



New Hampshire  
**WILDLIFE  
JOURNAL**

November / December 2007

\$2.95

**Special Biennial Issue**  
July 1, 2005 – June 30, 2007



Donald S. Clarke,  
Acting Executive  
Director

**Fish and Game contributes on a daily basis to the quality of life for everyone in the Granite State.**

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Judy Stokes,  
Editor-in-chief  
*New Hampshire Wildlife Journal*  
N.H. Fish and Game  
11 Hazen Drive,  
Concord, NH 03301  
*or email:*  
[judy.stokes@wildlife.nh.gov](mailto:judy.stokes@wildlife.nh.gov)

## *Your Fish and Wildlife Agency at Work*

I arrived as Acting Executive Director for the N.H. Fish and Game Department in August 2007 and am honored to be here until a permanent director is found. It seems appropriate that my first message in the *Journal* accompanies this special biennial issue, which looks back at Fish and Game's significant accomplishments during the past two fiscal years. I previously served as a Fish and Game Commissioner for six years, so I am familiar with the work of the Department. In my new position, however, I have had a chance to delve deeply into the day-to-day details of an agency with remarkably wide-ranging and complex statewide responsibilities.

This issue of the magazine shares some of those insights by highlighting the variety of vital work Fish and Game performs, from research to rescue to long-range species and habitat restoration.

Fish and Game professionals are critical to public safety – monitoring for devastating diseases such as Avian Flu and Chronic Wasting Disease and providing emergency and rescue services. By keeping our wildlife and fish populations in a healthy balance, conserving habitat, enforcing fish and wildlife laws, and providing technical expertise to local conservation initiatives, Fish and Game contributes on a daily basis to the quality of life for everyone in the Granite State.

Our rich natural resources form the foundation of New Hampshire's economy, with fish and wildlife-related recreational activities valued at \$525 million annually. Fish and Game supports this economic activity by promoting ecotourism, educating citizens about resource stewardship, informing people about outdoor opportunities and providing boat access. As a result, thousands of residents, visitors and businesses benefit.

Meanwhile, New Hampshire's fish and wildlife face ever-increasing challenges



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from human population growth. With completion of the state's first Wildlife Action Plan, Fish and Game now has documented knowledge of New Hampshire's species and habitats and the actions we should take to conserve them.

The N.H. Fish and Game Department itself faces challenges and is at risk. Changing demographics and public interests have placed greater expectations on this agency, at the same time traditional funding sources for conservation efforts are declining.

I hope you enjoy exploring the unique contributions of the N.H. Fish and Game Department through the stories in this issue. Behind every aspect of these endeavors lies the hard work and dedication of Fish and Game staff, each of whom is deeply committed to conserving fish, wildlife and the natural world and to serving the citizens of our state with professionalism and care.

The agency, the resources it oversees and the services it provides are clearly important to New Hampshire. It is my sincere hope that, during my brief tenure, I can guide Fish and Game in a way whereby it can continue to meet the lofty goals identified in its mission statement, while staying within the budget plan approved by the Governor and Legislature.

# PUBLIC BOAT ACCESS: MORE THAN MEETS THE EYE

Every year, many thousands of residents and visitors launch boats at N.H. Fish and Game public access sites for leisurely days of fishing and fun. Most aren't aware that years of planning and behind-the-scenes work go into these projects before construction even starts. "It's true – 90% of work on an access project is setting it up," said Fish and Game Fisheries Biologist Rich Tichko.

The access site at Pleasant Lake in Deerfield is a good example. The site had an existing boat ramp next to a state-owned dam, but no parking was available. To address this, Fish and Game acquired a 5-acre parcel of nearby land for a parking lot, available at no cost to the Department because of a unique circumstance involving the settlement of an old claim. This eliminated the need for doing an appraisal, deed and title search.

Trouble showed up at the next step, though, when Fish and Game performed the required reviews for compliance with state and federal historic preservation, threatened and endangered species and hazardous waste laws. The N.H. Division of Historic and Cultural Resources raised concerns that site was a likely place for remnants of early Native American activity. That meant

reconnaissance work had to be done to review the local topography and search for evidence. Artifacts turned up, then more extensive archeological digging revealed signs of lodges and cookfires. In the final phase of this process, a professional archeological firm recovered fragile relics from the site.

"It's easy to see how painstaking work like this can add time and expense to an access project," said Tichko. "We usually do these reviews before purchasing land; if they show the need for extensive work like this, the project may not go forward. In this case, an existing state-owned boat ramp and free land made the project too good to pass up."



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*An archeological dig for Native American relics was completed before a parking lot could be constructed at Pleasant Lake in Deerfield.*

## Office of the Executive Director

The Fish and Game Executive Director has general supervision and control of all activities, functions and employees of the New Hampshire Fish and Game Department and enforces all provisions of state laws relating to fish, wildlife and marine resources. The Executive Director is nominated by the Commission and appointed by the Governor and Executive Council. Each candidate must be a competent administrator experienced in the requirements for the protection, conservation and restoration of the fish and wildlife resources of the state. The Executive Director serves for a term of four years.

The Office of the Executive Director oversees coordination of federal aid, rules and legislation, budget development and oversight, and personnel administration.

Within the Director's office, the **Land Resources Bureau** handles land acquisition, land stewardship and habitat protection

efforts conducted through the use of various land conservation strategies. This Bureau coordinates all aspects of Fish and Game's land protection program across all divisions and is the lead and primary contact regarding land issues. Land Resources Bureau staff are responsible for acquiring land to conserve fish and wildlife habitat, secure public access to land and public waters and to ensure that Department policies relating to land use and development are consistently communicated and applied.

Also within the Director's office, the **Landowner Relations Program** works in partnership with hunters, anglers and landowners to maintain access to private lands for hunting, fishing and other outdoor recreation and to provide habitat that supports New Hampshire wildlife populations. The program identifies issues and concerns that landowners face in keeping their properties open, and works to address them.

