

NEW JERSEY'S TROUT PROGRAM

Part I – Stocking Trout...It's All in the NUMBERS

By Pat Hamilton, Principal Fisheries Biologist



New Jersey offers anglers an impressive variety of trout fishing opportunities year round. Our outstanding and multifaceted trout program is a well-oiled machine, occasionally fine-tuned to enhance trout angling opportunities. Behind the scenes a small army of staff and volunteers perform a myriad of tasks with one goal in mind: providing quality trout fishing opportunities year in and year out.

The popularity and success of this program is due in large part to Fish & Wildlife's trout stocking program. Over the last century, millions of trout raised in our state-run hatcheries have provided outdoor recreational fun for countless children and adults. Yet most anglers are not familiar with the inner workings of this program. This article, Part I of a multi-part series, offers a behind-the-scenes glimpse of the methodology used to allocate our hatchery-reared trout.

Prior to 1990, the statewide trout allocation was based on a tradition that heavily relied upon political boundaries. Back then, each of the 21 counties had their "trout quota" and the Fish and Game Council would determine the number of trout stocked in each waterbody. When a waterbody was dropped from the stocking program, it was common practice to redistribute those trout to other trout-stocked waters within that county. Council members, when besieged with requests from anglers, would also vie for more trout for their county of interest. The unpredictability in the number of trout produced—at that time from the Hackettstown Hatchery—compounded this allocation dilemma. Thus, over time

there developed some glaring inequities in the number of trout allocated to individual waters.

When the state of the art Pequest Trout Hatchery was constructed in the early-1980s, its cold and dependable well water enabled us to consistently rear a predictable number of trout annually. With a stable supply of cultured trout assured, efforts then turned to the development of a more equitable method to allocate trout statewide. After much trial and error, which included a 1989 public forum to solicit input from anglers, the "Trout Stocking Improvement Plan" was implemented the following year. At the heart of this plan, and still in use today (with a few "tweaks" over the years), is a trout allocation methodology that uses a database and formulas to derive the weekly spring trout allocations for nearly 200 ponds, lakes and streams statewide. The underlying principle of this methodology is that trout-stocked waters with similar characteristics are stocked with a similar number of trout.

How are the spring trout allocations determined?

Each pond, lake and stream (or stream segment) is listed in our computer database and character-

ized using a suite of physical, biological and social attributes. The physical size of a waterbody plays the largest role in determining the individual trout allocations. Streams are separated into five categories based upon their size (flow) and each size category is assigned a stocking rate. Large streams like the lower Musconetcong River have the highest rate (485 trout per mile, pre-season); our smallest streams have the lowest rate (135 trout per mile, pre-season).

Lakes and ponds are divided into three size categories based on surface area; a sliding-scale stocking rate is used. For the pre-season period, this rate is 75 trout per acre for the first 5 acres, five trout per acre for the next 6–30 acres and one trout per acre for each additional acre over 30 acres. The sliding scale is necessary because if large lakes were stocked at the same rate as small ponds, the supply of trout would quickly be exhausted by just a few large lakes.

For each stream, the appropriate stocking rate is multiplied by the stream mileage. This mileage is determined by assigning ½ mile to each stocking point (¼ mile above and below each point, discounting overlap and dams that prevent upstream fish movement). For lakes and ponds the appropriate stocking rate(s) is applied using their surface acreages.

Next, these initial allocations are adjusted using biological and social attributes. The biological attributes characterize the trout fishery in each water as either seasonal (trout survival in the summer is minimal to absent) or year round (trout thrive throughout the year). Those waters able to support trout year round have their allocation increased by 10 percent.

Adjustments are also made using social attributes, which describe conditions that enhance or limit fishing. The social attributes for streams are land ownership (percent publicly owned), availability of parking and angler interest. These factors affect the anglers' ability to fish the stream and describe the intensity of usage. For example, an allocation is increased by 10 or 20 percent if the stream has good parking, flows through public land, and is very popular. However, if conditions are less than ideal, then a stream's allocation might remain unchanged or be reduced by 10 or 20 percent, depending on the extent of its social limitation.

