation period began April 21, 1992, the date the request was received.

In consideration of the preceding informal consultation and biological data gathered in 1991, the FWS determined that the revised, proposed riverbank stabilization may adversely affect the endangered dwarf wedge mussel, although impacts will be considerably reduced. This "may adversely affect," determination is based on the mussel's sensitivity to changes in water quality. Riverbank stabilization will require the removal of all trees and other vegetation and expose an extensive area of riverbank, resulting in potential erosion and increased levels of turbidity and siltation.

Species General History and Status

The dwarf wedge mussel, (family Unionidae) was listed as endangered on March 14, 1990 (55 FR 9447). This small mussel whose length rarely exceeds 1.5 inches, is the only North American freshwater mussel that consistently has two lateral teeth on the right valve, but only one on the left. In the Connecticut River system, it occurs in shallow water (generally less than one meter deep) with a firm substrate of sandy mud and gravel and little silt deposition (USFWS 1991).

All freshwater unionids appear to have similar reproductive cycles and require one or more host fishes to complete larval development. The dwarf wedge mussel is a long-term brooder; female mussels are generally egg-laden from late August to June. Once eggs are fertilized, they develop into glochidia (larvae) and are released into the water column the following spring and summer. Upon release into the water column, mature glochidia attach to the buccal cavities and fins of appropriate host fish to encyst and eventually metamorphose to the juvenile stage. When metamorphosis is complete, they drop to the substrate as juvenile mussels. The host fish(es) has not been identified for Alasmidonta heterodon, though studies are currently underway.

Historically, the dwarf wedge mussel was widely but discontinuously distributed in Atlantic drainages, from New Brunswick, Canada south to the Neuse River in North Carolina. It was recorded from approximately 70 locations in 15 major Atlantic slope drainages in 11 states and one Canadian province. In 1991, there were only 17 extant populations found in 8 drainages in 7 states (USFWS 1991). Furthermore, many of these populations are small, scattered and threatened by ongoing activities impacting water quality and other habitat parameters.

The dramatic decline of the dwarf wedge mussel and the small size and extent of its remaining populations make this species highly vulnerable to extirpation. Human activity has significantly degraded dwarf wedge mussel habitat causing a general decline in populations and a reduction in distribution of the mussel (USFWS 1990). The primary factors responsible for the decline of Alasmidonta heterodon include: 1) impoundments of river systems 2) pollution 3) alteration of riverbanks 4) siltation (USFWS 1991).

The damming and channelization of rivers throughout the dwarf wedge mussel's range has resulted in the elimination of much of its formerly occupied habitat. Immediately upstream from a dam, conditions such as heavy silt deposition and low oxygen levels, are not conducive to the maintenance of dwarf wedge mussel populations. Immediately downstream of these dams, remaining habitat is subject to daily water level and temperature fluctuations, conditions stressful or intolerable to mussels.

Domestic and industrial pollution was the primary cause for mussel extirpation at many historic sites. Mussels are known to be sensitive to a wide variety of heavy metals, pesticides, excessive nutrients and chlorine (Havlik and Marking 1987). Keller and Zam (1991) concluded that mussels were more sensitive to metals than commonly tested fish and aquatic insects. The host fish species may also be adversely impacted by pollutants. Some pollutants indirectly impact the mussels; for example,

nitrogen and phosphorus input cause organic enrichment, and in extreme cases, oxygen depletion. Even though water quality has improved at many of the historic sites, chemicals trapped in the sediments inhabited by mussels may impede the recovery of sensitive species (master 1986).

Riverbank alteration includes bank erosion control measures, such as riprapping, and removal of vegetation, in particular shade trees and bushes. Placement of unwashed riprap along the bank will result in increased sedimentation in the water column, while placement of stones in the river will bury mussel beds and habitat. Removal of shade trees and bushes in small stream systems may lead to significant daily water temperature fluctuations and alter light levels, potentially affecting both the mussels and host fish species.

Siltation, generated by road construction, agriculture, forestry activities, and removal of streambank vegetation is considered to be an important factor in the decline of many freshwater mussel species, including the dwarf wedge mussel. Sediment loads in rivers and stream during periods of high discharge may be abrasive to mollusc shells. Erosion of the outer shell allows acids to reach and corrode underlying shell layers (Harman 1974). Irritation and clogging of gills and other feeding structures in mussels occur when suspended sediments are siphoned from the water column (Loar et al. 1980), and can severely impact the mussel's normal activity or cause death.

Because freshwater mussels are sedentary and cannot move quickly or for long distances, they cannot escape when silt is deposited over their habitat. Ellis (1936) found that mussels could not survive in substrate on which silt accumulated to depths over 0.6 - 2.5 cm. He observed dying mussels with large quantities of silt in their gills and, mantle cavities and attributed their deaths to interference with feeding and to suffocation. In addition, Ellis I determined that siltation from soil erosion reduced light penetration, altered heat exchange in the water, and allowed organic and toxic to be carried to the bottom where they were retained for long periods of time. This resulted in further oxygen depletion and possible absorption of these toxicants by mussels (Harman 1974).