## PRESERVING ACCESS FOR PHEASANT HUNTERS

Pheasant hunting is a New Hampshire tradition, going back more than a century, and the key to the program's success is the generosity of landowners who allow hunters access to their property. In an effort to work with landowners to resolve access issues related to pheasant hunting, during this biennium Fish and Game's Landowner Relations Program partnered with the Cheshire County Fish and Game Club to develop the Pheasant Hunter Landowner Relations Project.

Under the guidance of the Landowner Relations Program, 27 members of the Cheshire County Fish and Game Club, along with five members of Monadnock Regional High School Fish and Game Club, served as volunteers, adopting ten Cheshire County pheasant sites. Volunteers met with each landowner to talk about problems or concerns that arose because their property serves as a pheasant hunting area. Access man-

agement signs were printed to address these issues, and volunteers placed them on each property. During the pheasant season, volunteers monitored each site, picked up trash, met with landowners and worked to resolve any issues that developed. The program also created *A Pheasant Hunter's Guide to Landowner Relations*, which volunteers distributed to hunters using the sites, helping to raise their awareness of landowner concerns.

"The project was well received by both landowners and pheasant hunters," said Charles Miner, Landowner and Constituent Relations Administrator at Fish and Game. "Because of these collaborative efforts, the ten pheasant sites remain accessible, providing not only hunting access to over 3,000 acres, but also several miles of fishing access. Partnerships like these – and others in the works with Sullivan County Sportsmen – show how effectively we can work together to maintain access for present and future generations of hunters."



©NHFG/JANE VACHON PHOTO

*Pheasant hunter afield. Efforts in Cheshire County are encouraging landowners to keep their land open.*

agement signs were printed to address these issues, and volunteers placed them on each property. During the pheasant season, volunteers monitored each site, picked up trash, met with landowners and worked to resolve any issues that developed. The program also created *A Pheasant Hunter's Guide to Landowner Relations*, which volunteers distributed to hunters using the sites, helping to raise their awareness of landowner concerns.

### *Boat Access, continued from previous page*

That was not the last of the hurdles, however. The town of Deerfield had designated the road near the project with scenic status, which restricted the removal of trees. To comply with the spirit of this law, Fish and Game had to attend a formal public hearing to get permission to cut trees at the site. Steps like these are critical in working with community partners, but add to the

time needed to complete construction.

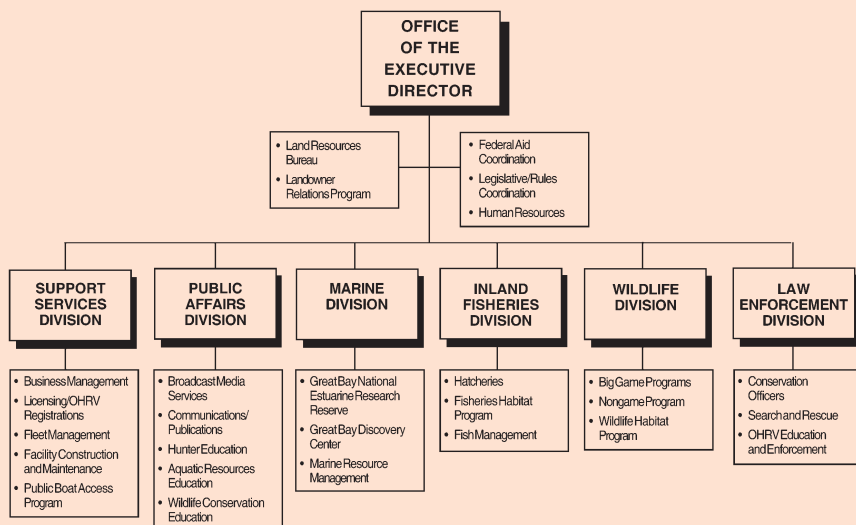
As the Pleasant Lake project proceeded, a final challenge emerged: utility wires crossing the site presented a safety issue for boats. Fish and Game worked with telephone and cable companies to have the utility poles replaced, raising wires to an adequate height.

"This is the process we had to go through to develop a piece of land the state had gotten for free, so you can imagine how complicated it can get," said Tichko. "Every project has its own story."

The Pleasant Lake access project is proceeding successfully. In March 2007, trees were cut for the site, and in May, Fish and Game construction crews built the expansive new parking lot. Fish and Game is replacing the old ramp, damaged in the floods of 2006, with a new ramp featuring modern concrete/log technology; the refurbished access site will be in business by spring of 2008.

N.H. Fish and Game administers 134 public water access sites throughout the state, ranging from shoreline fishing areas to large boat launching sites. These facilities give the public access to many recreational opportunities on the state's waterways. Fish and Game's public access projects are supported in part by Federal Aid in Sport Fish and Wildlife Restoration funds.

### New Hampshire Fish and Game Department



# FOLLOWING FISH

BY DIANNE TIMMINS, FISHERIES BIOLOGIST/COLDWATER PROJECT LEADER

I added a new skill to my professional repertoire during the biennium: surgery.

You won't be seeing me in the local emergency room any time soon, but if you need a tracking device implanted into a fish, give me a call!

To explain why fish surgery would be part of a fisheries biologist's job, I need to back up a little, to a major watershed – the Dead Diamond – contained within the Second College Grant, or “the Grant” — about 27,000 acres in the northeast portion of New Hampshire owned and managed by the Dartmouth College Board of Trustees.

Self-sustaining wild brook trout (*Salvelinus fontinalis*) populations may be found in many brooks and rivers throughout New Hampshire and Maine, but few exceed a lifespan of 4 years, or attain lengths over 6-7 inches. The Dead Diamond flows into the Magalloway River in Maine. These two rivers, part of the Grant's watershed complex, are rare in that they are not stocked by either state agency and serve as habitat for some very large wild brook trout.

