

TAPPED OUT



NEW YORK'S WATER WOES



Hinckley Reservoir, Hinckley, NY



INTRODUCTION

New York state has 60,000 miles of rivers and streams that provide over 20 million residents with drinking water and support habitat for a wealth of fish and wildlife. With an additional 7,000 lakes and ponds, and an average of almost 40 inches of precipitation a year, New York is rich in water resources. In years past, New York's rivers gained notoriety for their high levels of pollution, but many of the current problems with the state's rivers and streams are the result of droughts, floods and long periods of unnaturally low streamflow levels. The historical abundance of water in the region has, until now, fostered a level of state neglect for these types of problems and left it unprepared to resolve them.

Further, New York is one of the most densely populated states in the country. Next to California and Texas, New York ranks third in the country in water withdrawals for household use. New Yorkers use a high percentage of this household water for lawn watering. Compounding these problems is suburban sprawl. Small, vulnerable watersheds are now being tapped as water sources as development expands into rural regions of the state.

In addition, many of the state's municipalities have old, inefficient water supply systems. These antiquated pipes can leak large amounts of water, which is costly to the state, its residents and its rivers.

New York's current use and management of its water threatens the fish, reptiles, birds, amphibians and mammals that live in and near streams and rivers. In a state famous for its venerable trout waters and known as the birthplace of American fly fishing, thousands of rivers in New York do not have enough water at times to support native aquatic life.

The degradation of the state's rivers and streams has nearly depleted brook trout populations in many parts of the southern and western portions of the state. The brook trout is New York's state fish and its only stream-dwelling native trout. It is considered an "indicator species" for good water quality and adequate stream flow levels. Most of the remaining vibrant brook trout populations in the state are found in small, mountain head-water streams in the Catskills, the Adirondacks, and the Tug Hill Plateau in central New York. These smaller streams are invaluable for their pristine water quality, cold temperatures, and the amount of water they cumulatively contribute to the larger rivers in the southern portions of the state.

This report lays out the significant challenges New York faces as it attempts to reshape the laws, regulations and policies that regulate drinking water and maintain healthy rivers. Several case studies in the report demonstrate these challenges in different regions of the state. The final section of the report offers a set of recommendations for improving river health and management of New York's water supplies.

TAPPED OUT: NEW YORK'S WATER WOES

STRUGGLING RIVERS

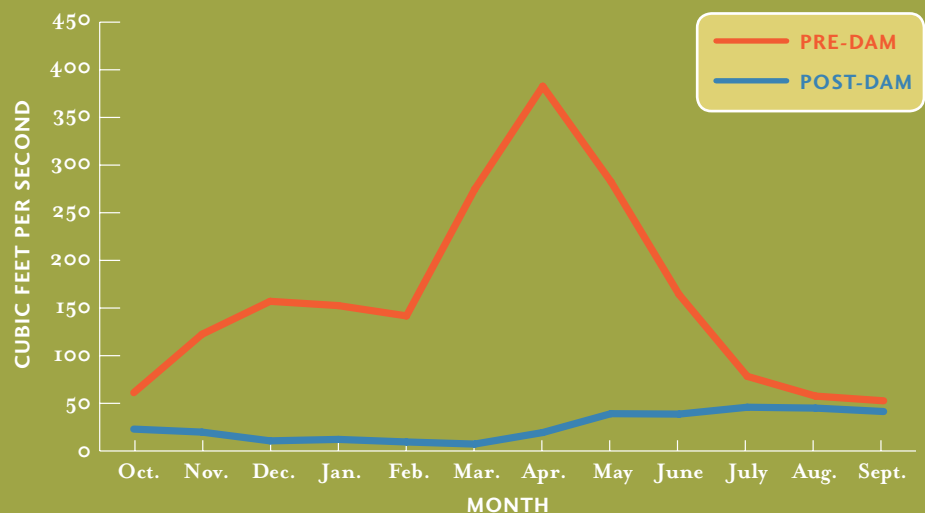
Streamflow generally refers to the naturally varying amount of water in a stream. Healthy streamflows support native fish, wildlife and instream and streamside habitat. Streamflow is the principal driver for all stream ecology, directly affecting channel formation, habitat, fish migration, temperature, oxygen levels and numerous other critical factors. Reservoir releases and water withdrawals can alter naturally varying streamflows, resulting in significant damage to river ecosystems.