With respect to the dwarf wedge mussel, a further unknown parameter is the impact of sedimentation on the host fish species. Some small fish species are vulnerable to changes in light, turbidity and pollutants. Any water quality degradation that affects fish species may affect the dwarf wedge mussel. Until such time as the host fish species is determined, all fish species resident in this portion of the Connecticut River must be equally protected.

The reproductive cycle of the dwarf wedge mussel may be particularly vulnerable to changes in water quality. Any interruption in the cycle may cause the loss of an entire generation. In addition, should the host fish species be eradicated, the reproductive cycle will be stopped, thus preventing future generations of mussels from fully developing.

Contrary to statements in the FHWA letter of April 17, 1992, the FWS has not designated critical habitat for the dwarf wedge mussel.

Effects of the Proposed Action

As stated previously, road construction and bank stabilization are actions known to adversely impact mussel populations both at and immediately downriver of project areas due to erosion and siltation. Your letter initiating formal consultation proposed a number of erosion and pollution

control measures that minimize impacts to the dwarf wedge mussel from project activities. We have reviewed these measures and concur with your recommendations. In addition, we have incorporated a few revisions to clarify some aspects of the conditions.

The following revised measures will minimize adverse impacts to dwarf wedge mussels and their habitat at, and downriver of, the proposed bank stabilization:

- The construction schedule will be limited to a 2 1/2 to 3 month period. All work will be performed during low flow months (July, August, September).
- Work is to be performed in stages: grubbing, grading and placement of geotextile fabric will be limited to what can be completed in one day. The width of the work area will also be limited to that which can be completed in one day.
- No access roads along the riverbank will be allowed. Equipment utilized by the contractor will operate from the road only. The work will be performed from the bottom of slope to the top.
- Silt curtains will be anchored at or above ordinary high water for the entire length of the project, with jay bales placed in from for reinforcement.
- The contractor will be informed about the general locations of the dwarf wedge mussel population (identified on the riverbank with stakes) and his responsibilities regarding in no impact to these areas.
- The contractor will coordinate with officials from Wilder Dam to minimize work efforts during releases of water.
- No work will be performed during significant rain events, since soils could potentially be washed down the slope. Determination will be made by the NHDOT resident engineer in conjunction with NHDOT environmental design office.
- The contract's staging area will be located in an area where it will not jeopardize mussel habitat and should be approved by NHDOT and/or FWS before actual work is initiated.
- Stone fill will be washed prior to arriving at the construction site. The iron content of the stone will be tested to assure that it does not cause a treat to the mussels.
- The NHDOT and the contractor will adhere to the water quality monitoring program developed by NHDOT and the New Hampshire Department of Environmental Services, Water Supply and Pollution Control Division (see Appendix). The FWS will be notified immediately of any violations of these procedures. In addition,

construction activities will immediately cease after said violation until FWS, NHDOT and NHFG have reviewed and remediated the situation.

- FWS and NHFG will be notified of the proposed water quality testing schedule and the proposed construction schedule.
- NHDOT will provide a qualified monitor to regularly observe activities of the construction, sample water quality and ensure compliance with the conditions.

Future Federal actions will be subject to the consultation requirements established in Section 7 and, therefore, are not considered cumulative in the proposed action.

Biological Opinion

Based on a review of all information available to the FWS, and with the stipulation that the erosion control measures and monitoring program be strictly followed, it is the biological opinion of the U. S. Fish and Wildlife Service that the proposed bank stabilization of 950 feet of the Connecticut River in Cornish is not Likely to jeopardize the continued existence of the dwarf wedge mussel. This non-jeopardy opinion is based on the following: stone fill will not bury dwarf wedge mussels or be placed in their habitat; and the incorporation of the erosion control measures and the monitoring program will be sufficient to prevent significant harm to the mussels or their habitat by siltation.

Incidental Take

Section 9 of the ESA, as amended, prohibit taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or attempt to engage, in any such conduct) of Listed species of fish or wildlife without a special exemption. Harm is further defined to include significant habitat modification or degradation that results in the death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Under the terms of S7 (b) (4) and §7 (o) (2), taking that is incidental to and not intended as part of the agency action is not considered a prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement. The erosion control measures and the water quality monitoring program described above are nondiscretionary, and must be implemented by the agency so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, in order for the exemption in §7 (o) (2) to apply.

The FHWA has a continuing duty to regulate the activity that is covered by this incidental take statement. If the agency fails to require the applicant to adhere to the terms and conditions of the incidental take