On lakes and ponds, the human population density, number of nearby trout fishing opportunities and shoreline/boating access is considered.

O + F + D + L + P = 0.9

Those near high population areas receive 10 or 30 percent more trout, because they serve a large number of anglers. If other trout fishing opportunities (within a 10-mile radius) are limited, then the allocation would increase 30 percent (no opportunities) or 10 percent (1-5 opportunities).

Once the allocations are adjusted by biological and social factors, the result is the number of trout the waterbody receives prior to opening day, referred to as the pre-season allocation. Typically, most waterbodies receive the greatest number of trout pre-season, and lesser quantities of trout each time they are stocked in season (after opening day). Each in-season allocation is a strict percentage of the pre-season allocation.

Larger streams are stocked more often than smaller streams because they are more heavily fished and have more water. The first in-season stocking on streams is usually 40 or 45 percent that of the pre-season allocation and this percentage dwindles to 25 percent by the end of the season (when water temperatures rise and flow subsides). The only exception is for small streams, which receive so few trout to begin with that the pre- and in-season allocations are identical. Lakes and ponds are typically stocked three times after opening day, with 75 percent of the pre-season allocation each time. A fourth stocking is added if the waterbody is near a populated area.

The last step in the trout allocation methodology involves one final set of adjustments. When the individual allocations are totaled statewide, the sum must equal the number of trout available for spring stocking—570,000 trout—Pequest hatchery's annual spring baseline. All the allocations are proportionally adjusted to achieve this baseline figure. Finally, all allocations are rounded to the nearest multiple of ten. With this last adjustment the grand total is very close (but seldom exactly equal) to 570,000 trout.

Though this trout allocation methodology may seem complicated, it provides us with the means to allocate trout equitably. Larger waters receive more trout than smaller waters. Good trout streams and lakes in north Jersey having year round fisheries are rewarded with more fish, but so too are the far-flung lakes and ponds in central and south Jersey that don't support trout year round. A more detailed explanation of the allocation methodology can be found in Fish and Wildlife's Coldwater Fisheries Management Plan, available at NJFishandWildlife.com.

An array of formulas is used in conjunction with a computerized database to determine the number of trout allotted to each trout-stocked water.



Calculation of Individual Trout Allocations for Spring 2010

Calculate the Unadjusted Weekly Allocations for Each Stream Using the Following Formula:

$$Q * M * [1 + F + R] * K$$

Stocking Rate (Q)	Category A	Q = 485 trout/mile
	Category B	Q = 395 trout/mile
	Category C	Q = 260 trout/mile
	Category D	Q = 210 trout/mile
	Categories E & F	Q = 135 trout/mile
Mileage (M)	M = number of miles stocked ¹	
Fishery Type (F)	Seasonal	F = 0.0 (no change)
	Year-round	F = 0.1 (10% increase)
Recreational Potential (R)	RP = 5 (outstanding)	R = 0.2 (20% increase)
	RP = 4 (excellent)	R = 0.1 (10% increase)
	RP = 3 (good)	R = 0.0 (no change)
	RP = 2 (fair)	R = -0.1 (10% decrease)
	RP = 1 (poor)	R = -0.2 (20% decrease)