There are over 10,000 public water supply systems in New York state that tap into groundwater and operate reservoirs, including a reservoir on the Neversink River. The Neversink River is a tributary to the Delaware River in the Catskills. It was dammed in 1953 to create a water supply reservoir for New York City. Before that, it was a healthy river system with naturally fluctuating streamflows. Trout and other river fish, along with streamside wildlife, rely on these fluctuations to support their life cycles. Trout depend on spring and late autumn high flows to initiate their reproductive cycles. Many wetland and floodplain wildlife also rely on these high flows to replenish their streamside habitat. Naturally low flows in the late summer and early autumn can give young trout a chance to grow and also provide additional benefits for certain plants and trees.



In recognition of the importance of healthy streamflows, the state recently amended its water quality standards to prohibit any alteration to flow that would impact a river or stream for such uses as drinking water, fishing, and fish propagation. Technical guidance from the Department of Environmental Conservation (DEC) will provide direction as to how much alteration will be permissible. The water quality standards, however, do not apply to most groundwater withdrawals and potentially will not apply to existing water supply operations, which represents the largest percentage of water use in the state.

NEVERSINK RIVER STREAMFLOWS
Pre- and Post- 1953 Construction of the Neversink Dam



Since its construction, the Neversink reservoir, in Grahamsville, has released a constant, low volume release of water throughout the year, limiting biodiversity in the stretch of river below the reservoir. “Flat-lined” flows such as these can have devastating effects on stream health. For example, trout and other fish that naturally thrive in a free-flowing river may be displaced by warm water species such as largemouth bass that live in slower, warmer waters. Unnatural flow conditions can also create inhospitable conditions for insects, which are a critical element of a river’s ecosystem. Low river flows can also create potentially lethal warm water temperatures, reduce food supplies, and ultimately lead to the disappearance of native fish that depend on cold, highly oxygenated waters.

Recent efforts to return streamflows on the Neversink to more natural levels are benefiting the river ecosystem and native brook trout.





NEAR CRISIS ON WEST CANADA CREEK

Herkimer County is located in central New York in the foothills of the Adirondack Mountains and has a population of approximately 65,000 people. The county has vast water resources that include the famous Mohawk River, which is part of the Erie Canal system. West Canada Creek is a tributary to the Mohawk River and one of the county's and central New York's largest and most popular trout streams.

In the summer and early autumn of 2007, Herkimer County and West Canada Creek experienced a water crisis that almost crippled the region's drinking water supply. For years, the Mohawk Valley Water Authority, the New York State Canal Corporation, several power companies, and area towns have been relying on West Canada Creek and its Hinckley Reservoir for their water supply, canal, and power needs. From August to October 2007, the county experienced a period of relatively low precipitation. This lack of rain, combined with excessive amounts of water withdrawals, resulted in catastrophically low water levels in the reservoir and creek.

Flows were so low in West Canada Creek that the DEC took unprecedented action to protect the prized brown trout fishery and closed 28 miles of the river to all fishing until the end of November. Understanding the danger that fishing could cause to already stressed trout, the local Trout Unlimited chapter and angling groups supported the closure. Some canal traffic, electric power, and drinking water for 130,000 people in Oneida and Herkimer counties were threatened due to the over-allocation of the water source.

Poor communication among the power company, the canal corporation, the drinking water supplier and the electric company was deemed the primary reason for this over-allocation. No system existed to communicate drought situations to the users so precautionary measures, such as increased water

conservation, could be taken. There was also a lack of information regarding the water levels, and the potential for other canal reservoirs to be utilized to help meet canal needs. As a result of the near crisis, and without proper scientific analysis of the problem as well as laws and regulatory tools to prevent it from reoccurring, the governor formed a special task force in October 2007 to facilitate communication among the various entities to help avert a similar situation in the future.

