

## Introduction

The removal of Edwards Dam from the Kennebec River in the fall of 1999 was a remarkable event for the State of Maine, concerned environmental groups, surrounding communities, anglers, and the river itself. The changes that would occur to the river, the fishery and its surroundings could not possibly have been predicted. This thesis presents an economic analysis of the post-Edwards Dam fishery.

Built in 1837, the Edwards Dam was intended to aid in upstream navigation and power local saw mills. The dam eventually powered seven saw mills, as well as a machine shop located along the Kennebec River. Significant economic growth in Augusta can be partially attributed to the dam, but its construction held negative consequences as well. The dam blocked off seventeen miles of river habitat for the migratory fish species which traveled up-river to spawn every year. Immediately following construction, populations of fish species such as Atlantic salmon, alewives and sturgeon, to name a few, diminished.

In the late 1980's, concern from the public and environmental groups led to the consideration of complete dam removal. Also around this time, the license which permitted Edwards Dam to produce hydroelectric power had expired, and had come up for renewal. The Federal Energy and Regulatory Commission (FERC) is the organization which reviews and renews (or denies) licenses for continued hydropower production. Review of this application for renewal led to the creation of a Draft Environmental Impact Statement (DEIS) by FERC, which included a benefit-cost analysis of the proposed dam removal

project. This DEIS recommended relicensing of the dam, with construction of fish passage capabilities.

Extensive comments were filed regarding this recommendation. Work from environmental economists and environmental groups led to a final Environmental Impact Statement, which reversed the recommendation of the draft and opted for complete dam removal, under the premise that the benefits that would arise from removal exceeded the costs. Included in the benefits portion of this analysis was an estimate of the value of the fishery to be created after the dam was removed. Removal of the dam began in July of 1999 and was finished in the fall of 1999.

Since removal however, little work has been done to monitor the river; especially the changed fishery. This thesis presents the results from an economic valuation survey, ultimately aimed at estimating the economic benefits of the post-Edwards Dam fishery. Also included in the survey were questions regarding general fishing activity in Maine and angler perceptions of the fishery and river since dam removal.

The first chapter of this thesis discusses the implications of dams related to fisheries. Potential downstream ecological effects are discussed as well as the effects that dams can have on the fisheries of the rivers in which they are built. The chapter also presents a dam removal decision making methodology. Finally, the chapter offers some case studies of past dam removals, focused on the effect that the removal had on the respective fisheries.

As mentioned above, the benefit-cost analysis which led to removal of Edwards Dam included an estimate of the benefits that would accrue from the post-dam fishery. The second chapter of this thesis discusses natural resource

valuation theory. These valuation techniques were implemented in the present survey and the survey which led to dam removal. The chapter also presents some case studies of past fishery valuations.

The third chapter offers a brief history of the Kennebec River and the Edwards Dam. Following is a discussion of the process that led up to the removal of the dam in 1999. Several papers strongly aided this dam removal process; these papers are discussed in the final section of the chapter, illustrating their significance to the dam removal decision.

The results of this thesis were found using the data collected from a mail survey sent to Maine anglers. The methodology of this survey is discussed in the fourth chapter. Also presented are descriptive statistics of responses to some questions of the survey.

The final chapter discusses the results from this survey. Comparisons are made between the present study and the one conducted prior to dam removal. An estimate of the total annual economic benefits from the post-dam fishery is made and is compared to the estimate used in the benefit-cost analysis which led to removal. A section detailing the results from econometric analyses is also presented in the fifth chapter. This section offers some insight into what factors affected responses to the survey. A brief discussion of some comments left by respondents is presented, and finally a section noting potential issues of concern resulting from the survey. Conclusions are reiterated in the final chapter of the thesis.

Appendix A is an exact copy of the mail survey; Appendix B reports descriptive statistics to each question of the survey; and Appendix C presents some comments left by respondents.

