

U.S. Fish & Wildlife Service

Economic Effects of Rainbow Trout Production by the National Fish Hatchery System

*Science and efficiency
at work for you*



“The mission of the U.S. Fish and Wildlife Service is working with others to conserve, protect and enhance fish, wildlife, plants and their habitats for the continuing benefit of the American people.”





Foreword

The gestation period for so many investments we make in life seems so often interminably long. Money invested today is to pay dividends years away. Raising children is much the same; bend the twig, so shall the tree grow into adulthood. There is, without question, much truth in the bromide that the good things in life are worth waiting for. But, as this peer-reviewed economic report will show, the return on the investments made in producing rainbow trout at our National Fish Hatcheries is one of an unparalleled immediacy. The economic effects of our taxpayer dollars spent producing rainbow trout for the American people ripple through the economy. The ripples make a splash in no small measure and, moreover, the effects are lasting.

Perspective is a perishable commodity. This economic report lends a well-documented perspective that, heretofore, was something intuitively known and measurable in experience by many fisheries biologists and business people. Fishing for rainbow trout generates business. It generates jobs. It generates significant dollars for public treasuries potentially reinvested back into communities. And it generates, perhaps most importantly, the beckoning to the water where people purchase those precious imperishable commodities carried with them in their collective memories.

It is the angler that drives this economic engine. Anglers benefit from conservation. I am proud to stand in league with the anglers that stand behind conservation, and I am proud to commit myself to the work of our Fisheries Program through the outstanding, efficient rainbow trout and other production programs of our National Fish Hatchery System. It is heartening to know the many positive economic effects of our rainbow trout work carried on across our nation.

Dr. Mamie Parker
Assistant Director, Fisheries and Habitat Conservation



Executive Summary

- The top 11 Fish and Wildlife Service hatcheries in terms of rainbow trout stocking in FY 2004 stocked 9.4 million fish and 1.9 million pounds in 16 states.
- Arkansas (2.8 million), Colorado (1.2 million) and Tennessee (1.1 million) were the leading states in terms of the number of rainbow trout stocked in FY 2004.
- **Angler days** associated with NFH rainbow trout stocking in FY 2004 totaled **3.9 million**.
- **Retail sales** associated with angling for NFH-produced rainbow trout amounted to **\$172.7 million** (based on aggregated state impacts).
- **Total economic output** (the “multiplier” effect) came to **\$325.1 million**.
- The number of **jobs** associated with this output totaled **3,502**.
- These jobs generated over **\$80 million** in wage and salary **income**.
- The **social benefits** (as measured by net economic value) of recreational angling for NFH-stocked rainbow trout totaled **\$197.9 million**.
- **Sales and motor fuel taxes** totaled **\$9.9 million**.
- **State income tax** generated came to **\$2.9 million**.
- **Federal income tax** generated totaled **\$10.6 million**.
- Rainbow trout-related **hatchery budget expenditures** totaled **\$5.4 million** in FY 2004.
- Each dollar of rainbow trout **hatchery budget expenditures** is associated with **\$32.20 of retail sales** and **\$36.88 of net economic value**.



Introduction

Over the past 120 years, Federal stewardship of the nation's fishery and aquatic resources has been a prime responsibility of the U.S. Fish and Wildlife Service. The Service works with a variety of stakeholders, including Federal agencies, State resource agencies, Tribal governments and private organizations, to improve fishery conservation efforts. This field presence includes: 70 National Fish Hatcheries; 64 Fish and Wildlife Resource Management Offices; nine Fish Health Centers, and six Fish Technology Centers.

The Service focuses its efforts on fulfilling Federal mandates¹ for recovery, restoration, and inter-jurisdictional management of depleted fish stocks. National Fish Hatcheries, Fish and Wildlife Resource Management Offices, Fish Technology Centers and Fish Health Centers focus their efforts to recover aquatic species listed as threatened, endangered or candidates under the Endangered Species Act; restore and maintain depleted anadromous or highly migratory fish stocks and aquatic habitats at productive or self-sustaining levels; and establish, protect or restore resources for which Congress has assigned responsibilities to the Service through legislation (i.e., mitigation of Federal water development projects).

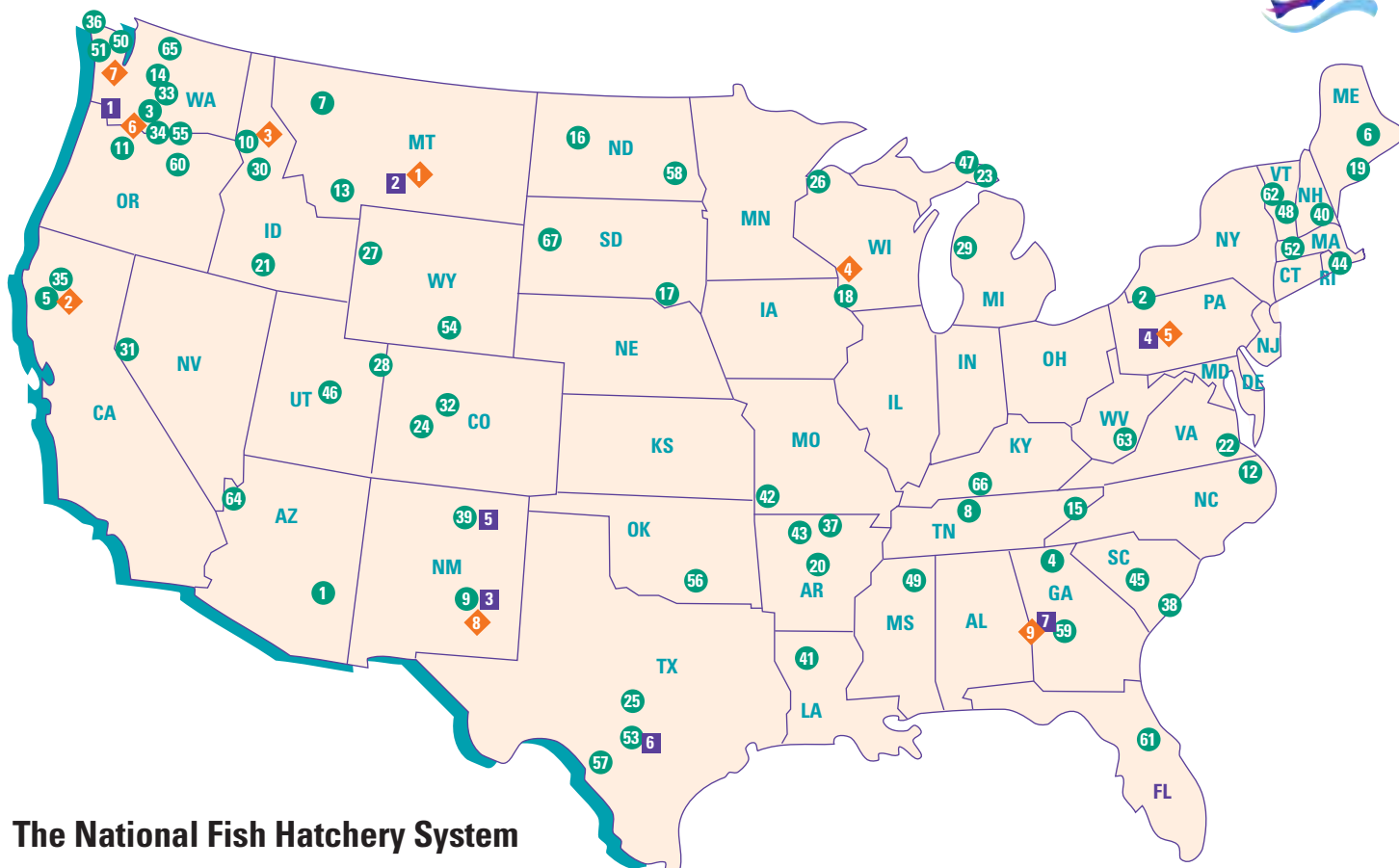
The Service implements several forms of mitigation associated with existing Federal water development projects: 1) minimizing adverse project impacts (i.e., constructing fish-passage facilities); 2) rectifying project impacts (i.e., restoring habitat); and 3) compensating affected parties for project impacts (i.e., enhancing fishery resources in reservoirs and tail waters created by Federal water development projects). The fundamental purpose of fishery mitigation is to compensate for adverse impacts to fishery resources caused by the construction of Federal dams and Federal water development projects. Fisheries mitigation utilizing National Fish Hatcheries consists of stocking a variety of species in waters impacted by Federal projects.