The task force was led by the New York State Health Department and included representatives of Herkimer and Oneida counties, the New York Power Authority, the DEC, several other state agencies and the canal, power, and water corporations. The group released its final report in April 2008 and issued 10 recommendations to facilitate communication and water allocation among the competing interests and to develop a plan to help the reservoir and the creek meet future needs. Among the recommendations were the following:

- There needs to be improved and routine communications among the agencies involved with the day-to-day operation of the reservoir;
- The canal corporation should consider the use of other available canal sources to help provide water to the eastern portion of the canal system for navigation when water levels are below normal and declining;
- More information needs to be gathered to better understand reservoir conditions;
- The aging water supply infrastructure needs to be improved;
- The feasibility of creating additional storage reservoirs upstream of the reservoir should be considered.

It is not clear how any of these recommendations will be implemented by the stakeholders or enforced by the state.



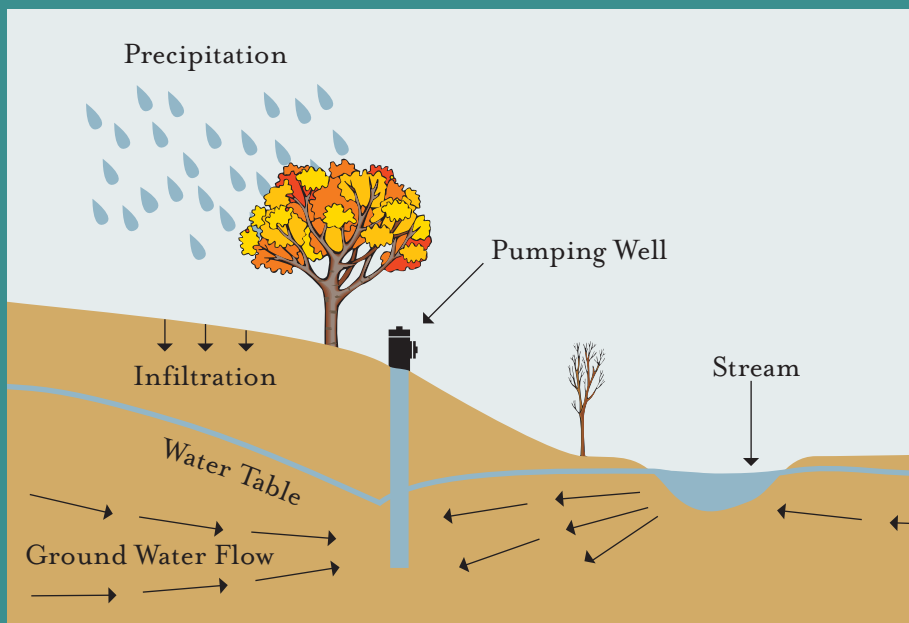
Water levels in Hinckley Reservoir in summer 2007, were 35 feet below the crest and just three feet short of where drinking water supplies would have been affected. The reservoir was only 17% full.

GOING TO THE WELL ONCE TOO OFTEN

The water supply in New York state either comes from reservoirs or wells that tap into groundwater. Groundwater and surface waters (rivers, streams, wetlands and lakes) in New York are generally one continuous resource. Groundwater is typically very cold and clean, and therefore its presence in streams is essential to the survival of sensitive, coldwater species like trout.

New York state residents rely heavily on groundwater for household use. Long Island alone contains around 1,000 groundwater wells, and Nassau and Suffolk counties rely almost 100% on groundwater. Dutchess County in upstate New York relies on groundwater for 60% of its water supply. Upstate dependency on groundwater is nearly 50%, and includes individual home wells, which are currently not regulated by the state. As sprawl and development continue, communities are increasingly relying on groundwater for their domestic water supplies. Many wells, especially those placed close to these streams, can severely restrict streamflows and increase temperatures to lethal levels for cold-water fish such as trout.

WELLS DEplete GROUND AND SURFACE WATER RESOURCES



Groundwater wells not only deplete underground aquifers, they also impact surface water flows by directly pumping water out of a stream or intercepting groundwater that otherwise would enter a stream.



State environmental law has not yet responded to the rapid increase in groundwater usage. As a result, most groundwater withdrawals are unregulated. The state does, however, attempt to regulate large public water supply groundwater withdrawals and the significant groundwater withdrawals on Long Island. As a member of the Delaware River Basin Commission, the state helps regulate major groundwater withdrawals from the Delaware River watershed. The Delaware River watershed is governed by the Delaware River Basin Compact which was adopted in 1961 by all of the states in the basin along with the federal government, who are members of the commission. The commission was granted broad powers to plan, develop, conserve, regulate, allocate and manage the water and related land resources of the basin.