We wanted to learn more about these special fish. Why are they thriving here? Could we learn anything from these wild brook trout that will help us manage other fisheries habitat?

Some years ago, we started conducting annual electrofishing assessments on several brook trout waters within the Grant to determine if they support self-sustaining brook trout populations at densities that would qualify them to be managed as Wild Trout Fisheries (for the science-minded, the threshold is 15 kg/ha). No wild adult brook trout (greater than 9 inches long) were captured in these assessments, although some tributaries did

meet the criteria. This raised many questions on fish behavior and migration and how this population of brookies supports itself, when none appear to grow larger than 9 inches.

A new project took shape — to determine the migration patterns of wild adult brook trout in the Dead Diamond and Magalloway River systems. What habitats are important to brook trout at different times of the year, and where are they? How far do brook trout move to seek those habitats within this watershed?

Learning from the experiences of Florida Power and Light and Maine Department of Inland Fisheries and Wildlife personnel who have used radio-telemetry on fish in the Rapid River in Maine and in the Rangeley watershed, we set out to gather migration information on these brook trout populations.

## TRACKING TROUT MIGRATION

And so we come our streamside surgical theater. We fished for brook trout and kept those we caught in “live carts” in the river. We measured and weighed our test subjects, keeping those that met the tagging requirements and releasing the rest.

After anesthetizing each fish, I made an incision on the underside of the belly, then inserted a 1¼-inch Lotek transmitter into the cavity. The antenna of the transmitter was fed into a 1½-inch, 16-gauge catheter that was used to create an exit for the antenna, taking care not to harm the fish's internal organs. I then stitched the incision with absorbable sutures and held the fish in aerated recovery tubs until they resumed their normal swim pattern, at which point they were released back into the water. In all, we tagged 23 fish from the Magalloway River during the biennium, and 36 fish from the Dead Diamond watershed.

With the fish tagged, we were ready to monitor their whereabouts. There's no practical way of knowing where each fish is from moment to moment; rather, we used a mobile receiver and antenna to locate the fish periodically at various times of year — on foot, by boat, plane and snowmobile. Initially, tracking occurred every week to determine the tag status for the test fish.

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*Fisheries Biologist Dianne Timmins implants a radio transmitter in a brook trout.*

PHOTOS © REGION 1 FISHERIES STAFF, NHFG

### Inland Fisheries Division

The **Inland Fisheries Division** is responsible for all freshwater fish within state and interstate waters. Fisheries biologists and fish culturists work to protect and restore fish resources and aquatic habitat and to provide New Hampshire anglers with a diversity of fishing opportunities. This Division is responsible for operating the Department's six fish hatcheries, which during the biennium produced more than a million fish each year to meet a variety of management needs.

## INLAND FISHERIES DIVISION

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Then it dropped to every two weeks until the onset of spawning in September, when we went back to weekly monitoring. Post-spawn, the fish migrated to their wintering grounds and didn't move much, so we tracked just once a month.

Mapping the tagged fishes' locations over time gave us a tremendous amount of information about these particular brook trout populations. The brook trout in the Magalloway have ideal conditions throughout the year, because of the "hypolimnetic draw" from Aziscohos Dam (intake is on the bottom of the lake – nice cold water). Without the thermal stress, these fish only moved when they were staging for spawning. They move just under 5 kilometers downstream, to Abbott Brook — a tributary to the Magalloway in Maine — and then drop further downstream to overwinter. Some ventured into Umbagog Lake, while others remained in the lower Magalloway.

The results from the Dead Diamond fish migration were poles apart. Their migration seems to be directly linked to weather patterns. During 2005, the weather was hot and dry, and water temperatures in the Dead Diamond were well above the critical temperature for brook trout survival (21°C). The fish sought refuge by mi-

grating into the Magalloway during the hot summer months. Some were harvested by anglers, while some spawned in Abbott Brook with the Maine population. After spawning, these fish also dropped downstream to seek deeper water for overwintering. During the first year, some of the fish traveled more than 50 kilometers to reach suitable habitat! The bulk of the movement occurred in the fall, pre- and post-spawn.

In the second year of the study, the weather was completely different, and water temperatures were lower throughout most of the Dead Diamond watershed. The fish remained in the river longer and appeared to be using it in its entirety, swimming upstream and visiting various pools throughout the summer months. The fish didn't have the thermal stress from warmer waters that they had in 2005, which resulted in less movement overall (less than 26 km). Conditions within the watershed have varied so much over the past two years that habitat preferences have been difficult to determine, so we decided to continue the study for a third year.

I had the view of a lifetime while tracking these spotted beauties on a float trip at the close of the biennium. The signal on my tracking device was booming, so I knew the fish were close. While frantically searching the waters around my canoe, I suddenly caught a glimpse, through my polarized glasses, of a fish swimming. As it neared, I realized it was a whole pod of brook trout — and within the bunch were two of my tagged fish.



*Timmins searches for a signal from radio-tagged brook trout.*

### **Bringing Brookies Back to Nash Stream**

For nearly 40 years, brook trout have had a tough time in the 40,000-acre Nash Stream watershed in northern New Hampshire, situated almost entirely within the Nash Stream State Forest. When an old logging dam broke at Nash Bog Pond in 1969, the resulting flood surge scoured the streambed and adjacent riparian forest.

Repairs made soon after the flood — with all good intentions — involved straightening, dredging and berming channels and repairing culverts. Unfortunately, poor design of those culverts has made it difficult and sometimes impossible for fish to reach important habitat in several of the tributaries. As a result, Nash Stream no longer

supports a self-sustaining wild brook trout fishery, and wild brook trout are nearly absent from a 7-mile stretch downstream of the former dam — most of the stream.

During the biennium, the Fisheries Division started a project to determine the effect culverts have had on the ability of brook trout to move upstream to spawning habitat in the Nash Stream tributaries, and the resulting effects on the genetic structure of the fish populations. This work is being conducted with the U.S. Geographic Survey and the U.S. Fish & Wildlife Service, and is part of the larger Eastern Brook Trout Joint Venture (EBTJV). The EBTJV is a geographically focused, locally driven and scientifically based effort to protect, restore and enhance aquatic habitat throughout the range of the Eastern brook trout.

