## Coldwater Fisheries Management Plan



# New Jersey Department of Environmental Protection Division of Fish and Wildlife Bureau of Freshwater Fisheries

December 2005





### **GRANT AGREEMENT F-48-R**

Investigations and Management of New Jersey's Freshwater Resources

Job II-6 Development of a Coldwater Fisheries Management Plan



This project was paid for by fishing license sales and matching Dingell-Johnson/Wallop-Breaux funds available through the Federal Sportfish Restoration Act.

#### **Principal Authors**

Patricia L. Hamilton, Principal Fisheries Biologist Lisa Barno, Bureau Chief

#### **Contributing Authors**

Ed Washuta, Fish Pathologist
Jeff Matthews, Superintendent
Craig Lemon, Superintendent
Mark Boriek, Principal Fisheries Biologist
Robert Papson, Principal Fisheries Biologist

#### **Map Production**

Andrea Ostroff, Wildlife Worker

#### **Additional Assistance**

Michelle Ruggiero, Seasonal Worker Scott Ward, Seasonal Worker Hugh Carberry, Supervising Biologist Shawn Crouse, Assistant Biologist Christopher Smith, Assistant Biologist Carole Delibero, Principal Clerk Typist James Hartobey, Seasonal Worker

## **Table of Contents**

	Page
Introduction	1
History of Trout Management in New Jersey	3
Trout Life History and Ecology	11
Classification of NJ Trout Waters	33
Management of Habitat	43
Management of Wild Trout	53
Culture of Salmonids	75
Fish Health Management for Salmonids	83
Management of Cultured Trout	97
Allocation Methodology for Cultured Trout	119
Fishing Regulations for Trout	131
Communications and Public Outreach	169
Funding	179
Goals and Strategies	187
Operational Plan	203
Literature Cited	221
Glossary	229

## **List of Figures**

		Page
Figure 1	New Jersey's trout waters (2004) shown in relation to physiographic provinces.	13
Figure 2	New Jersey's trout-stocked waters (2004).	14
Figure 3	New Jersey's trout waters (2004) shown in relation to 1995-97 land use cover.	51
Figure 4	New Jersey's watersheds and freshwaters having known reproducing salmonid populations (trout production waters) as documented through NJDFW surveys conducted from 1968 through 2003.	56
Figure 5	New Jersey's physiographic provinces and freshwaters having reproducing salmonid populations (trout production waters) as documented through NJDFW surveys conducted from 1968 through 2003.	57
Figure 6	Distribution of wild brook trout in New Jersey as documented through NJDFW surveys conducted from 1968 through 2003.	59
Figure 7	Distribution of wild brown trout in New Jersey as documented through NJDFW surveys conducted from 1968 through 2003.	64
Figure 8	Distribution of wild rainbow trout in New Jersey as documented through NJDFW surveys conducted from 1968 through 2003.	66
Figure 9	Distribution of wild lake trout in New Jersey as documented through NJDFW surveys conducted from 1968 through 2003.	68
Figure 10	New Jersey's trout-stocked waters for spring 2005.	104
Figure 11	New Jersey's trout-stocked waters for fall 2005.	107
Figure 12	New Jersey's trout-stocked waters for winter 2005.	111
Figure 13	New Jersey waters designated as <i>Trout Stocked</i> Waters Having Closed In-season Stocking Dates, in 2005.	144

## **List of Figures (continued)**

		Page
Figure 14	New Jersey streams designated as <i>Wild Trout Streams</i> , in 2005.	148
Figure 15	New Jersey streams designated as Year Round Trout Conservation Areas, in 2005.	152
Figure 16	New Jersey streams designated as Seasonal Trout Conservation Areas, in 2005.	156
Figure 17	New Jersey streams designated as Fly Fishing Only Areas, in 2005.	147
Figure 18	New Jersey lakes designated as Trophy Trout Lakes in 2005.	160
Figure 19	New Jersey lakes designated as Holdover Trout Lakes, in 2005.	166
Figure 20	New Jersey waters designated as Boundary Waters, in 2005.	168

## **List of Tables**

		Page
Table 1	Timetable for trout spawning and egg development (Taken from Hamilton and Minervini 1983).	15
Table 2	Dissolved oxygen concentration at 100% saturation for water temperatures associated with trout streams.	18
Table 3	A summary of some effects of pH on salmonids and other aquatic organisms (modified from National Academy of Sciences 1973).	21
Table 4	Incidence of occurrence of selected species in association with naturally reproduced trout (revised 1973).	37
Table 5	Land area, total stream length and proportion of trout production streams for each watershed management area in New Jersey.	55
Table 6	Factors and Associated Criteria used to Determine Spring Trout Allocations for New Jersey Trout-Stocked Streams.	125
Table 7	Factors and Associated Criteria used to Determine Spring Trout Allocations for New Jersey Trout-Stocked Lakes and Ponds.	126
Table 8	Calculation of individual trout allocations – a 3 step process.	127
Table 9	Annual spring baseline and constant used to adjust individual raw pre-season and in-season trout allotments in order to achieve the spring baseline figure.	130
Table 10	Cost of resident freshwater fishing licenses and trout stamps by year.	180
Table 11	New Jersey freshwater fishing license and trout stamp requirements and fees, in effect during 2005. Licenses and stamps are valid from date of purchase to December 31 <sup>st</sup> , unless otherwise indicated.	182