ROCKLAND COUNTY — A FAILURE TO COMMUNICATE

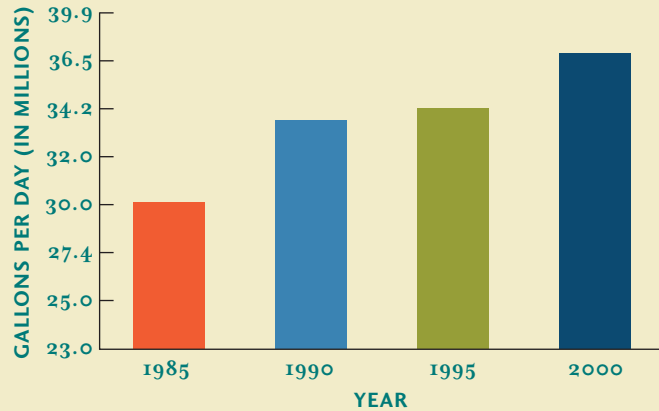
Even though Rockland County is a suburb of New York City, it has less than 300,000 residents living within 175 square miles. Parkland constitutes almost one-third of the county. The Ramapo River, which originates to the north in Orange County, flows through Rockland County before entering New Jersey, and is valued by anglers for its holdover brown trout populations and proximity to New York City.

Even with its modest population and a great deal of open space, Rockland County has declared three drought “emergencies” since 1995. A fourth emergency was narrowly averted in 2005 after just a few months of below average rainfall. According to a 2005 report in the *Journal of the American Water Resources Association*, reduced precipitation was not the driving force behind these droughts as much as it was poor water supply planning and increased human demand.

The county’s population has more than doubled since the last major drought in the 1960s. Much of the new development has been single-family homes. People in single-family homes can use twice as much water as those in multi-family residences partly due to how often they water their lawns.

Two-thirds of the county’s water comes from two sources: groundwater wells in a bedrock aquifer that has little water to spare, and shallow wells along the banks of the Ramapo River that during heavy use can reduce the river’s streamflow. The Ramapo River can naturally experience low streamflows in the late summer and early autumn months and this groundwater pumping can further decrease the flows. As a result, the water supply permits issued to the private water company that owns the wells require that the wells be shut down during extreme low flow periods on the river.

ROCKLAND COUNTY TOTAL WATER WITHDRAWALS

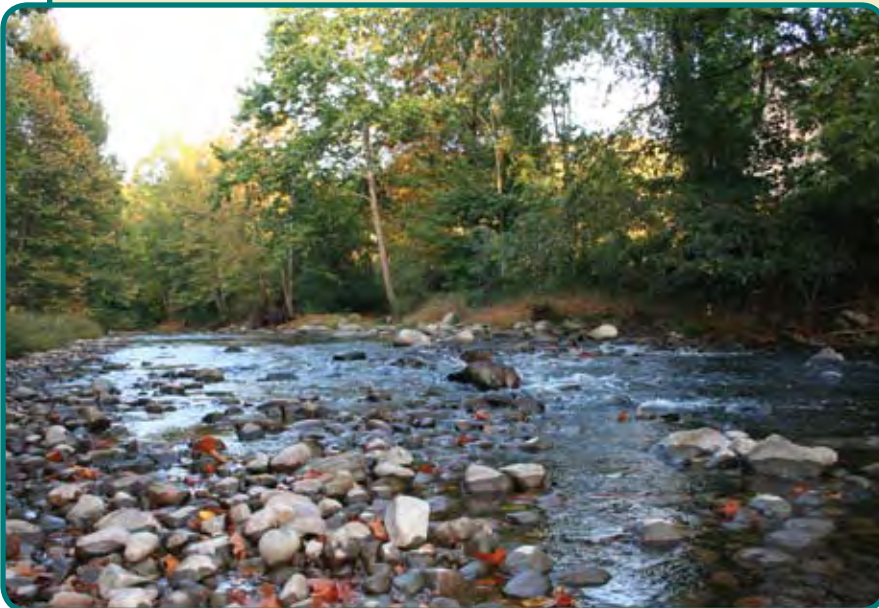


Water use in Rockland County has been steadily increasing since the 1980s.