*—John Magee, Fish Habitat Biologist*



*Fish and Game biologists are studying Nash Stream to learn how culverts affect the movement of brook trout in the watershed.*

## INLAND FISHERIES DIVISION

They swam right beside the canoe. It was awesome!

This study has given us the insight that brook trout populations move substantial distances to access various habitats throughout the year. It has also provided some information on what appears to be their largest stressor: water temperature. We still have questions on where these fish are spawn-

ing, and why they haven't ventured into the tributaries – though we hope the third year of the study will help demystify their movements. The information we've gathered will help us better manage brook trout into the future, including protecting existing populations and restoring damaged habitats where populations are declining.



### NUMBER OF FISH STOCKED BY SPECIES - FY2006

	1+YR	2+YR	3+YR	Fingerling	Fry	Total
Atlantic salmon	1,340		1,035		418,225	420,600
Brook trout	530,662	20,799	2,407	225,684		779,552
Brown trout	145,336	769	1,177	31,998		179,280
Landlocked salmon	42,655			37,978		80,633
Rainbow trout	299,975	250	80			300,305
Tiger trout	1,000					1,000
<b>Grand Total</b>	<b>1,020,968</b>	<b>21,818</b>	<b>4,699</b>	<b>295,660</b>	<b>418,225</b>	<b>1,761,370</b>

### NUMBER OF FISH STOCKED BY SPECIES - FY2007

	1+YR	2+YR	3+YR	Fingerling	Fry	Total
Atlantic salmon			1,119		479,000	480,119
Brook trout	465,187	15,853	2,894	228,884		712,818
Brown trout	152,157	2,268	818	37,856		193,099
Landlocked salmon	39,701			36,600		76,301
Rainbow trout	282,841			67,635		350,476
Tiger trout	2,100					2,100
<b>Grand Total</b>	<b>941,986</b>	<b>18,121</b>	<b>4,831</b>	<b>370,975</b>	<b>479,000</b>	<b>1,814,913</b>

©NHFG PHOTO



*In some locations, Fish and Game staff use a fish chute to stock trout from the local hatchery.*

# LIVES ON THE LINE

BY LT. JONAS TODD BOGARDUS

Raging floodwaters descended on the town of Alstead in October 2005, destroying homes, bridges and roadways. Up to 11 inches of rain had pounded southwestern New Hampshire overnight, forcing small rivers and streams over their banks.

A plugged culvert and elevated roadway broke, releasing a large impoundment of water that washed out the roadway and swept away a large portion of Alstead.

Fish and Game Law

Enforcement Division personnel helped to coordinate a multi-agency emergency response and search effort during this flooding disaster. Law Enforcement was the lead agency in Alstead, coordinating search and rescue efforts for four people

who perished while their vehicles and homes were washed away, destroyed by the surging waters of the Cold River and Warren Brook. Fish and Game officers coordinated multiple state and federal agencies and volunteer organizations in searching more than nine miles of debris — a devastated landscape of destroyed homes, businesses and motor vehicles. Rescuers faced treacherous conditions, including hazardous waste, as they made their way through the destruction. Agencies with equipment and resources, such as the National Guard, Cheshire County

Sheriff's Department and the N.H. State Police, were organized to provide security and relief to those affected by the flood and to search for missing people and provide help to the flood-ravaged area over many days. All four deceased victims of the Alstead flood were eventually recovered.

At the same time the Alstead search was going on, Conservation Officers also directed search efforts for a kayaker who drowned on the North Branch River in Antrim during flood-stage water levels. Volunteers from the New England K-9 Search and Rescue Team eventually found this victim after flood waters receded.

These dramatic events tell the story of a biennium that proved both challenging and rewarding for Fish and Game Conservation Officers. In many different incidents, the Division's Specialized Search and Rescue Team once again took on dangerous and rewarding life-saving missions.

## MOUNTAIN SEARCH

In January of 2007, the Division's Search and Rescue Team — along with numerous volunteer search and rescue groups who routinely assist in rescue efforts — participated

in a three-day search for a lost hiker who had become disoriented while on the summit of Mount Lafayette in Franconia. The incident occurred during a period of severe winter weather. Search teams contended with

hurricane-force winds (60 to more than 100 miles per hour) and severe, below-zero temperatures (-15 to -20°F, with a wind chill nearing -67°F). Ground search crews successfully located the missing 24-year-old hiker, alive and suffering from frostbite and hypothermia. He was found one mile east of the Mt. Lafayette summit, deep in the Pemigewasset Wilderness. A successful airlift by the Army National Guard Blackhawk helicopter brought the rescued hiker back to safety.

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©AMY NIKON PHOTO, COURTESY OF THE CALEDONIAN RECORD



*Fish and Game Conservation Officers Gregory Jellison (left) and Thomas Dakai (right) transport a lost hiker evacuated by helicopter from Mt. Lafayette in January 2007. Inset, CO Bradley Morse treats the lost hiker near the summit.*



©NHFG STAFF PHOTO

*Conservation Officers, with the assistance of volunteers, search rubble for victims during the Alstead flood.*

## Law Enforcement Division

The **Law Enforcement Division** is responsible for enforcement of all laws and rules pertaining to fish, wildlife and marine resources. Conservation officers prosecute all of their own cases involving offenders of wildlife law. By law, they also are responsible for search and rescue operations and for enforcing off-highway recreational vehicle (OHRV) regulations.


## LAW ENFORCEMENT DIVISION

### FUNDING SEARCH AND RESCUE

Faced with the challenges the Division experienced conducting numerous search and rescue missions during the biennium, Fish and Game Law Enforcement supported a legislative initiative to aid in funding the Department's Search and Rescue activities.