This report summarizes the economic impacts associated with recreational angling for rainbow trout (RBT) produced and stocked by Fish and Wildlife Service hatcheries in FY 2004. The following hatcheries are included in this report (all hatcheries with less than 15,000 pounds of rainbow trout production in FY 2004 are excluded): **Region 2:** Alchesay-Williams Creek National Fish Hatchery (NFH) and Willow Beach NFH; **Region 3:** Neosho NFH; **Region 4:** Chattahoochee Forest NFH, Dale Hollow NFH, Greens Ferry NFH, Norfolk NFH, and Wolf Creek NFH; **Region 6:** Garrison Dam NFH, Hotchkiss NFH and Jones Hole NFH².

These hatcheries provide a variety of environmental and ecological goods and services. This report focuses on a subset of these goods and services: the economic effects of the recreational use of hatchery-produced rainbow trout. In addition to the direct fish-related economic effects, these hatcheries also provide additional economic impacts to local communities and adjacent regions through hatchery budget expenditures, including spending related to fish production and the spending of hatchery staff salaries. This report focuses on a reconnaissance-level estimate of the economic effects associated with angler use of NFH produced and stocked rainbow trout. Site-specific data on a variety of different types of information which ideally would be available to estimate economic effects of NFH stocking is not available for the vast majority of stocking sites. Different regions had different information available. Consequently, different data sets were combined using different estimation techniques to derive the estimates of economic impact and economic value from the recreational use of NFH-produced and stocked fish.

“Rainbow trout are an important species in South Dakota and highly sought after by anglers. The U.S. Fish and Wildlife Service provides a great service to South Dakota anglers and the rainbow stocking program by maintaining brood stock that supply eggs to states. The availability of eggs from a source with a clean disease record, good genetics and strain selection is invaluable. States working individually could not maintain such an egg source, and this service is very much appreciated.”

Dennis Unkenholz
Fisheries Program Administrator
South Dakota
Game Fish and Parks



The National Fish Hatchery System

National Fish Hatcheries ●

1. Alchey-Williams Creek NFH, AZ
2. Allegheny NFH, PA
3. Carson NFH, WA
4. Chattahoochee Forest NFH, GA
5. Coleman NFH, CA
6. Craig Brook NFH, ME
7. Creston NFH, MT
8. Dale Hollow NFH, TN
9. Dexter NFH, NM
10. Dworshak NFH, ID
11. Eagle Creek NFH, OR
12. Edenton NFH, NC
13. Ennis NFH, MT
14. Entiat NFH, WA
15. Erwin NFH, TN
16. Garrison Dam NFH, ND
17. Gavins Point NFH, SD
18. Genoa NFH, WI
19. Green Lake NFH, ME
20. Greers Ferry NFH, AR
21. Hagerman NFH, ID
22. Harrison Lake NFH, VA
23. Hiawatha Forest NFH, MI
24. Hotchkiss NFH, CO
25. Inks Dam NFH, TX
26. Iron River NFH, WI
27. Jackson NFH, WY
28. Jones Hole NFH, UT
29. Jordan River NFH, MI

30. Kooskia NFH, ID
31. Lahontan NFH, NV
32. Leadville NFH, CO
33. Leavenworth NFH, WA
34. Little White Salmon NFH, WA
35. Livingston Stone NFH, CA
36. Makah NFH, WA
37. Mammoth Spring NFH, AR
38. Bears Bluff NFH, SC
39. Mora NFH, NM
40. Nashua NFH, NH
41. Natchitoches NFH, LA
42. Neosho NFH, MO
43. Norfolk NFH, AR
44. North Attleboro NFH, AM
45. Orangeburg NFH, SC
46. Ouray NFH, UT
47. Pendills Creek NFH, MI
48. Pittsford NFH, VT
49. Private John Allen NFH, MS
50. Quilcene NFH, WA
51. Quinault NFH, WA
52. Richard Cronin NSS, MA
53. San Marcos NFH, TX
54. Saratoga NFH, WY
55. Spring Creek NFH, WA
56. Tishomingo NFH, OK
57. Uvalde NFH, TX
58. Valley City NFH, ND
59. Warm Springs NFH, GA

60. Warm Springs NFH, OR
61. Welaka NFH, FL
62. White River NFH, VT
63. White Sulphur Springs NFH, WV
64. Willow Beach NFH, AZ
65. Winthrop NFH, WA
66. Wolf Creek NFH, KY
67. D.C. Booth HNFH, SD

Fish Technology Centers ■

1. Abernathy FTC, WA
2. Bozeman FTC, MT
3. Dexter FTC, NM
4. Lamar FTC, PA
5. Mora FTC, NM
6. San Marcos FTC, TX
7. Warm Springs FTC, GA

Fish Health Centers ◆

1. Bozeman FHC, MT
2. California-Nevada FHC, CA
3. Idaho FHC, ID
4. La Crosse FHC, WI
5. Lamar FTC, PA
6. Lower Columbia River FHC, WA
7. Olympia FHC, WA
8. Dexter FHC, NM
9. Warm Springs FHC, GA



National Fish Hatchery System Mitigation

Total rainbow trout production amounts to more than 9 million fish annually (FY 2004). The vast majority of these fish are produced for mitigation purposes. Fishery mitigation is necessary because Federal water development projects on some river systems have drastically altered the environmental conditions. Mitigation hatcheries, as part of the National Fish Hatchery System, compensate for the impacts caused by Federal water development projects, as well as fulfill Tribal trust responsibilities. The hatcheries considered in this report are mitigation hatcheries, although a given hatchery may have other responsibilities in addition to mitigation.

Rainbow Trout Stocking Program

The NFH rainbow trout stocking program stocked 9.4 million fish at 1.9 million pounds in 2004. Region 4 stocked the most fish and the most pounds with 5.6 million fish with a weight of 1.3 million pounds. Region 6 stocked 2.6 million fish with a weight of 315,000 pounds followed by Region 2 with 847,000 stocked fish weighing 162,000 pounds. Region 4 accounted for 60 percent of all rainbow trout stockings, Region 6 for 27 percent, Region 2 for nine percent and Region 3 for four percent.