Consult table below for value assigned to K

Stream Characteristics	Pre-Season	Weekly stocking frequency and value assigned to K						
		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
A, B, & C Closed in-season stocking dates, year round fishery or DMR Feeder Canal not trout production	1.2	0.45	0.4	0.4	0.4	0.4	0.25	0.25
A, B, & C Closed in-season stocking dates; trout production	1.0		0.4	0.4	0.4	0.4	0.25	0.25
A & B No closed in-season stocking dates; year round fishery or DMR Feeder Canal No closed in-season stocking dates; seasonal fishery	1.0	0	0.4	0.4	0.4	0.4	0	0
C No closed in-season stocking dates; year round fishery No closed in-season stocking dates; seasonal fishery	1.0	0	0.4	0.4	0.4	0.4	0	0
D RUP = 3, Year-round fishery 4, or 5 Seasonal fishery			0.4	0.4	0.4	0.4	0	0
E RUP = 1 or 2 year round fishery			0.4	0.4	0.4	0.4	0.25	0
F seasonal fishery							0	0
Note (all inclusive)								

Calculation of Individual Trout Allocations for Spring 2010

Calculate the Unadjusted Weekly Allocations for Each Pond & Lake Using the Following Formula:

$$Q * [1 + F + D + L + P] * 0.95 * K$$

VARIABLE	CRITERIA	ASSIGNED VALUE
Stocking Rate Subformula (Q)	Surface area (A) is 1 to 5 acres	Q = [75 * A]
	Surface area (A) is 6 to 30 acres	Q = [5 * (A - 5)] + 375
	Surface area (A) is over 30 acres	Q = [1 * (A - 30)] + 500
Fishery Type (F)	seasonal	F = 0.0 (no change)
	year-round	F = 0.1 (10% increase)
Human Population Density (D)	less than 1,000 people/sg. mile	D = 0.0 (no change)
	1,000 - 4,999 people/sg. mile	D = 0.1 (10% increase)
	at least 5,000 people/sg. mile	D = 0.2 (20% increase)
Angler Access (L)	boat access present AND shoreline at least 25% accessible (Note: if lake < 10 acres then boat access not present OR shoreline < 25% accessible (Note: if lake < 10 acres then boat access criteria does not apply))	L = 0.0 (no change)
	boat access not present AND shoreline less than 25% accessible (Note: if lake < 10 acres then boat access criteria does not apply)	L = -0.2 (20% decrease)
Angling Opportunity (P)	more than 5 TSW within a 10 mile radius	L = -0.4 (40% decrease)
	1 - 5 TSW within a 10 mile radius	P = 0.0 (no change)
	No TSW within a 10 mile radius	P = 0.1 (10% increase)
Frequency Factor (K)	No TSW within a 10 mile radius	P = 0.3 (30% increase)

Consult table below for value assigned to K

Pond/Lake Characteristics	Pre-Season	Weekly stocking frequency and value assigned to K						
		Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7
Year round None (all inclusive)	1.0	0	1.0	0	1.0	0	1.0	0
Seasonal ¹ surface area at least 1,000 Stocked pre-season only	1.0	1.0	1.0	0	1.0	0	1.0	0
Human population density 5,000+ people/sg. mile OR no trout-stocked waters within a 10 mile radius	1.0	0.75	0.75	0.75	0.75	0	0	0
All other waters		0.75	0.75	0.75	0			

Q * A * I * F * R * K

How often are changes made to the database and formulas?

The database is reviewed and updated annually. Therefore, the allocations for an individual waterbody may change from year to year as a result of program and database changes.

Where can I find the allocation numbers?

The spring allocations are announced at the public meeting held each February at the Pequest Trout Hatchery and then posted, along with the in-season stocking schedule, on Fish and Wildlife's Web site.

How can I get more trout stocked in my favorite lake or stream?

The trout allocation for a waterbody stays about the same from year to year unless circumstances there have changed. Circumstances seldom change at ponds and lakes. Their physical size doesn't change, and the other biological and social factors previously described remain fairly constant. On the other hand, the allocations for streams can fluctuate from year to year. When stocking points on a stream are added or dropped, the stream mileage figure must be adjusted, in

turn affecting the allocation. Also, when land ownership along a trout-stocked stream section changes from private to public, increasing public access, a stream's allocation may increase accordingly.

Are the fall and winter trout allocations calculated the same way as the spring allocations?