The Law Enforcement Division spent \$285,000 in FY 2006 and \$258,000 in FY 07 on search and rescue activities, significantly more than the amount of funds received as revenue for these responsibilities. The deficit in revenues to match expenses was made up by a surplus that had existed in the account during the prior biennium. That surplus was reduced to zero by the close of the biennium – leaving no margin for further overruns. To address this situation, Fish and Game sought \$200,000 from the state's General Fund to help pay for this human safety responsibility – a means of ensuring that all N.H. residents and visitors would help to fund this essential service. Currently, people who register snowmobiles, Off-

Highway Recreational Vehicles and motorboats provide most of the funding for search and rescue, yet they represent a very small percentage of those who require rescue services.

Although General Funds were not included in Fish and Game's FY 08-09 budget, the Department will continue to explore broadening the funding sources for search and rescue. "It's clear that additional funding is needed for the Law Enforcement Division to continue to outfit and train its Conservation Officers and provide the high level of professional search and rescue response that New Hampshire expects to receive from the Fish and Game Department," said Col. Jeffrey Gray, Chief of the Law Enforcement Division. 

*Lt. Jonas Todd Bogardus is the Fish and Game Law Enforcement Division District Three Chief, Specialized Search and Rescue Team Leader and statewide coordinator of the hikeSafe program.*



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*A Fish and Game Search and Rescue Team member and volunteer rescuers look for a lost winter hiker on the summit of Mount Lafayette.*

## LIFE SAVING MEDALS


In February 2006, **Lt. Douglas Gralenski**, and **Conservation Officers Delayne Brown** and **Christopher Egan** were patrolling the Lake Francis area of Pittsburg by snowmobile, checking ice anglers. Two snowmobilers hailed them, "Machine through the ice!" The officers responded immediately. They found a man submerged to his armpits and clinging to the edge of the ice. Brown threw a line of connected ropes, with a backpack attached, to the panicked man. Fortunately, the man was able to grasp the bag and hang on as he was dragged through the thin ice and onto shore. Egan and Brown brought him to a cabin, removed his wet clothing and wrapped him in a sleeping bag.

Soon afterwards, Gralenski observed a second snow machine fall through the ice on the far side of the inlet. The driver was submerged in the freezing water, his life in peril. Using an inflatable tube and a rope, Gralenski and Egan responded. They got the second man out of the water in less than ten minutes by maneuvering him onto the tube — his clothes froze instantly — and dragging him across the hazardous, wafer-thin ice. Thanks to their quick response, the man was treated for hypothermia and released.

For their valor in handling these life-threatening incidents, Gralenski, Brown and Egan were awarded Life Saving Medals from the N.H. Fish

and Game Department in May 2007.

Life Saving Medals were also presented to the **NH Army National Guard, 1159<sup>th</sup> Medical Company**, whose dedicated members, including professional helicopter pilots and crews, have helped Fish and Game successfully resolve many search and rescue missions. Guard members have also provided advanced helicopter personnel deployment training to Conservation Officers.

**Nancy Lyon and the members of New England K-9 Search and Rescue Team** also received Life Saving Medals recognizing the capabilities of their wilderness-certified air-scenting canine teams, which have routinely been directly responsible for 'finds' that saved lives. The volunteer canine handlers cover all the costs associated with their outdoor equipment and travel for their ongoing training and search missions. 



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*(From left) Law Enforcement Chief Jeffrey Gray presents Life Saving Medals to Lt. Douglas Gralenski, CO Delayne Brown and CO Christopher Egan in May 2007.*

# HOW MANY FISH IN THE SEA?

BY DOUG GROUT, MARINE FISHERIES BIOLOGIST

In the popular imagination, marine biologists have a certain mystique — even glamour. Remember when George on *Seinfeld*, trying to impress his date by posing as a marine biologist, saved a beached whale by pulling a golf ball out of its blow hole? Uh-huh.

The day-to-day work of N.H. Fish and Game's marine biology staff may not be sitcom-worthy, but it's critical to ensuring that our marine resources stay healthy and sustainable for use and enjoyment by the public.

One of the most important things needed for science-based management of our marine resources is accurate stock assessments for each species — that is, figuring out how many fish there are in the ocean. Is overfishing occurring? Are there enough fish in the population to continue to sustain the population? Typically, these stock assessments occur once every 3-5 years, and are used by state and federal fisheries managers as the basis for fisheries management plans and for rules —

such as size limits, creel limits, seasons and quotas — needed to limit harvest.

A critical piece of information for these stock assessments is how many fish are being harvested by commercial and recreational anglers each year. If we don't know how many fish are being removed each year from a population of fish, we can't determine if overfishing is occurring or not.

## ASKING THE RIGHT QUESTIONS

For the commercial harvest of species including cod, pollock and lobsters, logbooks and fish

dealer reports provide the information. But how do we know how many fish are being caught by marine recreational fishermen and how many fishing trips they take? There are too many saltwater anglers to make logbooks of every trip for all anglers a requirement. So, we use proven statistical survey techniques to estimate the catch and number of fishing trips taken by anglers.

Since 1980, the National Marine Fisheries Service (NMFS) has conducted an annual nationwide survey of saltwater anglers called the Marine Recreational Fishing Statistical Survey or MRFSS. While this is a federal survey, many states, including New Hampshire, have worked with NMFS to conduct the survey by providing trained fisheries biologists to conduct the interviews of marine anglers and by conducting extra interviews needed to make the estimates more precise.

The MRFSS survey has just two parts: a telephone survey of households to estimate "fishing effort" — the amount of time spent trying to catch fish; and a shoreside survey of angler catches at boat launches, marinas and shore

fishing sites. For the telephone survey, we randomly call about 4,500 New Hampshire households throughout the year to find out if they fish in saltwater, and if they do, how many saltwater fishing trips they have taken in the past two months. From this part of the survey we can estimate the total number of saltwater fishing trips (we call them "angler trips") taken in New Hampshire each year.