While the county’s population has been growing, its total water supply capacity has remained fairly stagnant. The reason for this is due, in part, to a fragmented oversight process. The towns make development decisions while the state, county and a private water company manage the water supply. Frequently these entities do not share information or coordinate regional planning so that growth occurs in conjunction with available water supply and without harm to area rivers. Last year, the private water company filed plans for its long-term water supply solution for the county. Its final proposal involved the construction of a \$79 million desalination facility along the Hudson River that would serve as a supplemental source of water for the county as it continues to grow.

The project, which is currently under review by state and local agencies, would begin providing water to county residents by the end of 2015. It would be built near Stony Point, just across the Hudson River from the Indian Point nuclear plant, and include a complex treatment system that would have to remove a number of toxic chemicals and other pollutants found in the river. Desalination is also a very energy-intensive process as the methods used to convert saltwater to drinking water require a lot of energy for pumping and/or heating the water.

With better planning and coordination among the various water interests, development could have been curtailed to match available water or stricter conservation measures could have been implemented, ensuring both an inexpensive and reliable water supply and healthy stream flows on county rivers.



The Ramapo River can experience dangerously low streamflows in the summer and early autumn months due to excessive groundwater pumping along its banks.



LONG ISLAND — A CASE FOR RECHARGE

Long Island is the most heavily populated island in the country. While Kings and Queens counties in western Long Island get the bulk of their water from upstate reservoirs, Suffolk and Nassau Counties, which make up most of Long Island, both rely almost exclusively on groundwater to supply their populations of over three million people. Both counties have experienced a drop in their water tables due to heavy groundwater pumping, a large amount of paved surfaces and poorly designed storm water systems. When large areas are paved for parking lots and roads, rain and snowmelt that would otherwise have soaked naturally into the ground flow across the pavement into storm water sewers. The storm water is then piped away and discharged into a stream or other body of water or sometimes a recharge basin, a pit that collects water and allows it to enter naturally into the ground. If the storm water is piped into a stream in another watershed, it is unavailable to help recharge the local water table, causing it to drop.

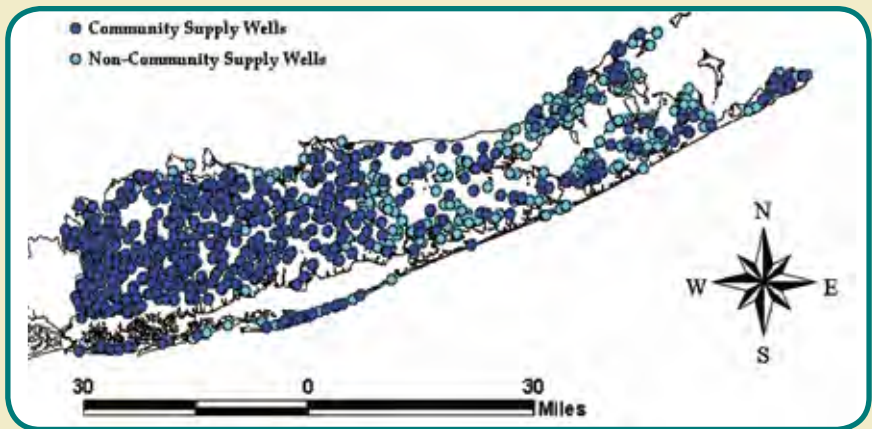
The effects of these withdrawals on the aquifer and streams can be pronounced, especially in the western portion of Suffolk County, but pale in comparison to those in Nassau County. Nassau County has seen its water table drop almost 20 feet at times compared to a just a few foot drop throughout most of Suffolk County. Many Nassau County streams that once flowed all year now only flow intermittently and are much shorter in length, and water levels in wetlands and ponds in the northern head-water areas have decreased.

One of the reasons for the difference between the two counties is that the vast majority of the homes and storm water drains in Nassau County are connected

to sewer systems that collect storm water and wastewater from homes and discharge it into Long Island Sound or the Atlantic Ocean. In other words, water that is pumped out of the ground for human consumption, once used, is being piped out of the watershed, causing streamflow and aquifer levels to drop. In addition, the precipitation that would normally have entered the ground, replenishing aquifers and streams, instead becomes storm water and is piped out of the watershed.