“The National Fish Hatchery System is a wonderful management tool. It is used to assist in putting fisheries back in balance when altered by factors such as pollution, destruction of habitat, siltation, overfishing, installation of federal projects, etc. Our goal is to provide quality rainbow trout for the nation’s anglers to have a quality fishing experience. The stocking of rainbow trout into Lake Taneycomo alone generates millions of dollars back into the nation’s economy. It is also imperative that we educate our public about the importance of good water quality and good fish health, thus making it possible for many generations to enjoy the fun of fishing for rainbow trout.”

David Hendrix, Hatchery Manager
Neosho National Fish Hatchery
Neosho, Missouri

Footnotes

¹These mandates include, but are not limited to: Fish and Wildlife Act of 1956; Fish and Wildlife Coordination Act; Water Resources Development Act of 1976; Mitchell Act; Endangered Species Act of 1973; Atlantic Striped Bass Conservation Act; Great Lakes Fishery Act of 1956; Recreation Use of Fish and Wildlife Areas; Sikes Act; and the New England Fishery Resources Act of 1990.

² Fish and Wildlife Service Regions include: Region 1: California, Oregon, Washington, Idaho, Nevada, Hawaii; Region 2: Arizona, New Mexico, Texas, Oklahoma; Region 3: Missouri, Iowa, Minnesota, Wisconsin, Illinois, Indiana, Ohio, Michigan; Region 4: Arkansas, Louisiana, Tennessee, Georgia, Kentucky, Mississippi, Alabama, Florida, North Carolina, South Carolina; Region 6: Montana, Wyoming, North Dakota, South Dakota, Nebraska, Kansas, Colorado, Utah.



Economic Effects

Angling days generated: 101,357
 Retail expenditures: \$6,161,600
 Jobs generated: 115
 Job income: \$2,788,300
 Sales and motor fuel tax: \$355,300
 State income tax: \$75,800
 Federal income tax: \$416,600
 Total economic output: \$11,299,900
 Consumer surplus: \$5,098,600

**Region 2
 Alchesay-Williams Creek National Fish Hatchery**

Located on the Fort Apache Indian Reservation in eastern Arizona, the Alchesay and Williams Creek National Fish Hatchery Complex raises five species of trout for stocking in Indian waters, in Arizona, New Mexico, and Colorado. The Williams Creek unit is known for its leading role in the recovery of the threatened Apache trout, a rare trout native only to Arizona. The Williams Creek unit was established in the mid-1930s with funds provided by the Bureau of Indian Affairs as a trout-producing station. The Alchesay unit, established in 1959, also raises trout for Indian reservations. Both hatchery units operate in cooperation between the White Mountain Apache Tribe and the Fish and Wildlife Service.

Table 8. Alchesay-Williams Creek NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	0	11,300	802,991	0	0	814,291

Table 9. Alchesay-Williams Creek NFH 2004 RBT Stocking by State

Species	Arizona	New Mexico
Rainbow Trout	72 %	28%



“You know, Tribes don’t receive Federal Aid money. We fund our Game and Fish Department with dollars we receive from fishing permits sold on our Reservation. Without the funds generated by public fishing on our lands, sustained by rainbow trout stocking from National Fish Hatcheries, we would have no money to manage our natural resources.”

Bradley Clarkson
 Fishery Biologist, Williams Creek
 National Fish Hatchery
 Member—White Mountain Apache
 Tribe
 Whiteriver, Arizona



Economic Effects

Angling days generated: 4,067
 Retail expenditures: \$247,300
 Jobs generated: 5
 Job income: \$121,800
 Sales and motor fuel tax: \$14,600
 State income tax: \$3,300
 Federal income tax: \$20,300
 Total economic output: \$473,400
 Consumer surplus: \$202,300

**Region 2
 Willow Beach National Fish Hatchery**

The Willow Beach National Fish Hatchery is located on the Colorado River (upper Lake Mojave) 11 miles downstream from Hoover Dam. The hatchery actively carries out the U.S. Fish and Wildlife Service Fishery Resource Priorities and mandated Federal Indian Trust Responsibilities. These include the production of rainbow trout for recreational fishing and economic development on five Native American tribal reservations and along the Colorado River. In addition, the hatchery plays a very active role in developing culture protocol for endangered razorback sucker and bonytail chub. Each summer thousands of these fishes are stocked in their native habitat, the Colorado River, with the aim of aiding their recovery.

***Economic output data for Willow Beach NFH for 2004 is not indicative of normal production years. The overall rainbow trout production for 2004 was 80 percent lower than 2005 (155,000 fish) due to a raceway construction project.**

Table 10. Willow Beach NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	0	0	32,537	0	0	32,537

Table 11. Willow Beach NFH 2004 RBT Stocking by State

Species	Arizona	California
Rainbow Trout	88%	12%





Economic Effects

Angling days generated: 161,138

Retail expenditures: \$5,800,500

Jobs generated: 110

Job income: \$2,808,500

Sales and motor fuel tax: \$333,300

State income tax: \$68,100

Federal income tax: \$460,700

Total economic output: \$10,985,600

Consumer surplus: \$8,234,700

**Region 3
Neosho National Fish Hatchery**

The Neosho National Fish Hatchery is the oldest federal hatchery in operation today. Established in 1888, it is located in southwestern Missouri near the Kansas border on the west and the Arkansas border on the south. The hatchery has a number of on-going fisheries programs, including: (1) provide mandated mitigation for rainbow trout, primarily for Lake Taneycomo, MO; (2) provide recovery efforts for the endangered pallid sturgeon; (3) provide protection for the endangered Ozark cavefish; (4) provide recovery efforts for threatened or endangered native mussels; (5) provide restoration efforts for candidate species lake sturgeon; and (6) provide restoration efforts for candidate species, paddlefish.

Table 12. Neosho NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	0	0	239,159	3,530	111,815	354,504

Table 13. Neosho NFH 2004 Stocking by State

Species	Missouri	Kansas	Iowa
Rainbow Trout	98%	1.4%	0.6%





Economic Effects

Angling days generated: 224,841
 Retail expenditures: \$8,225,500
 Jobs generated: 155
 Job income: \$4,112,400
 Sales and motor fuel tax: \$308,300
 State income tax: \$217,900
 Federal income tax: \$692,500
 Total economic output: \$16,512,900
 Consumer surplus: \$10,985,400

**Region 4
 Chattahoochee Forest National Fish Hatchery**

The Chattahoochee Forest National Fish Hatchery is located in Fannin County in northern Georgia. It is surrounded by the 750,000-acre Chattahoochee National Forest. The original facility was constructed in 1938 by the Civilian Conservation Corps and was owned and managed by the U.S. Forest Service and the Bureau of Sport Fisheries. The original purpose of the facility was to conserve, restore and enhance the recreational fisheries on waters within the Chattahoochee National Forest. Brook, brown and rainbow were reared at the hatchery and distributed throughout the streams and lakes of the National Forest. Early production approximated 20,000 fish annually. In 1955, a bilateral agreement between the U.S. Forest Service and the Bureau of Sport Fisheries and Wildlife assigned full responsibility to the Bureau. Production of the facility has been greatly increased through advances in feed and fish culture technology and by upgrading from circular production ponds to raceways. Rainbow trout is the primary species currently propagated and presently distribution commitments exceed 1 million fish annually. The mission of the station has been expanded to include the mitigation of three Federal water impoundments, providing fish to satisfy obligations of a Memorandum of Understanding (MOU) to the State of Georgia, and providing fish to satisfy the obligations of an MOU with the Eastern Band of Cherokee Indians. This facility is also involved in the conservation of imperiled non-game fishes.