The second part of the MRFSS survey involves trained Fish and Game biologists interviewing marine anglers about their fishing trips and catches at randomly selected shore and boat access sites around the New Hampshire seacoast. In the case of party boats, we actually ride the boats and interview anglers on the boat while identifying, counting and measuring both the fish being kept and fish being released. We typically interview between 2,000 and 3,000 an-



©NHFG STAFF PHOTO

*Marine biologist Kevin Sullivan is in charge of coordinating Fish and Game's marine recreational fishing surveys.*



©NHFG STAFF PHOTO

*Sullivan tallies angler trip data to be used in a national statistical survey.*

## Marine Fisheries Division

The **Marine Fisheries Division** manages estuarine and saltwater species, including fish, lobsters, clams and oysters. The division also manages the Great Bay Estuarine Research Reserve and the Great Bay Discovery Center. Its concerns reach beyond New Hampshire's boundaries, and staff work closely with other states and federal agencies to protect and maintain marine resources for both commercial and recreational fisheries.

## MARINE FISHERIES DIVISION

glers per year here in New Hampshire, so some of you may have been interviewed by one of our marine biologists over the years. From this part of the survey, we get an average number of fish caught per trip for each fish species.

Finally, we combine the results of the two surveys and use formulas to estimate the total number of fish caught (or harvested) for a given species.

### WHAT WE'RE LEARNING

Saltwater fishing by recreational anglers has become increasingly popular over the past decade. The number of fishing trips taken by anglers in the ocean, bays and estuaries all along the Atlantic coast has grown from roughly 40 million trips in the mid-1990s to just under 55 million trips in 2006. In New Hampshire alone, the number saltwater fishing trips from shore, boats, and charter/party boats has nearly doubled during that same time period from 265,000 to 546,000 trips.

With so much fishing activity, there is bound to be a lot of fish being caught and harvested by recreational angler — about 1.5 million fish each year in New Hampshire alone. In some cases, such as bluefish, the recreational harvest far outnumbers the commercial harvest. More than a third of fish caught — almost 600,000 — are striped bass, by far the most popular sport fish off New Hampshire's coast.

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*On sunny summer days, dozens of anglers looking to hook the Big One depart New Hampshire's coast on party and charter boats.*

So, the next time you are fishing down in Great Bay or in our coastal waters and a Fish and Game biologist asks if you could answer a few questions about your fishing trip, please take a few minutes to talk to them and let them measure and weigh your catch. The information you provide will be used to make good marine fisheries management decisions for New Hampshire and the Atlantic coast.

WJ



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*Josh Borgeson (right), biological aide with the Marine Division, hoists a guest's deep-sea catch aboard a local party boat.*

### Saltwater Registration In New Hampshire's Future

As professional biologists and managers, we are always looking for ways to improve the science that we use to make fisheries management decisions. To that end, the National Research Council conducted a peer review of MRFSS and other recreational surveys in 2006. One of the major recommendations of the peer review panel for improving the marine recreational surveys was the establishment of "a national registry of all saltwater anglers," so that natural resource agencies will know who is recreationally fishing in saltwater.

As a result of this recommendation, Congress and the President passed a law in 2007 called the Magnuson-Stevens Act that, among other things, required NMFS to establish a national registry of saltwater anglers by 2009. Under the law, all anglers that fish in federal waters (more than 3 miles from shore), or that fish for anadromous fish like striped bass, salmon and shad, will be required to register. Saltwater anglers who are already licensed by a state with a saltwater license (like the Gulf Coast states) would not have to sign up with the national registry.

# WILDLIFE ACTION PLAN: ROADMAP FOR CONSERVATION

BY ALLISON BRIGGAMAN, NONGAME AND ENDANGERED WILDLIFE PROGRAM

What would New Hampshire look like if there were no large parcels of forests for deer, bear, wood thrushes and bobcat to live, no natural wetlands or marshes for red-winged blackbirds and waterfowl to return to each spring? With the human population steadily growing in New Hampshire each year and urban development keeping pace, the possibility of losing these valuable natural resources is a real threat.

One organization working to preserve New Hampshire's natural resources is the Bear-Paw Regional Greenways, a private land trust in south-central New Hampshire. Bear-Paw is currently developing a Conservation Plan to guide future land protection efforts in the region. For this project, and others, staff and volunteers at Bear-Paw have turned to N.H. Fish and Game and the N.H.

Wildlife Action Plan for assistance.

The N.H. Wildlife Action Plan was developed by Fish and Game's Nongame and Endangered Wildlife Program and involved every division within the Department, as well as partners from the conservation community. It was completed and approved by the U.S. Fish and Wildlife Service during the biennium, and provides the most comprehensive assessment ever done of New Hampshire's wildlife and their habitats. The plan, hailed as one of the best in the nation, can be seen as a "roadmap" for future wildlife conservation in the state – for the state as a whole, and for agencies and groups of any size that want to use wildlife diversity and habitat information to make better conservation decisions.

"The N.H. Wildlife Action Plan has been helpful to us in several ways," said Bear-Paw Executive Director Dan Kern. "It is a useful reference when writing easements and proposals, and the habitat descriptions in the Wildlife Action Plan are helpful in describing the areas we are going to be setting as priorities for conservation."

More importantly, the N.H. Wildlife Action Plan has helped Bear-Paw determine which areas to focus on for future conservation. Kern said, "Being able to describe properties in terms of wildlife priorities adds weight when proposals are presented to town conservation commissions and potential funders." Using the Wildlife Action Plan, land use planners can look at maps of all habitat types and see whether specific parcels are good for wildlife.