In comparison, most Suffolk County homes have septic systems, and storm water is generally discharged into local streams or recharge basins within the watershed. Therefore, this water recharges the aquifer and the streams that originally provided the water, helping to maintain healthy streamflow and aquifer levels. When communities keep water local like this, the aquifers, rivers and drinking water supplies can all win in the long run.

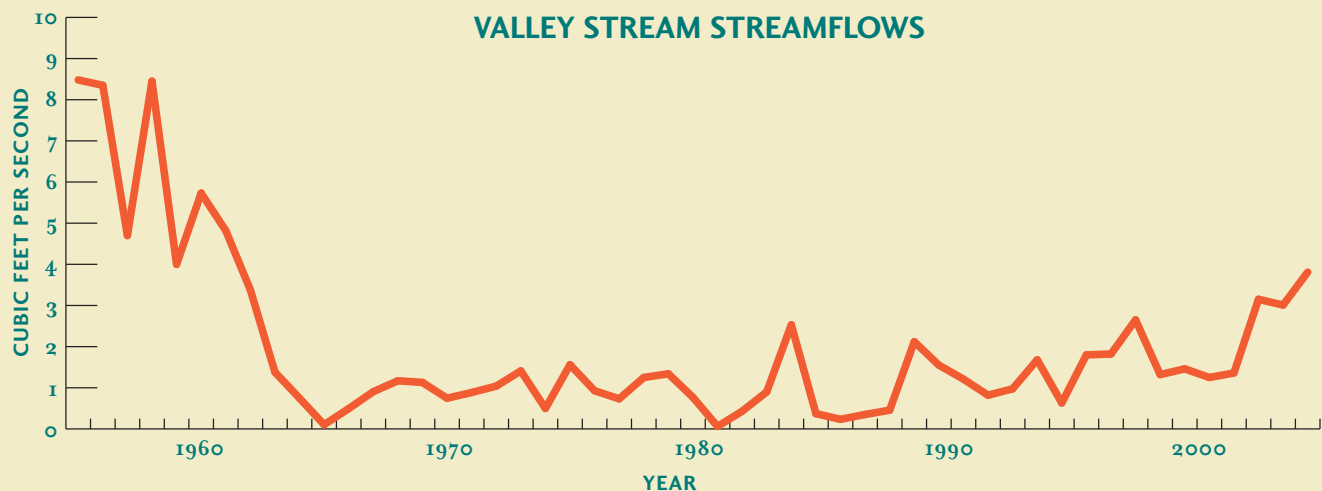
LONG ISLAND WATER SUPPLY WELLS



The Suffolk County Water Authority serves over 1.2 million people and is considered the largest groundwater supplier in the country, pumping over 73 billion gallons per year.

SOURCE: SUFFOLK COUNTY WATER AUTHORITY

VALLEY STREAM STREAMFLOWS



Partly in response to excessive groundwater pumping, streamflow levels in Nassau County's Valley Stream began to steadily decline in 1955, and at times the stream has run dry. Due to a decrease in groundwater pumping in the 1980s, streamflow levels have slightly rebounded, although nowhere near natural, healthy levels.

SPRAWL WITHDRAWALS

SERVING A THIRSTY POPULATION

In New York, tap water, bathroom water and water for lawns surpass all other consumptive uses by a wide margin. Nationally, lawn-watering is estimated to account for almost one-third of all residential water use. Automatic sprinklers for home lawn watering can triple a household's water usage. Numerous studies indicate that this use is unnecessary and wasteful, when, on average, watering a lawn once a week will allow turf to stay green. Lawn watering also takes place primarily during the hotter months when aquifers and smaller streams are already struggling.

In addition to the water waste that occurs on the demand side, there are also equally inefficient practices with the delivery of water. Most notably, the pipes that bring water from large public water supply wells or reservoirs to households are generally old and can lose as much as 20% to 30% of the water that flows through them. An Environmental Protection Agency (EPA) survey suggested over \$13 billion be invested in New York state to replace this decaying infrastructure.