***Economic output data for Chattahoochee Forest NFH for 2004 is not indicative of normal production years. The overall fish production for 2004 was approximately 37 percent less compared to previous and current years, due to an uncontrollable decrease in the number of fingerling rainbow trout received by the hatchery in 2004.**

Table 14. Chattahoochee Forest NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	19,305	37,890	850	319,858	241,416	647,543

Table 15. Chattahoochee Forest NFH 2004 RBT Stocking by State

Species	Georgia	North Carolina
Rainbow Trout	96%	4%



“Fannin County is indebted to the National Fish Hatchery System for its contribution to this area. Our main industry is tourism, and the abundance of streams stocked with rainbow trout is one of the major draws.”

Richard Vollrath, M.D.
 Chairman, Fannin County Board of Commissioners
 Blue Ridge, Georgia



Economic Effects

Angling days generated: 467,966
 Retail expenditures: \$18,974,300
 Jobs generated: 392
 Job income: \$9,975,500
 Sales and motor fuel tax: \$1,398,700
 State income tax: N/A
 Federal income tax: \$1,636,200
 Total economic output: \$39,157,100
 Consumer surplus: \$23,543,400

**Region 4
 Dale Hollow National Fish Hatchery**

This National Fish Hatchery is one of many serving a vital role in the management of our country’s fishery resources. Dale Hollow NFH was established to mitigate for fishery resources which were lost due to the construction of Federal water development projects in the Southeast. This is accomplished by stocking rainbow, brown, and lake trout in waters impacted by Federal dams. Stocking trout in public waters supports a significant recreational fishery which generates a substantial amount of economic activity for local and regional economies. This facility is also involved in the conservation of imperiled freshwater mussels and non-game fishes.

Table 16. Dale Hollow NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	669,288	175,980	8,709	12,221	130,233	996,768

Table 17. Dale Hollow NFH 2004 Stocking by State

Species	Tennessee
Rainbow Trout	100%



“My family lives for our weekend trout fishing adventures. I depend on the National Fish Hatchery System to provide my children with wonderful fishing opportunities in our local tailwaters—and the valuable moments of discovery and family time they bring.”

Kimberly Boyd
 Accountant and mother of two



Economic Effects

Angling days generated: 640,341
 Retail expenditures: \$27,485,200
 Jobs generated: 597
 Job income: \$12,593,200
 Sales and motor fuel tax: \$1,658,100
 State income tax: \$630,900
 Federal income tax: \$1,293,500
 Total economic output: \$50,300,100
 Consumer surplus: \$32,220,600

**Region 4
 Greers Ferry National Fish Hatchery**

The Greers Ferry National Fish Hatchery is located next to the tail waters of the Greers Ferry Dam administered by the U.S. Army Corps of Engineers on the Little Red River, in north central Arkansas. Hatchery construction began in 1965 after the Greers Ferry Dam was completed. The first trout were produced in 1966. Currently, the hatchery produces rainbow and brook trout to mitigate the fishery losses from COE water development projects in central and southeastern Arkansas and eastern Oklahoma. This facility is also involved in the conservation of imperiled non-game fishes.

Table 18. Greers Ferry NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	1,312,700	0	0	0	0	1,312,700

Table 19. Greers Ferry NFH 2004 RBT Stocking by State

Species	Arkansas	Oklahoma
Rainbow Trout	89%	11%





Economic Effects

Angling days generated: 1,039,439
 Retail expenditures: \$42,863,900
 Jobs generated: 916
 Job income: \$19,484,600
 Sales and motor fuel tax: \$2,594,700
 State income tax: \$921,700
 Federal income tax: \$2,073,700
 Total economic output: \$77,618,600
 Consumer surplus: \$52,452,800

**Region 4
 Norfolk National Fish Hatchery**

The Norfolk National Fish Hatchery is located below Norfolk Dam and Reservoir in Baxter County, Arkansas. Authorizing legislation for the Norfolk NFH was based on meeting the fishery needs arising from COE projects in the White River of northern Arkansas and southern Missouri. Norfolk stocked the most fish in FY 2004 at nearly 1.8 million, accounting for 19 percent of total NFH rainbow trout stockings.

Table 20. Norfolk NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	995,895	0	4,690	10,804	767,831	1,779,220

Table 21. Norfolk NFH 2004 Stocking by State

Species	Arkansas	Missouri	Tennessee	Oklahoma	Georgia
Rainbow Trout	92%	2.1%	2.1%	1.9%	1.8%



“I see an omission in this report concerning the economic value, both immediate and long term, for the youth of America. Norfolk NFH has provided invaluable opportunities for the Southern Council FFF Youth Conclave and the Boy Scouts in Arkansas. There is no telling the immediate impact these educational programs have on the young people and the future economic value of rainbow trout production by the National Fish Hatchery System for decades to come.”

Louis P. Semrau, Ph.D.
 The Northeast Arkansas Flyfishers
 Jonesboro, Arkansas



Economic Effects

- Angling days generated: 401,811
- Retail expenditures: \$15,933,300
- Jobs generated: 318
- Job income: \$7,188,200
- Sales and motor fuel tax: \$942,900
- State income tax: \$350,000
- Federal income tax: \$1,079,100
- Total economic output: \$31,216,500
- Consumer surplus: \$20,083,700

**Region 4
Wolf Creek National Fish Hatchery**

Wolf Creek NFH is located in Russell County in south-central Kentucky. The hatchery is situated about 1,800 feet below Wolf Creek Dam. Construction of the 240-foot concrete and earth dam, designed primarily for flood control and hydroelectric generation, was completed in 1950. The resultant impoundment, Lake Cumberland, totals 63,530 surface acres with 1,255 miles of shoreline.

Wolf Creek NFH currently provides mitigation fish for stocking in tailwaters below 13 COE impoundments across six different river basins in Kentucky. That portion of the trout program that takes place on state-managed lands is very important to the state of Kentucky. The fish distributed in support of the trout stream program provided over 163 miles of stream fishing in FY 1998. Wolf Creek NFH provided advanced fingerling (6-8 inches) brown trout and catchable (9 inches) rainbow trout in support of ongoing sportfishing programs in 18-state managed lakes and 32 state managed streams in FY 1998. These 50 management areas are located in 43 counties in Kentucky. The hatchery also provides fingerling and advanced-fingerling brown trout and advanced-fingerling and catchable rainbow trout to the Daniel Boone National Forest in eastern Kentucky. The hatchery distributes both rainbow and brown trout to two military installations in western Kentucky, Fort Campbell and Fort Knox. This facility is also involved in the conservation of imperiled non-game fishes.

Table 22. Wolf Creek NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	349,125	186,900	38,810	195,950	113,025	883,985

Table 23. Wolf Creek NFH 2004 Stocking by State

Species	Kentucky	Tennessee	Georgia	North Carolina
Rainbow Trout	78.1%	9.1%	6.8%	6%



“The economic puzzle in any community has many intricate pieces, and with millions of dollars generated, thousands of visitors attracted and the education of future generations ongoing, the Wolf Creek National Fish Hatchery is one of the most important pieces in the total economic picture of the entire Lake Cumberland area and beyond.”