## PARTNERING FOR WILDLIFE

As the biennium came to a close, Fish and Game was taking the lead in implementing Wildlife Action Plan conservation strategies. "Our conservation partners in the state, like The Nature Conservancy, the Society for the Protection of New Hampshire Forests and N.H. Audubon, are really stepping up and taking on some important projects," said John Kanter, Nongame Program Coordinator. "With their help, we've been able to begin – and in a few cases, complete – many of the plan's top priorities, like conducting a moth survey in the Ossipee Pine Barrens and developing a plan to bring nighthawks back to our urban areas." Dozens of towns and local and regional

*continued on next page*



*The Bear-Paw Regional Greenway is currently working to protect the 275-acre Clay Pond Headwaters in Hooksett. Project partners used N.H. Wildlife Action Plan maps to show that the area is within a 3,900-acre Conservation Focus Area and is rich in significant wildlife habitat, including a number of species of special concern.*

## Wildlife Division

The **Wildlife Division** manages and maintains the state's game and nongame species at levels consistent with available habitat and public desires. Wildlife biologists conduct surveys to monitor populations; promulgate hunting regulations to balance competing public interests; and oversee applied research. Division staff protect, restore and actively manage wildlife habitat on public lands throughout the state and work with private landowners to enhance, protect and manage wildlife habitat. The division works closely with U.S. Department of Agriculture–Wildlife Services staff to prevent or reduce wildlife damage to orchards, agricultural lands and other private property. Staff also provide technical assistance to local, regional and statewide planning boards to minimize the impact of development on our wildlife resources.

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land trusts have also become engaged in the effort.

State agencies, too, have done great work to incorporate the Wildlife Action Plan priorities into their own work plans. “The N.H. Department of Environmental Services and others have worked on improved stream crossing guidelines and wetlands mitigation plans,” Kanter said. “And,

working with Fish and Game, the Natural Resource Conservation Service has been helping to fund habitat management on private lands to benefit species like the New England cottontail.”

While many Wildlife Action Plan strategies are still to be undertaken, the biennium saw tremendous progress in planning for the future of wildlife, and ensuring that there will always be wild places for our special species to thrive. **WJ**

## HOW MANY BEARS?

BY ANDREW TIMMINS, BEAR PROJECT LEADER

Very few of New Hampshire’s wildlife species garner such a broad array of public opinion as black bears. Most people have a genuine fascination with bears, but this fondness can turn to frustration when a 200-pound bruin wanders into the backyard in search of easily accessible, high-calorie foods such as birdseed or barbecue! It’s easy to see why managing the black bear population is very complex, occasionally misunderstood and at times emotional.

While social variables influence management of most wildlife species, they hold particular sway with black bears because of their controversial nature. Social, rather than biological constraints, tend to limit black bear abundance in N.H. and in most states where black bears live.

The goals for managing N.H. bear populations are set out in terms of “bear density,” the number of bears in a given land area. That makes it essential to have an accurate estimate of the number of bears in the state. How do you find out how many bears are roaming the back woods of N.H.? Since 1995, Fish and Game has estimated the state’s bear population by analyzing bear mortality data. Each year, we reconstruct the statewide bear population using sex and age data from all known bear deaths, then use bear observation rates by deer hunters to partition it into six regional populations. While this method of estimating bear abundance has served as a useful index, its accuracy has never been verified through field study.

During the biennium, biologists – much like forensic scientists – began putting DNA technology to work to see if the current system for estimating bear populations is giving us the accurate numbers we need. In 2006, this analysis got underway through a cooperative research project between Fish and Game and UNH. Researchers are using innovative techniques that involve the “genetic tagging” of black bears to estimate population size in six northern N.H. towns. Genetic tagging allows us to identify individual bears by

collecting genetic material and analyzing the DNA to determine unique genetic fingerprints. Genetic data are then used along with “mark-recapture models” to estimate population size by comparing the ratio of newly captured individuals to previously captured bears.

To get reliable population estimates using the genetic tagging method, researchers need many genetic samples. How do you go about getting multiple samples of DNA from your friendly neighborhood bears? Hair was the genetic material of choice for this study, because it is easy to collect and gathering it is non-invasive.

There is no better way to get a bear’s attention than through its stomach, so we constructed “hair traps,” consisting of a strand of barbed wire strung around four corner trees and placed an inviting combination of commercial bear lure and bait inside. Curious bears would enter the traps by crawling under or stepping over the barbed wire to get to the food. In the process, barbs on the wire snagged the animal’s hair, providing the samples of genetic material needed to identify individual bears.

Since the study began, researchers have collected a total of 5,610 bear hair samples from 100 hair traps in 200 square-miles of study area. Once DNA is extracted and the samples are analyzed, biologists will enter the data into mark-recapture models and estimate the bear population.

Estimating the black bear population using the genetic tagging approach will allow us to judge how well the current system is working. If results confirm that the current technique provides an accurate index to the population, Fish and Game will continue using it. If there are discrepancies between the two methods, biologists may have to modify their approach. In the end, we’ll have a better knowledge of bear population status in New Hampshire. **WJ**



*Slipping under carefully placed barbed wire perimeter fencing to access food and a lure scent, a black bear leaves a hair sample for a Fish and Game study.*