There is also a lot of unmetered water in the state, that is, unauthorized use of water, including loss from accounting errors, theft, or inaccurate meters. Unmetered water, water lost to leaks and water used



From a standpoint of environmental protection, New York principally regulates water withdrawals through permits issued by the DEC under the Environmental Conservation Law (ECL). Under this statute, the DEC is supposed to require a permit for public water supply withdrawals, water withdrawals for agricultural irrigation as well as for some local and regional water plans. There are also state laws governing large groundwater withdrawals in Long Island and release requirements for certain reservoirs, mainly those connected with the New York City water supply system.

New York also recently signed the Great Lakes Compact, which will not go into effect until four other states also sign it. The compact improves upon the older, informal Great Lakes Charter and would prohibit new large surface or ground water withdrawals in the Great Lakes watershed without regional review. The Delaware River basin also has its own set of withdrawal laws as do a few other watersheds in the state.

The state purports to regulate interstate transfers via a separate permitting program. However, no discrete permitting system exists to analyze the impact of interbasin transfers, unlike other states in the Northeast, such as Massachusetts and Connecticut. Generally, regulation of water withdrawals in New York is implemented in bits and pieces and not in a well thought-out, comprehensive manner. As a result, many of the state's rivers and streams are left unprotected.

for other purposes such as flushing dirty pipes is frequently referred to as unaccounted-for-water, meaning water suppliers cannot bill a user for this water. The city of Troy in upstate New York reports that about 30% of the city's water use falls into this category. In western New York, the Erie County Water Authority, which takes water from Lake Erie and the Niagara River, cannot account for as much as 26% of its water. High unaccounted-for-water numbers such as these signify that unnecessarily high amounts of water are being withdrawn from aquifers and streams along with a significant loss of potential revenue for water suppliers. The EPA suggests that water supply systems minimize unaccounted-for-water to just 10% of total water supply.

New York state loses an average of 174 acres each day to development, including 70 acres of farmland in rural areas like Dutchess County.



MINING THE MARCELLUS SHALE

Rising energy prices and increasing demand from sprawling populations are prompting global efforts to create new sources of energy. In response, dozens of energy companies are now exploring the vast Marcellus Shale layer that underlies a large portion of New York state, as well as parts of Maryland, Ohio, Pennsylvania, and West Virginia. Geologists have long known that the Marcellus Shale holds vast amounts of natural gas, yet extracting the fossil fuel from its depths — typically 5,000 to 8,000 feet below the surface — was cost-prohibitive. Now advancements in directional drilling and extraction technologies, combined with soaring natural gas prices, have conspired to create a 21st-century natural gas boom.

In a process called hydraulic fracturing, anywhere from 2 to 5 million gallons of fresh water are pumped into each well, extending a fracture in the shale, such that the gas can be recovered in greater quantities and at a higher rate. Environmental concerns from the drilling operation are numerous, including



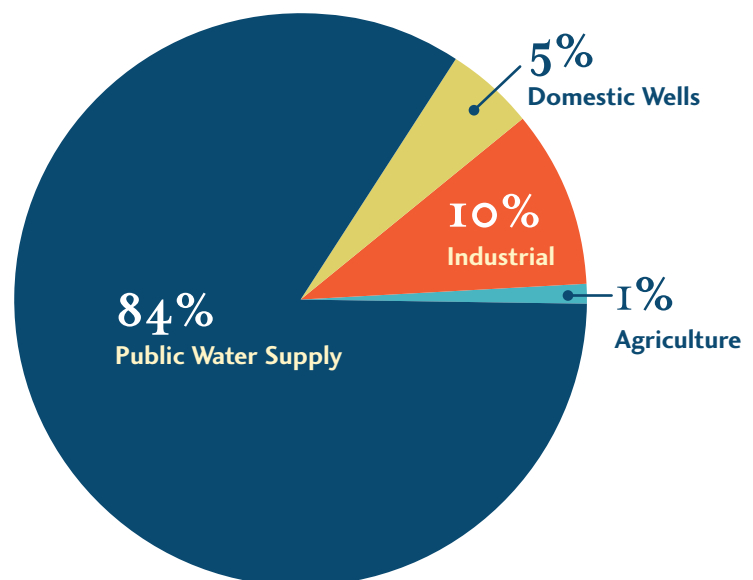
Marcellus Shale formation

the effects of the massive water withdrawals on area streams and wetlands. Some withdrawals in New York will be regulated by the Susquehanna River Basin Commission (SRBC) — a multi-state commission comprised of officials from New York, Pennsylvania and Maryland — for withdrawals over 100,000 gallons per day out of the Susquehanna watershed. The Susquehanna watershed includes the south-central portion of New York, however, does not cover New York's entire Marcellus Shale formation that extends west and east of the Susquehanna watershed. Some of the proposed wells in New York, outside the authority of the SRBC, are located in delicate headwater areas, and operations will continue