Jacky Burton, Board Chairman, Russell County Tourist Commission Board Member, Russell County Chamber of Commerce



Economic Effects

Angling days generated: 26,989
 Retail expenditures: \$1,184,300
 Jobs generated: 21,
 Job income: \$435,500
 Sales and motor fuel tax: \$71,600
 State income tax: \$4,500
 Federal income tax: \$44,200
 Total economic output: \$2,021,300
 Consumer surplus: \$1,352,200

**Region 6
 Garrison Dam National Fish Hatchery**

Garrison Dam National Fish Hatchery was originally established in 1957 to provide fish for recreational fishing in new reservoirs created by federal water development projects in the Midwest. Today, the hatchery continues to provide management and production of many freshwater fishes for the Missouri River Dam development projects, National Wildlife Refuges, Native American waters, and state programs of North Dakota.

As many of the native fishes struggle with the changes in the Missouri aquatic ecosystems, the hatchery’s role has changed to include maintaining migratory fishes, such as the paddlefish, and restoring endangered species, such as the pallid sturgeon.

To meet the high fish production demands, Garrison Dam National Fish Hatchery encompasses 209 acres of land and has a total of 64 rearing ponds.

Table 24. Garrison Dam NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	0	40,175	7,769	3,405	0	51,549

Table 25. Garrison Dam NFH 2004 Stocking by State

Species	North Dakota
Rainbow Trout	100%



“Rainbow trout production is an effective tool for our fisheries managers. Essentially rainbow trout stockings fill the void for the benefit of the fisheries and anglers—and as a bonus provide a boost to the local economy.”

Rob Holm
 Project Leader
 Garrison Dam National Fish
 Hatchery Complex



Economic Effects

Angling days generated: 433,236
 Retail expenditures: \$26,078,700
 Jobs generated: 497
 Job income: \$12,849,100
 Sales and motor fuel tax: \$1,167,600
 State income tax: \$427,600
 Federal income tax: \$2,056,000
 Total economic output: \$50,413,700
 Consumer surplus: \$23,277,600

**Region 6
 Hotchkiss National Fish Hatchery**

Hotchkiss National Fish Hatchery was established in 1967 as part of the Colorado River Storage Project Act. Located in west-central Colorado about 50 miles southeast of Grand Junction, the hatchery rears rainbow trout for stocking in Colorado and New Mexico reservoirs and Federal water developments. Facilities include 24 nursery tanks, 32 concrete raceways and six earthen ponds.

Table 26. Hotchkiss NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	0	1,411,076	41,306	3,292	0	1,455,674

Table 27. Hotchkiss NFH 2004 RBT Stocking by State

Species	Colorado	New Mexico
Rainbow Trout	80.6%	19.4%



Economic Effects

Angling days generated: 395,477
 Retail expenditures: \$19,855,700
 Jobs generated: 376
 Job income: \$7,914,600
 Sales and motor fuel tax: \$1,082,200
 State income tax: \$210,900
 Federal income tax: \$811,900
 Total economic output: \$35,054,500
 Consumer surplus: \$20,480,900



Region 6 Jones Hole National Fish Hatchery

Jones Hole National Fish Hatchery was established in 1956 under Section 8 of the Colorado River Storage Project Act, and produced its first trout in 1970. Located on 390 acres in northeastern Utah near the town of Vernal, the hatchery provides management and production of trout for mitigation of Colorado River Storage Project waters of the Upper Colorado River System and to meet Tribal trust responsibilities on Native American land.

Table 28. Jones Hole NFH 2004 Stocking by Water Type (numbers of fish)

	Tailwater	Reservoir	Lake/Pond	Stream/Canal	Other Hatcheries	Total
Rainbow Trout	0	1,043,779	18,720	5,290	0	1,067,789

Table 29. Jones Hole NFH 2004 RBT Stocking by State

Species	Utah	Wyoming
Rainbow Trout	57.7%	42.3%



“We have many great fisheries in this country that people have come to enjoy and rely on. Throughout the history of this nation Americans have celebrated many great natural resources. The work of the National Fish Hatchery system is necessary to continue this historic natural resource tradition!”

Richard “Kip” Bottomley,
 Hatchery Manager
 Jones Hole National Fish Hatchery
 Vernal, Utah



Economic Effects of Hatchery Stocking

Federal hatcheries provide a variety of environmental and natural resource goods and services. These services can be grouped into four broad categories:

Recreation:

- Replacing lost fishing opportunities
- Creating additional fishing opportunities
- Visitor center and facility tours
- Expenditures by anglers and their effect on local and regional economies

Information:

- Environmental and fisheries educational programs
- Fisheries research
- Fish health diagnostics

Ecological Use:

- Mitigation of environmental damages

Federal Spending:

- Hatchery budget expenditures and their effect on local and regional economies



While this report focuses on recreation, people who use any of the above services benefit in the sense that their individual welfare or satisfaction level increases with the use of a particular good or service. Use of the good or service usually entails spending money in some fashion and these expenditures, in turn, create a variety of economic effects collectively known as **economic impacts**. Aside from these impacts, a measure of the magnitude of the change in welfare or satisfaction associated with using a particular good or service is **economic value**. For this report, the term **economic effect** encompasses both economic impacts and economic value.

Economic impacts refer to total economic output, jobs, job income, and federal and state tax revenue that occur as the result of consumer expenditures (retail sales) on angling - related goods and services.

Economic value is the economic trade-off people would be willing to make in order to obtain some good or service. It is the maximum amount people would be willing to pay in order to obtain a particular good or service minus the actual cost of acquisition. In economic theory this is known as net economic value or consumer surplus (see Aiken and La Rouche [p. 4] for more detailed information).





Spending associated with angling can generate a substantial amount of economic activity in local and regional economies. For example, anglers spend money on a wide variety of goods and services. Trip-related expenditures may include expenses for food, lodging and transportation. For example, most anglers also buy equipment and angling-related goods and services such as rods, reels, lures, hooks, lines, bait, boats, boat fuel, guide and outfitter services, camping equipment, and memberships in fishing clubs and organizations. Because this spending directly affects towns and communities where these purchases are made, angling can have a significant impact on local economies, especially in small towns and rural areas. These direct expenditures are only part of the total picture, however. Businesses and industries that supply the local retailers where the purchases are made also benefit from angler expenditures. For example, a family may decide to purchase a set of fishing rods for an upcoming vacation. Part of the total purchase price will go to the local retailer, say a sporting goods store. The sporting goods store in turn pays a wholesaler who in turn pays the manufacturer of the rods. The manufacturer then spends a portion of this income to cover manufacturing expenses. In this way, each dollar of local retail expenditures can affect a variety of businesses at the local, regional and national level. Consequently, consumer spending associated with angling can have a significant impact on economic activity, employment, household income and local, county, State and Federal tax revenue.

General approach

The general approach to estimating economic impacts associated with hatchery stocking is to link stocking information to angler days. Once angler days are determined, total retail sales can be calculated and economic impacts estimated. So, in a general sense:

Trout Stocking → Angler Days → Retail Sales → Economic Impacts



“Public waters stocked with rainbow trout provide something for everyone to enjoy and contribute immeasurably to one of our greatest national pastimes. In addition to excellent fishing they offer great opportunities to connect with the peace and beauty of nature. And more importantly, these resources made possible by the National Fish Hatchery System play a key role in developing conservation awareness in our future generations. We all live downstream.”