The fall baseline for streams is 16,700 trout and each fall-stocked stream is proportionally allocated based upon their pre-season allocation. The baseline for lakes and ponds in the fall (3,300 trout) and winter (5,000) and their individual allocations were set when these stocking programs were established; the individual allocations have changed very little over the years.

I know a waterbody that would be great for trout fishing. Can Fish and Wildlife stock it with trout?

While it would be great to expand the trout stocking program and add new waters to the list, it is important to understand there is a finite number of trout available for stocking. If more waters are stocked, existing stocked waters will receive fewer fish and trout fishing in those waters could suffer.

Additionally, in order for a waterbody to be stocked with trout, it must be formally incorporated into the listing of trout stocked waters in the New Jersey Fish Code. Every two years the Fish and Game Council reviews requests from the public for stocking changes plus recommendations from agency biologists, and then decides which waterbodies to include in a formal proposal. Following a public hearing, the proposal is adopted with or without changes. Requests for changes to the Fish Code for the 2014-2015 fishing season should be submitted to the Council by September, 2012.

What else does Fish and Wildlife do under its trout program, besides stock trout?

A less visible, but equally important component of our trout program is the research and management activities. These range from surveys in lakes and streams to assess their trout fisheries, to the development of trout fishing regulations, to protection of water quality and habitat. In the 2012 freshwater edition of this *Digest*, Part II of this series will explore interesting aspects of Fish and Wildlife's trout research and management programs. Don't miss it! 



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For the first time in over 20 years, the number of New Jersey anglers increased four consecutive years from 2006 through 2009. In total, the number of New Jersey anglers in 2009 was more than 10 percent greater than 2005. Non-resident anglers increased more than 25 percent from 2005 to 2009. During this same period, many other states saw declines in angler numbers.

What's behind New Jersey's increase in fishing participation? Likely it's a combination of factors encouraging more people to fish. New Jersey has fabulous fishing opportunities, more fishing access, better

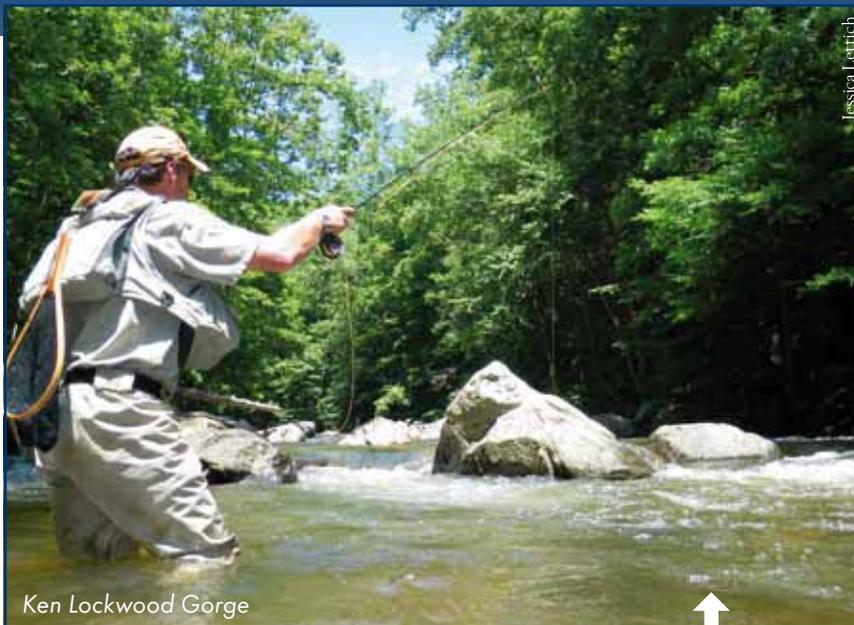
information resources and easy online licensing. Fishing's popularity as a way to relax and enjoy the outdoors is strong. Plus targeted advertising and marketing highlight all the reasons to fish in New Jersey.