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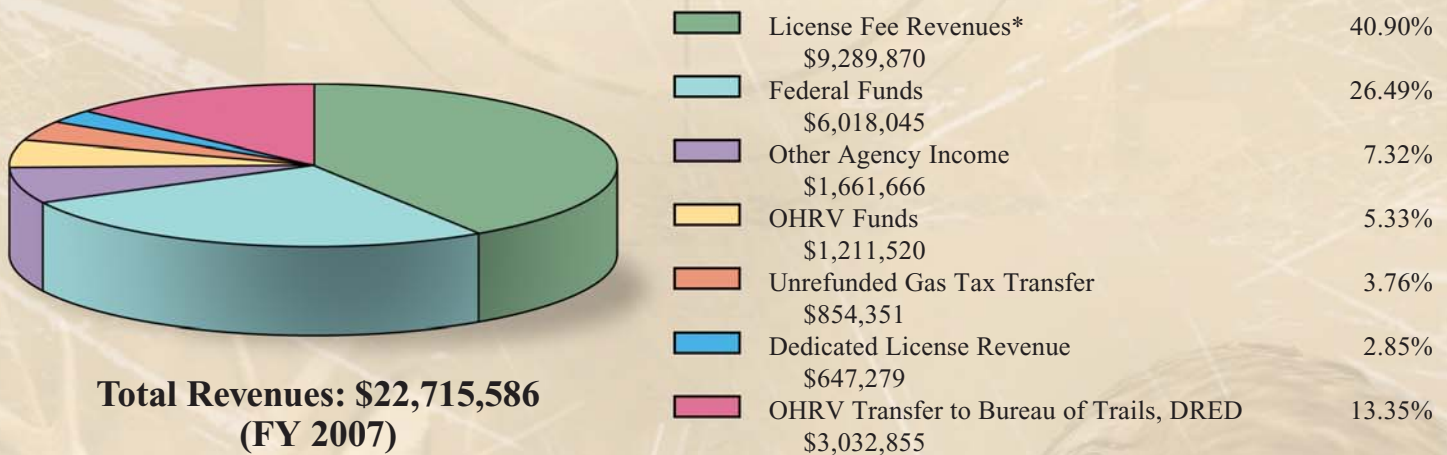
©ORIN JONES PHOTO

# THE BIG PICTURE

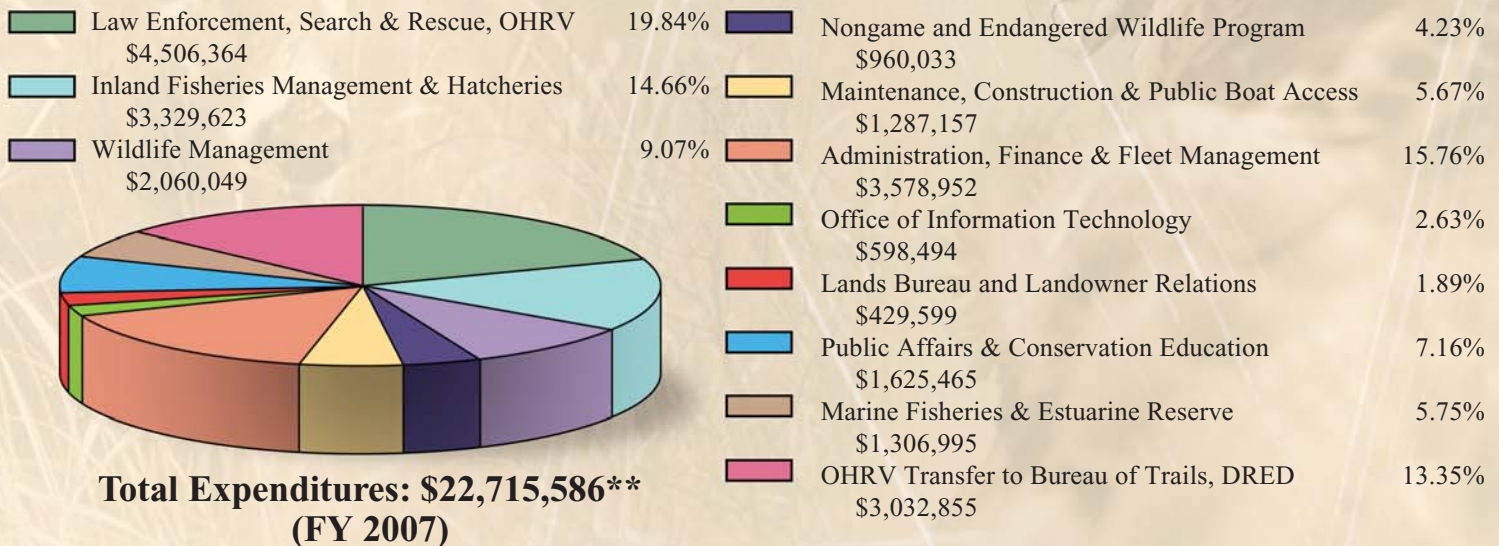
The New Hampshire Fish and Game Department is a self-supporting agency. Currently, the Department uses revenue from fishing and hunting license fees, federal funds and other sources to accomplish its broad mission of conserving, managing and protecting the state's fish, wildlife and marine resources and their habitats; informing and educating the public; and providing opportunities for people to use and appreciate these resources.

As the charts below show, Fish and Game's budget sustains the full range of habitat and fish and wildlife management tasks, plus conservation education, law enforcement, search and rescue and support work. All of these are essential to ensure that the Department can effectively serve the wildlife and people of New Hampshire.

## WHERE THE MONEY COMES FROM...



## WHERE THE MONEY GOES...



\*License Fee Revenue: Includes all resident and nonresident fishing and hunting licenses and permits plus related fines and interest.

\*\*Total Expenditures of the Fish and Game fund for Fiscal Year 2007 per year-end Monthly Statement of Appropriation by Office (Report F149) is \$23,417,263, included within this amount is \$701,677 of inter-fund expenditure reimbursements. Net result of expenditures for fiscal year 2007 is \$22,715,586

Other Agency Income: \$5 Boat surcharge - \$563,468; \$1 Search & Rescue surcharge on boat, OHRV and snowmobile registrations - \$257,659; Nongame donations and program income - \$232,070; State General Fund match for Nongame - \$50,000; Miscellaneous donations and income - \$558,469

Federal Funds: Sport Fish Restoration Act (Dingell-Johnson and the Wallop-Breaux Amendment) for inland fisheries management, boat access and aquatic resources education - \$3,026,602; Wildlife Restoration Act (Pittman-Robertson) for wildlife management and hunter education - \$1,123,757; State Wildlife Grants - \$468,810; National Oceanic and Atmospheric Administration for marine fisheries management, the Great Bay National Estuarine Research Reserve program and marine law enforcement - \$1,084,649; other Federal sources - \$314,227