Tommy H. Wilkinson
Operations Manager
Bass Pro Shops Outdoor World,
Atlanta



Angling Days Generated

From the perspective of local communities, economic benefits accrue because of spending by visitors. For example, spending on angling-related goods and services by **residents** within a given area (town, county, state, etc.) is money *not* spent on non-angling goods and services; it is simply a transfer of spending from one set of goods and services (non angling-related) to a different set of goods and services (angling-related). However, from the perspective of residents of the area, spending by non-residents creates a net addition to area wealth and economic well-being.

Residents refer to state residents **and non-residents** refer to anglers residing outside of the state stocked. Information from the *2001 National Survey of Fishing, Hunting and Wildlife Associated Recreation* (U.S. Department of the Interior et al. 2002) on the percentage of annual angler days for each group by state was used. These percentages are based on state-wide estimates for all freshwater recreational species in 2001. For this report, it is assumed that these percentages also pertain to the estimates of state-wide angler days associated with NFH RBT stocking.

By applying these stocking ratios to the number of fish stocked by each hatchery, the number of angling days associated with rainbow trout stocked by each hatchery can be estimated.

Table 33 shows rainbow trout angler days by state. Arkansas had the most angler days with 1.5 million angler days accounting for 39 percent of total rainbow trout angler days. Tennessee, Colorado and Kentucky followed with 14 percent, 9 percent and 8 percent respectively.

Table 33. Total NFH Rainbow Trout Angler Days by State

State	Resident Angler Days	Non-Resident Angler Days	Total Angler Days	Percent of Total Angler Days
AR Total	1,345,578	183,488	1,529,066	39.2%
TN Total	468,479	57,902	526,381	13.5%
CO Total	244,432	104,757	349,188	9.0%
KY Total	282,433	31,381	313,815	8.1%
GA Total	250,560	10,440	261,000	6.7%
UT Total	205,371	22,819	228,190	5.9%
MO Total	152,801	26,965	179,765	4.6%
WY Total	118,774	48,513	167,287	4.3%
NM Total	94,524	18,005	112,529	2.9%
OK Total	85,637	2,649	88,286	2.4%
AZ Total	69,563	6,880	76,443	2.0%
NC Total	31,962	2,040	34,002	0.87%
ND Total	24,290	2,699	26,989	0.69%
KS Total	2,188	68	2,256	0.06%
IA Total	909	58	967	0.02%
CA Total	485	15	500	0.01%
Grand Total	3,377,987	518,678	3,896,664	100.0%



Table 32 summarizes the number of resident and non-resident angler days for each of the eleven hatcheries based on 2004 stocking. Region 4 accounts for 2.8 million angler days, about 71 percent of the total number of rainbow trout angler days in 2004. Region 6 followed with 855,702 angler days accounting for 22 percent of the total. Region 3 had 4 percent of total angler days and Region 2 had 3 percent. [note: stocking numbers in Tables 32 and 33 are slightly different because of rounding.]

Table 32. Angling Days Generated by National Fish Hatchery Rainbow Trout Stocking: FY 2004

Hatchery	Resident Angler Days	Non-Resident Angler Days	Total Angler Days
Region 2			
Alchesay-Williams Creek	90,241	11,116	101,357
Willow Beach	3,731	336	4,067
Region 2 Total	93,972	11,452	105,424
Region 3			
Neosho	137,325	23,813	161,138
Region 4			
Chattahoochee Forest	215,650	9,192	224,841
Dale Hollow	416,490	51,476	467,966
Greers Ferry	569,667	70,674	640,341
Norfolk	917,547	121,892	1,039,439
Wolf Creek	363,868	37,943	401,811
Region 4 Total	2,483,222	291,177	2,774,398
Region 6			
Garrison Dam	24,920	2,699	26,989
Hotchkiss	315,032	118,204	433,236
Jones Hole	324,145	71,332	395,477
Region 6 Total	664,097	192,235	855,702
Total 2004 RBT Stocking	3,378,616	518,677	3,897,293



Total Retail Expenditures

Once angler days are estimated, the next step is to combine these estimates with per day angler expenditures to derive total retail expenditures associated with NFH rainbow trout stocking. **Table 34** shows per day angling expenditures by Region adjusted for inflation to 2004 dollars.

These expenditures were obtained from the *2001 National Survey of Fishing, Hunting and Wildlife Associated Recreation* (U.S. Department of the Interior et al. 2002) and represent Region-wide averages for per day per angler freshwater fishing-related expenditures. These expenditures include: (1) food; (2) lodging; (3) transportation; (4) guide fees; (5) public land access; (6) private land access; (7) equipment rental; (8) bait; (9) ice; and (10) boat fuel

<i>Table 34. Angling Day Expenditures by Region and by Resident and Non-Resident (2004 \$)</i>		
Region	Resident Expenditures	Non-Resident Expenditures
1	\$64.32	\$116.92
2	\$56.91	\$92.30
3	\$29.58	\$72.29
4	\$34.24	\$91.57
6	\$36.01	\$114.72

source: U.S. Department of the Interior et al. 2002



“Stocked trout play an integral role in providing a diversity of recreational angling experiences across northern Georgia. The success of our agency’s trout stocking program is only possible through an outstanding partnership with the NFHS. The NFHS provides 80% of the eggs, 40% of the fingerlings, and nearly 30 % of the adult trout used by the state of Georgia in the production and distribution of 1.1 million catchable size fish annually to benefit our trout anglers. This decades-long partnership is an excellent example of state/federal cooperation to serve recreational anglers on hatchery-supported waters. I look forward to this program continuing to meet the needs of our angling public.”

Charles C. Coomer, Chief
 Fisheries Management Section
 Georgia Wildlife Resources Division



Combining angler days with angling expenditures for residents and non-residents for each hatchery, total angler retail expenditures are estimated. **Table 35** shows total angling related retail expenditures by hatchery and Region. These figures represent retail spending associated with angling for rainbow trout stocked by the respective hatchery.

Table 35. Recreational Use of FY 2004 NFH Rainbow Trout Stocking: Retail Expenditures
(all dollar figures in '000's of dollars; inflation adjusted to 2004 \$)

Region/Hatchery	Retail sales
Region 2	
Alchesay-Williams Creek	\$6,161.6
Willow Beach	\$247.3
Region 2 Total	\$6,408.9
Region 3	
Neosho	\$5,800.5
Region 4	
Chattahoochee Forest	\$8,225.5
Dale Hollow	\$18,974.3
Greers Ferry	\$27,485.2
Norfolk	\$42,863.9
Wolf Creek	\$15,933.3
Region 4 Total	\$113,482.2
Region 6	
Garrison Dam	\$1,184.3
Hotchkiss	\$26,078.7
Jones Hole	\$19,855.7
Region 6 Total	\$47,118.7
Total RBT Retail Expenditures	\$172,675.1



Total Economic Impacts

Recreational fishing for trout produced and stocked by the various hatcheries results in considerable expenditures for recreation-related goods and services. **Table 36** shows total angler expenditures associated with recreational angling for rainbow trout produced and stocked by Federal hatcheries along with estimates of total industrial output, jobs and job income, sales and motor fuel taxes, state income tax and Federal income tax revenue. These estimates were obtained using multipliers from the report, *The Economic Importance of Sport Fishing* published by the American Sportfishing Association. The multipliers were derived using the Regional Input-Output Modeling System (RIMS II)¹¹ developed by the Bureau of Economic Analysis of the Department of Commerce (Maharaj and Carpenter, pp. 3-4, 1997c). The estimated economic impacts in this report are state-wide impacts; information is not available to disaggregate impacts down to the local community or county level.