Why People Fish in New Jersey

Fishing is a wonderful way to unwind and to experience the outdoors. In fact, nearly 70 percent of New Jersey anglers surveyed in 2009 cited enjoying the outdoors and escaping the stresses of everyday life as the top reasons they go fishing. As the pace of life quickens and the need for escape, relaxation and a connection to nature grows, an increasing number of people may satisfy all of those needs through fishing.

Excitement of the catch is another key reason cited by around 50 percent of our anglers for why they fish. There's certainly no lack of excitement since freshwater fishing has never been better in New Jersey. At no time in our state's history has there been a greater diversity and quality of thriving game fish populations for anglers to pursue than now. The double-digit percentage increase in non-resident anglers speaks volumes about the quality of fishing in our state and clearly the word is spreading.

The dramatic improvement in New Jersey's fisheries has taken place over the last 20 years through progressive fisheries management and fish stocking programs made possible by the Division of Fish and Wildlife's state of the art fish



Ken Lockwood Gorge

Jessica Lettich

FISHING ON THE RISE

By Jim Sciascia, Chief, Office of Information and Education

rearing facilities at the Pequest Trout Hatchery and the Hackettstown Warmwater Hatchery. In the recent past we developed thriving fisheries for species like muskellunge, northern pike, walleye, hybrid striped bass and channel catfish. These newcomers are in addition to a spectacular statewide largemouth bass fishery and a small-mouth bass fishery that is being expanded to south Jersey locales.

On the coldwater front, trout fishing in New Jersey is amongst the best in the Middle Atlantic States, with year round stockings that include a popular fall and winter stocking of 25,000 trout, all measuring 14 inches to 16 inches.

The 'Intermittent' Angler

So the good news is that more people are fishing in New Jersey. However, many may not be fishing every year. This became apparent after our electronic licensing system was put in place in 2006.

The electronic licensing system made buying fishing licenses and trout stamps quick and easy. The new system gave anglers the ability to buy and print a fishing license and trout stamp from the comfort of their home and at a moment's notice. This undoubtedly helped increase fishing participation since spur-of-the-moment fishing trips no longer had to be cancelled or delayed because someone did not yet have a license. The newer license system also provided a wealth of annual data on our angler population and their license buying patterns.

Prior to 2006, New Jersey fishing licenses were handwritten paper documents with no annual database of license buyers. Now, electronic license data gives Fish and Wildlife the ability to identify annual license-buying patterns of New Jersey anglers. The data shows that more than one third of the anglers who buy a license each year do not purchase a license the following year. This means more than 60,000 anglers float in and out of the New Jersey fishing license buying population in any given year!

New Jersey is not alone. Fishing license data from 15 states having

multiple years of electronic license data revealed that only 10.4 percent of northeast anglers purchased a fishing license each year of a five-year period. Surprisingly, the majority of anglers (53 percent) only purchased a license one time during a five-year period.

This recent revelation of the national trend in license buying came as quite a surprise to fish and wildlife agencies, which always assumed mostly the same anglers bought licenses every year. Prior to automated license systems, most states did not have a database of license buyers necessary to observe individual license buying trends. Today, *churning*, the term for anglers continually entering and leaving the license buying population, is a well-documented and accepted fact.

Many states, including New Jersey, now recognize the great potential for building a larger voice and greater funding for aquatic conservation and fisheries management by encouraging the 'intermittent' or 'lapsed' angler to become a more frequent license buyer. New Jersey joined in a national partnership program with the Recreational Boating and Fishing Foundation (RBFF) aimed at encouraging lapsed anglers to renew their licenses through a direct mail marketing program.

The RBFF partnership provided funding to send postcards and fishing information brochures to New Jersey lapsed anglers in 2008, 2009 and

2010. This outreach program is part of a more extensive marketing program that began modestly in 2005 with local radio advertising. Fishing promotion efforts grew in subsequent years to include direct mail marketing, extensive radio advertising, newspaper and media coverage plus e-mail communication linked to Web site information. Building awareness about fishing and promoting fishing in New Jersey has helped sustain New Jersey's annual increase in fishing participation over the last four years.

