USGS

WATER RESOURCES RESEARCH GRANT PROPOSAL

1. Title: An assessment of the transferability of habitat suitability criteria for brown trout in southern New England streams

2. **Focus categories:** WQN, COV, M&P

3. **Keywords:** Fisheries, habitat suitability, instream flow, brown trout

4. **Duration:** January 1999 - December 2001

5. **Federal funds requested:** $51,796

6. **Non-Federal (matching) funds pledged** $105,507

7. **Principal investigators**:

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8. **Congressional district** 2nd Congressional district

9. **Statement of critical regional or state water problems:**

Long a "sleeper" problem in water rich New England, water allocation and instream flow have risen to the forefront of environmental concern. The focus of governmental regulation has been on clean water and improving water quality without directly

considering the complex issues of water quantity. Managing water diversions to avoid resource degradations requires access to effective tools to define instream flow needs; the instream flow incremental methodology (IFIM) has generally been recognized as the most useful tool. The physical habitat simulation (PHABSIM), a component of IFIM, uses habitat suitability criteria (HSC) to translate structural and hydraulic characteristics into descriptions of habitat suitability for different fish species and life stages. The HSC describe microhabitat preferences for individual fishes and life stages as measurable variables (e.g., depth, velocity, substrate, and cover) that change with the quantity of water in a stream.

In spite of the wide spread acceptance of the IFIM and PHABSIM, concerns have been expressed over the sensitivity of the predictions of habitat suitability to inappropriate or flawed HSC. Studies have demonstrated that microhabitat selection by fishes can be altered by body size, risk of predation, presence and abundance of competitors, thermal regime, food availability, and habitat availability. These factors explain much of the observed differences in microhabitat preference and use between rivers. In some instances, studies have confirmed the appropriateness of using HSC developed for one stream in another application. In others, little overlap in microhabitat use was observed between streams, hence large errors should be expected in the projections of habitat quantity and quality calculated using PHABSIM. To date, no HSC have been developed for southern New England streams, yet the PHABSIM has been applied in over six different studies in Connecticut, Massachusetts, and Rhode Island. Recognizing the threats posed by flawed assessments of instream flow needs, representatives of Connecticut, Massachusetts, and Rhode Island, the US Fish and Wildlife Service, US Environmental Protection Agency, Universities, and private industry have formed a working group (Southern New England HSC Working Group) to define HSC needs and encourage their development.

10. **Statement of results or benefits:**

Concerns have been expressed regarding the transferability of species-specific HSC among streams and regions; thus, the use of previously developed HSC should be used with great care. Only HSC developed for streams of similar size and morphometry, and in the same geographic area to the candidate stream, should be used. Further, the transferability of these HSC should be tested before they are used to assess discharge and microhabitat relationships. This has never been done in New England; in each application of PHABSIM, previously developed HSC were used. These criteria were not developed using direct underwater observation, and were based on professional speculations on habitat use of fishes in streams of western states. Further, the transferability of these HSC were never tested.

This study will result in the first set of HSC developed from direct observations in New England. It will provide the first assessment of the transferability of HSC between New England streams. The HSC developed can be used in assessments of the accuracy of PHABSIM outputs on the instream flow study conducted pursuant to designation of the Farmington River as a Wild and Scenic River. They can also be used to improve

confidence in the instream flow studies being conducted on the Housatonic River. Finally, the criteria and transferability test results will be used by managers throughout New England to improve confidence in future instream flow studies.

Note: The National Park Service has committed $15,000 as partial support for this project (see attached letter). These funds are being provided through the 1998 Partners Wild and Scenic River Competative Funds. Through this award, NPS is intending to provide funds for field travel, equipment, and supplies.