Retail sales shows the total annual angling expenditures associated with the recreational catch of the specified hatchery's rainbow trout stocking. The figures include spending in all states where hatchery fish are released.

Total Industrial output shows the total industrial output generated by the angler expenditures. Total output is the production value (alternatively, the value of all sales plus or minus inventory) of all output generated by angling expenditures. Total output includes the direct, indirect and induced effects of angling expenditures. Direct effects are simply the initial effects or impacts of spending money; for example, spending money in a grocery store for a fishing trip or purchasing fishing line or bait are examples of direct effects. The purchase of the fishing line by a sporting goods retailer from the line manufacturer or the purchase of canned goods by a grocery from a food wholesaler would be examples of indirect effects. Finally, induced effects refer to the changes in production associated with changes in household income (and spending) caused by changes in employment related to both direct and indirect effects. More simply, people who are employed by the grocery, by the food wholesaler, and by the line manufacturer spend their income on various goods and services which in turn generate a given level of output. The dollar value of this output is the induced effect of the initial angling expenditures. For more information, see *Regional Multipliers: A User Handbook for the Regional Input-Output Modeling System (RIMS II)* (U.S. Department of Commerce 1997).



The economic impact of a given level of expenditures depends, in part, on the degree of self-sufficiency of the area under consideration. For example, an area with a high degree of self-sufficiency (out-of-area imports are comparatively small) will generally have a higher level of impacts associated with a given level of expenditures than an area with significantly higher imports (a comparatively lower level of self-sufficiency). Consequently, the economic impacts of a given level of expenditures will generally be less for rural and other less economically integrated areas compared with other, more economically diverse areas or regions.



Additionally, the economic impacts estimated in this report are state-level impacts. Information on where expenditures may occur locally and the magnitude of resident and non-resident local and regional expenditures is not currently available for the states associated with rainbow trout angling. Generally speaking, non-resident expenditures bring "outside" money into the area and thus generate increases in real income or wealth. Spending by residents is simply a transfer of expenditures on one set of goods and services to a different set. In order to calculate "net" economic impacts, much more detailed information would be necessary on expenditure patterns and angler characteristics. Since this information is not currently available for all the states affected by NFH fish stocking, gross state-level estimates are used (for additional information, see Loomis p. 191 and U.S. Department of Commerce 1997, pp. 7-9).



Jobs and job income includes both full and part-time jobs with associated wages and salaries, with a job defined as one person working for at least part of the calendar year, whether one day or the entire year

Taxes include revenues from sales and motor fuel taxes, state income taxes (where applicable) and federal income tax generated by angler expenditures on NFH stocked rainbow trout.

Retail sales associated with recreational angling for NFH rainbow trout totaled \$172.7 million in FY 2004 which generated \$325.1 million in total economic output. Over 3,500 jobs are associated with this economic activity with wage and salary income of over \$80 million. Sales and motor fuel taxes totaled \$9.9 million, state income tax \$2.9 million and Federal income tax came to \$10.6 million.

Table 36. Recreational Use of FY 2004 NFH Rainbow Trout Stocking: Summary of Economic Impacts
(all dollar figures in '000's of dollars; inflation adjusted to 2004 \$)

Region/Hatchery	Retail sales	Total Industrial output	Jobs	Job Income	Sales and motor fuel taxes	State income tax	Federal income tax
Region 2							
Alchesay-Williams Creek	\$6,161.6	\$11,299.9	115	\$2,788.3	\$355.3	\$75.8	\$416.6
Willow Beach	\$247.3	\$473.4	5	\$121.8	\$14.6	\$3.3	\$20.3
Region 2 Total	\$6,408.9	\$11,773.3	120	\$2,910.1	\$369.9	\$79.1	\$436.9
Region 3							
Neosho	\$5,800.5	\$10,985.6	110	\$2,808.5	\$333.3	\$68.1	\$460.7
Region 4							
Chattahoochee Forest	\$8,225.5	\$16,512.9	155	\$4,112.4	\$308.3	\$217.9	\$692.5
Dale Hollow	\$18,974.3	\$39,157.1	392	\$9,975.5	\$1,398.7	na	\$1,636.2
Greers Ferry	\$27,485.2	\$50,300.1	597	\$12,593.2	\$1,658.1	\$630.9	\$1,293.5
Norfork	\$42,863.9	\$77,618.6	916	\$19,484.6	\$2,594.7	\$921.7	\$2,073.7
Wolf Creek	\$15,933.3	\$31,216.5	318	\$7,188.2	\$942.9	\$350.0	\$1,079.1
Region 4 Total	\$113,482.2	\$214,805.2	2,378	\$53,353.9	\$6,902.7	\$2,120.5	\$6,775.0
Region 6							
Garrison Dam	\$1,184.3	\$2,021.3	21	\$435.5	\$71.6	\$4.5	\$44.2
Hotchkiss	\$26,078.7	\$50,413.7	497	\$12,849.1	\$1,167.6	\$427.6	\$2,056.0
Jones Hole	\$19,855.7	\$35,054.5	376	\$7,914.6	\$1,082.2	\$210.9	\$811.9
Region 6 Total	\$47,118.7	\$87,489.5	894	\$20,839.2	\$2,321.4	\$643.0	\$2,912.1
Total RBT Impacts	\$172,675.1	\$325,053.6	3,502	\$80,271.7	\$9,927.5	\$2,910.7	\$10,584.7



Net Economic Value (Consumer Surplus)

Table 37 shows per angling day estimates of net economic value for trout fishing (Aiken and La Rouche 2003). These values are based on statewide averages for 19 states and represent the lower bound of the 95 percent confidence interval (Aiken and La Rouche 2003, p. 9). The numbers are fairly close to those in Kaval and Loomis (p. 7) which show a per person per day value for recreational angling of \$47.42 (based on 129 studies from 1967 to 2003, adjusted for inflation to 2004 dollars). These numbers represent the maximum amount anglers would be willing to pay (minus their actual expenses) for the angling experience associated with trout fishing. Alternatively, net economic value (also known as **consumer surplus**) is the difference between the total value people *receive* from the consumption of a particular good (in this case recreational angling for NFH stocked rainbow trout) and the total amount they *pay* for the good. The amount people pay to obtain a good or service (e.g., retail sales) plus net economic value (consumer surplus) is also known as **gross benefits** or **total consumer's surplus**; see Varian (p. 244) and Just et al. (p. 101) for additional information). However it is **net benefits** (net economic value) which are the most appropriate measure of the social or public economic benefits of recreational angling for NFH-produced and stocked fish.