Increased Fishing Participation Has Many Benefits

Fishing is fun and a great way to spend time either solo or with people close to us. Those of us who fish also know the healing power of time on the water and making that meaningful connection to the natural world around us. That time instills and nurtures a strong conservation and stewardship ethic that has spawned—and will continue to foster—generations of advocates for a healthy environment.

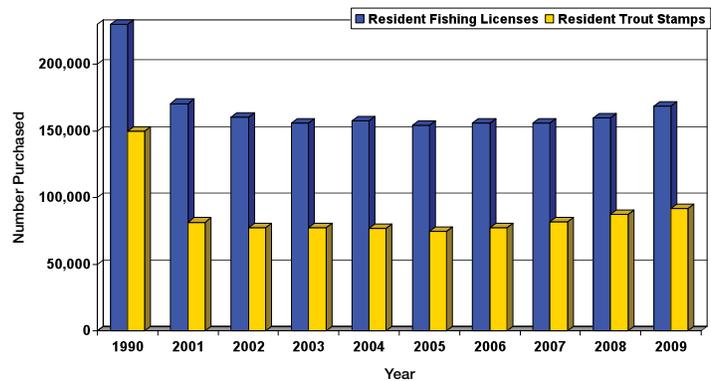
Increasing the number of anglers strengthens the voice for conservation of our state's aquatic and natural resources. Increasing anglers also increases license revenue and federal funds from the Sport Fish Restoration Program that support Fish and Wildlife's freshwater research, management and water quality/aquatic habitat protection efforts. This important work leads to cleaner and more plentiful water both for fish and for people. License revenue and matching federal funds are also necessary to maintain and improve the outstanding freshwater fishing opportunities that have been developed in New Jersey.

The continued operation of the Pequest Trout Hatchery and the Hackettstown Warmwater Hatchery is critical to maintaining and improving our excellent trout and warmwater fisheries. The Pequest Hatchery provides trout fishing opportunities in many areas of the state that otherwise would not have a trout fishery. Almost two years are required to raise the more than 600,000 trout stocked each year in the spring, fall and winter. The Hackettstown Hatchery hatches and stocks two to three million fish each year to sustain top-notch fisheries for lake trout, muskellunge, walleye, northern pike, bass, and about 10 other warmwater fish species. Stocking programs from both facilities are constantly re-assessed and successful trophy fisheries are the result of long-term investments of time and resources.

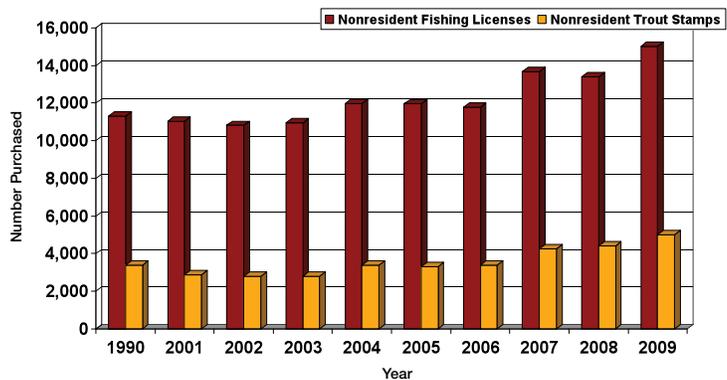
Revenues generated from the sale of fishing licenses go far beyond supporting fisheries research and management, fish culture operations and aquatic habitat protection. Educational programs, maintenance of public lands and fishing access areas plus fish and wildlife law enforcement all depend on angler support.

So if you don't buy a fishing license each and every year, you may be getting a postcard or brochure in the mail reminding you of all the reasons you should. The best reason of all is the pure enjoyment of the fishing experience.