## **List of Appendices**

Appendix A	Potential Changes to the Trout Stocking Program for 2005 and 2006
Appendix B	List of New Jersey Freshwater Fishes
Appendix C	Classification of New Jersey Waters as Related to Their Suitability for Trout
Appendix D	Field Data Sheets
Appendix E	Pequest Trout Hatchery And Natural Resource Education Center — Access Guidelines
Appendix F	Plan for Utilization of Hatchery Surplus Trout
Appendix G	Trout-Stocked Waters Database and Allocations
Appendix H	List of Trout-Stocked Waters
Appendix I	Inventory of Waterbodies for Coldwater Management (Existing and Potential)

COLDWATER FISHERIES MANAGEMENT PLAN	NEW JERSEY DIVISION OF FISH AND WILDLIFE
This Page Intentionally L	oft Rlank
This I age intentionally L	CIL DIAIIK

### Introduction

New Jersey's coldwater streams and lakes come in a variety of shapes and sizes, and offer an array of habitats for animal, plant, and microbial life. Fish species such as trout, that inhabit and prefer waters with relatively cold temperatures,  $4-15^{\circ}$ C ( $40-60^{\circ}$ F), are often referred to as coldwater fishes. The emphasis in this plan is placed on managing New Jersey's salmonid (trout) fisheries because they are widely recognized as indicators of high water quality, and are important recreational game fish. Efforts to conserve, protect, and manage trout and their habitats are beneficial not only to other aquatic organisms that co-exist with trout, but to downstream biotic communities as well.

The Department of Environmental Protection's Division of Fish and Wildlife is the primary agency entrusted with protecting and managing the state's fish and wildlife. Trout management in New Jersey dates back to the late 1800's when the New Jersey Fish Commission planned to re-stock natural trout streams believed to have been decimated by a severe drought. The state's first fish hatchery was constructed in 1912 to produce trout in response to a growing demand. Since that humble beginning, trout management within the state has evolved into efforts to protect water quality and in-stream habitat and enhance seasonal and year round trout fishing opportunities for anglers through two modern fish culture facilities. Anglers help support agency research and management activities through the purchase of fishing licenses and trout stamps. While many of the Division's fish management efforts benefit the angler, the state's eight million residents also reap the benefits of resource protection and preservation efforts. In addition, the pursuit of freshwater fishing in New Jersey generates over 138 million dollars annually into the state's economy.

Despite the long history and evolution of trout management within the state there has never been a long term, strategic plan formulated to address the myriad of issues surrounding the state's fragile coldwater resources. The lack of long range goals and objectives leads to a "reactionary" approach to fisheries management. New Jersey is the fourth smallest state in the union, the most densely populated, and is currently undergoing rapid changes in land uses. The development of this plan is crucial to providing for the long term protection of coldwater resources and providing for its most optimal use. The plan also coincides with the Department's on-going initiative in protecting the state's waterways. This initiative most recently resulted in substantially increasing buffers on trout production streams through changes in stormwater management rules. These comprehensive rules play an integral role in the protection of the water quality and critical habitat of important indicator species such as trout.

For the first time an information base specific to New Jersey's trout resources has been compiled into a single reference document. The information contained in the Coldwater Fisheries Management Plan (CWFMP) has been organized into sections that can be readily referenced and used by a broad audience that includes resource managers and regulators, anglers, conservation organizations, consultants, and landowners. This Plan documents the evolution of trout management practices in NJ over the last century and identifies coldwater issues, goals and strategies in the areas of fish culture, habitat

protection, fish health, regulations and stocking practices. Most importantly, it provides a mechanism for implementing these strategies by establishing an operational plan for the next five years.

Since social as well as biological factors play an important role in the management of the State's aquatic resources a draft version of the plan was released for public comment in February 2004. A public meeting was held on April 3, 2004. Due to the magnitude of the document, several extensions were granted for the comment period. Public comments have been incorporated in this final document.

The CWFMP is not static and should be considered a work in progress, subject to change as warranted by changes in environmental or social pressures on New Jersey's coldwater resources, or advances in fisheries management techniques. Updates to the CWFMP will be noted in this document at the end of each appropriate section. In addition, these updates, as well as summaries of activities and actions related to coldwater fisheries management, will appear in the Addendum to the plan.