Table 37. Trout Fishing Net Economic Values Per Day (2004 \$)

	Resident Net Economic Value	Non-Resident Net Economic Value
Trout Fishing Values per Day	\$48	\$69





Table 38 summarizes net economic value generated by anglers fishing for NFH-produced and stocked rainbow trout. Almost \$198 million in net economic value is generated by the hatcheries. Region 4 contributes \$139.3 million in net economic value, Region 6 almost \$45.1 million, Region 3 \$8.2 million and Region 2 \$5.4 million.

Table 38. National Fish Hatchery FY 2004 Rainbow Trout Stocking: Net Economic Value (Consumer Surplus) ('000's of dollars; inflation adjusted to 2004 \$)

Hatchery	Net Economic Value(consumer surplus)
Region 2	
Alchesay-Williams Creek	\$5,098.6
Willow Beach	\$202.3
Region 2 Total	\$5,300.9
Region 3	
Neosho	\$8,234.7
Region 4	
Chattahoochee Forest	\$10,985.4
Dale Hollow	\$23,543.4
Greers Ferry	\$32,220.6
Norfolk	\$52,452.8
Wolf Creek	\$20,083.7
Region 4 Total	\$139,285.9
Region 6	
Garrison Dam	\$1,352.2
Hotchkiss	\$23,277.6
Jones Hole	\$20,480.9
Region 6 Total	\$45,110.7
2004 RBT Total	\$197,932.1



Summary

Over and above the major contributions of the Federal hatcheries to fisheries conservation in the U.S., the production and stocking of rainbow trout by the 11 hatcheries results in a significant amount of related economic activity.

Table 39 summarizes retail sales, total industrial output, jobs and job income by the Region where stocking takes place. **Table 40** summarizes sales and motor fuel tax revenue, state income tax and Federal tax revenue.

Table 39. Economic Impacts of NFH Rainbow Trout Stocking by Region: 2004 (all dollar figures in 000's of dollars, 2004 \$)

Region	Retail Sales	Total Output	Jobs	Job Income
1	\$33.0	\$67.9	1	\$17.9
2	\$16,753.1	\$31,081.3	335	\$7,446.3
3	\$6,500.2	\$12,303.5	123	\$3,149.7
4	\$107,577.9	\$202,834.8	2,242	\$50,383.3
6	\$41,946.2	\$78,766.1	802	\$19,274.5
Total	\$172,810.4	\$325,053.6	3,502	\$80,271.7

Table 40. Economic Impacts of NFH Rainbow Trout Stocking by Region: 2004 (all dollar figures in 000's of dollars, 2004 \$)

Region	Sales and Motor Fuel Tax	State Income tax	Federal Income tax	Total Tax revenue
1	\$2.3	\$0.8	\$3.2	\$6.3
2	\$969.3	\$303.3	\$902.0	\$2,174.6
3	\$372.9	\$75.3	\$517.4	\$965.6
4	\$6,563.2	\$1,961.2	\$6,444.4	\$14,968.8
6	\$2,019.8	\$570.1	\$2,717.8	\$5,307.7
Total	\$9,927.5	\$2,910.7	\$10,584.7	\$24,423.0



Table 41 shows economic impacts by state (where stocking occurred) with respect to retail sales, industrial output, jobs and job income.



Table 41. NFH Rainbow Trout Stocking: 2004 Economic Impacts by State

State	Retail Sales	Industrial Output	Jobs	Job Income
Arkansas	\$62,874,586	\$112,749,257	1,346	\$28,300,570
Tennessee	\$21,342,806	\$44,044,922	441	\$11,220,695
Colorado	\$20,819,664	\$41,520,361	403	\$10,884,561
Kentucky	\$12,544,114	\$24,256,470	248	\$5,422,377
Utah	\$10,013,226	\$20,529,252	225	\$5,213,913
Wyoming	\$9,842,478	\$14,525,279	151	\$2,700,691
Georgia	\$9,535,169	\$19,103,716	178	\$4,749,765
New Mexico	\$7,041,220	\$11,907,068	127	\$2,630,320
Missouri	\$6,469,131	\$12,239,870	123	\$3,135,367
Oklahoma	\$5,118,069	\$10,482,565	121	\$2,589,525
Arizona	\$4,593,823	\$8,691,708	87	\$2,226,469
North Carolina	\$1,281,177	\$2,680,473	29	\$689,874
North Dakota	\$1,184,305	\$2,021,332	21	\$435,483
Kansas	\$86,563	\$169,867	2	\$39,893
California	\$32,966	\$67,850	1	\$17,856
Iowa	\$31,076	\$63,577	1	\$14,325
Total	\$172,810,372	\$325,053,567	3,502	\$80,271,685



Table 42 shows motor fuel and sales tax revenue, state income tax revenue and federal income tax revenue also by state.

Table 42. NFH Rainbow Trout Stocking: 2004 Economic Impacts by State (Thousands, 2004 \$)

State	Sales and Motor Fuel Taxes	State Income Tax	Federal Income tax	Total Taxes
Arkansas	\$3,822.6	\$1,375.0	\$2,902.6	\$8,100.1
Tennessee	\$1,573.3	\$0	\$1,840.5	\$3,413.8
Colorado	\$860.4	\$352.9	\$1,855.8	\$3,069.1
Kentucky	\$751.8	\$300.0	\$790.3	\$1,842.2
Utah	\$660.5	\$210.9	\$557.5	\$1,428.9
Wyoming	\$421.8	\$0	\$254.4	\$676.1
Georgia	\$352.0	\$252.9	\$802.6	\$1,407.4
New Mexico	\$411.3	\$100.0	\$268.1	\$779.4
Missouri	\$371.1	\$74.5	\$515.1	\$960.7
Oklahoma	\$294.5	\$150.4	\$268.1	\$713.0
Arizona	\$263.5	\$52.9	\$365.8	\$682.2
North Carolina	\$63.4	\$33.2	\$108.4	\$205.0
North Dakota	\$71.6	\$4.5	\$44.1	\$120.2
Kansas	\$5.5	\$1.9	\$5.9	\$13.3
California	\$2.3	\$0.86	\$3.2	\$6.5
Iowa	\$1.8	\$0.78	\$2.2	\$4.9
Total	\$9,927.5	\$2,910.7	\$10,584.7	\$23,422.9



Table 43 compares retail sales and net economic value with rainbow trout expenditures in FY 2004. For every \$1 of rainbow trout budget expenditures, \$32.20 of retail sales and \$36.88 of net economic value are associated with these budget expenditures. These comparisons are provided only for the purpose of broadly comparing the magnitude of economic effects resulting from recreational angling for NFH-stocked rainbow trout to budget expenditures and should not be interpreted as a benefit-cost ratio.

Table 43. Comparison of Selected Impacts with Rainbow Trout Expenditures (inflation adjusted to 2004 \$)

FY 2004 RBT Expenditures	Retail Sales	Net Economic Value
\$5,366,600	\$172,810,400	\$197,932,100
Per \$1 of RBT Expenditures	\$32.20	\$36.88



“The Wolf Creek National Fish Hatchery plays a major role in the economic impact of the Southern Kentucky Lakes Region. Fishing and water-related sports and events play an integral part in attracting visitors to the area. According to a recent study produced for the State of Kentucky, by D.K. Shifflet and Associates, the three most popular activities participated in by Southern Kentucky Lakes Region visitors are boating, hunting/fishing and dining...notably different than much of the rest of Kentucky’s nine regions.”

Cheryl Hatcher
Deputy Commissioner
Kentucky Department of Tourism



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