NJ Resident Fishing Licenses & Trout Stamps



NJ Nonresident Fishing Licenses & Trout Stamps



LICENSE BUYING FACTS

- The day before trout season opening day is typically the busiest day for license sales; 6,452 fishing licenses were issued on that day in 2009.
- The oldest angler (non-resident) to buy a license in 2009 was 93.
- In 2009, visitors from 71 different countries purchased a fishing license in New Jersey.
- Residents from all 50 states purchased a license in New Jersey since 2006. New York and Pennsylvania residents make up the bulk of non-residents sales but Floridians are surprisingly third.
- The last fishing license sold in 2009 was on Dec. 26, 2009.

CHAIN PICKEREL

Fishing for a New Jersey Native

By Christopher Smith, Principal Fisheries Biologist

Chain pickerel are one of New Jersey's few native sportfish. Most of the highly sought after gamefish species such as largemouth bass, rainbow trout, channel catfish and muskellunge were introduced from other parts of the country. In a recent survey, 61 percent of anglers indicated they had fished for bass; 41 percent had fished for trout in New Jersey. No surprise here. What is surprising, though, is that only 10 percent of anglers indicate they target chain pickerel.

Many anglers consider pickerel a nuisance, referring to them as "toothy critters" "gators" "slimy snakes" and "snot rockets." I will admit, they are a little slimy and yes, I've lost my share of lures to their sharp teeth. But despite these small inconveniences pickerel are great fun to catch and are often extremely abundant, creating lots of fishing *action!* While anglers may not admit to targeting chain pickerel, many slow fishing trips have been saved by these always-aggressive sportfish.

A pickerel's appearance is quite similar to their close cousins, both muskellunge and northern pike—each from the family Esocidae. However, pickerel do not grow nearly as large. Chain pickerel over 25 inches are considered a real trophy; occasionally 30-inchers are caught. Pickerel may not reach the impressive proportions of a musky, but inch-for-inch they are a great-fighting fish.

Pickerel prefer areas with aquatic vegetative and woody cover. Found in slow moving rivers and many lakes throughout the state, they can tolerate the very low pH (acidic) waters often associated with the Pinelands. Many old, south Jersey cranberry bogs have excellent chain pickerel fisheries. Although this species has adapted to living in low pH waters, pickerel also thrive in the heavily weeded lakes of north Jersey such as Lake Musconetcong. During a recent fisheries inventory conducted by New Jersey Division of Fish and Wildlife's Bureau of Freshwater



Fisheries, several trophy-size pickerel were collected from these prime pickerel waters.

In the early spring right after ice-out, chain pickerel are an excellent species to target because they prefer cooler water. Spawning occurs when the water reaches the high 40s to low 50s near aquatic vegetation. From spring through early fall, pickerel can be found in shallow bays with vegetation or stumps. These fish "ambush predators" but will follow lures for a short distance with a great burst of speed producing some excellent topwater action in late spring and early summer. During the winter they move to deeper areas of the lake and can be caught on small jigs and suspended jerkbaits. Chain pickerel will bite year round and are quite popular among anglers fishing through the ice.

Live minnows, golden shiners and herring are excellent bait for chain pickerel. Spinnerbaits, topwater frogs worked over aquatic vegetation and even plastic worms fished slowly through the grass are effective choices when targeting chain pickerel.

Don't wait to fish for pickerel as a last resort when nothing else will bite. These sportfish are abundant and hard-fighting without the need for specialized tackle.

Proven Places to Fish for Pickerel

- Alloway Lake
- Batsto Lake
- Cranberry Lake
- Lake Hopatcong
- Lake Lenape (Atlantic Co.)
- Lake Musconetcong
- Swartswood Lake
- Union Lake

Be sure to see our **Places to Fish** at NJFishandWildlife.com/fishplc.htm or request our new **Central Jersey Warmwater Game Fish** brochure.

See publication list on page 46.

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