through typically low streamflow months in late summer and early autumn. The current laws and regulations in New York do not adequately protect these streams from these massive withdrawals, and notably do not allow for proper review of the cumulative impacts of multiple wells.

Also, some towns or counties that have nearly tapped out their local watersheds now import water from more water-rich regions, which is called an “interbasin transfer”. In these situations, water leaving the donor watershed is not able to help recharge its aquifer (and maintain natural streamflows) in the form of wastewater; something that typically occurs if water stays local.

NEW YORK WATER USE



Public water supply and domestic wells constitute almost 90% of New York's water use.



FLEXIBLE FLOWS ON THE UPPER DELAWARE

New York City and Westchester County residents receive almost all of their drinking water from reservoir systems located in the Catskill Mountains, on the upper Delaware River and on the Croton River. The New York City water supply system is a complex world unto itself, dating back to 1677. The three upstate reservoir systems include 19 reservoirs and three controlled lakes with a total storage capacity of around 580 billion gallons.

New York City has, in the past, been deemed a model for conservation and efficiency. In the early 1990s, the city was experiencing increased droughts and placing too much stress on its reservoirs. By replacing thousands of inefficient toilets in city buildings and requiring leak detection and water metering across the city, it reduced per capita water use from 195 gallons per day in 1991 to 167 gallons per day in 1998. While the reduction was an improvement, according to the EPA, per capita water use in the country is quite a bit lower than New York's, at 100 gallons. Some states, such as Massachusetts, legally mandate amounts as low as 65 gallons per person per day.

The city's water consumption still has significant impacts on the watersheds from where it takes water. This is not only due to the quantities the city requires but also how and when it chooses to release water from its reservoirs.

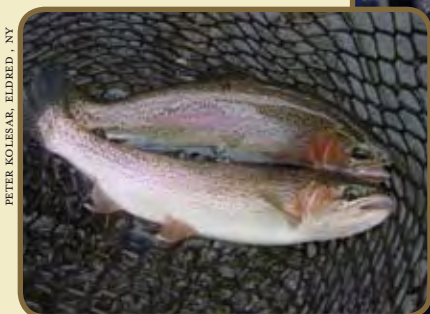
Management of the famous trout water of the upper Delaware River has long been a controversial issue, and is again, drawing attention from regulators, conservationists and anglers. In 1931, and then by amendment in 1954, the U.S. Supreme Court partitioned the waters of the upper Delaware River among New York City, and the states of New Jersey, New York,

Pennsylvania and Delaware. The rules governing the river focused primarily on supplying drinking water to over five million people in New York City and over three million people downstream of New York in the other states. For decades, the inflexible and complex nature of managing the reservoirs that strongly favors New York City over the needs of downstream communities and the fabled upstream trout fishery has frustrated conservationists, fishermen and local communities as these rivers suffered chronically low flows, devastating floods, drastic fluctuations in water levels, and even fish kills.

Recently, a new streamflow concept for the Delaware River was developed by a group of interests, including Trout Unlimited. The new framework would allow for greater flow releases when reservoirs are at higher capacity, then reduce releases accordingly as reservoir levels drop. The releases would also be related to naturally varying seasonal flows. If adequate flows are released under the framework, it would provide the rivers and fish with the water they need during the critical spring and summer seasons while still providing ample protection for drinking water supplies to the various states. A decision regarding the future of the Delaware River flows is expected in the months to come.



PETER KOLESAR, ELDBRED, NY



PETER KOLESAR, ELDBRED, NY

The upper Delaware River is one of the most popular fly fishing destinations in the country.

THE GOLF AND SKI DILEMMA

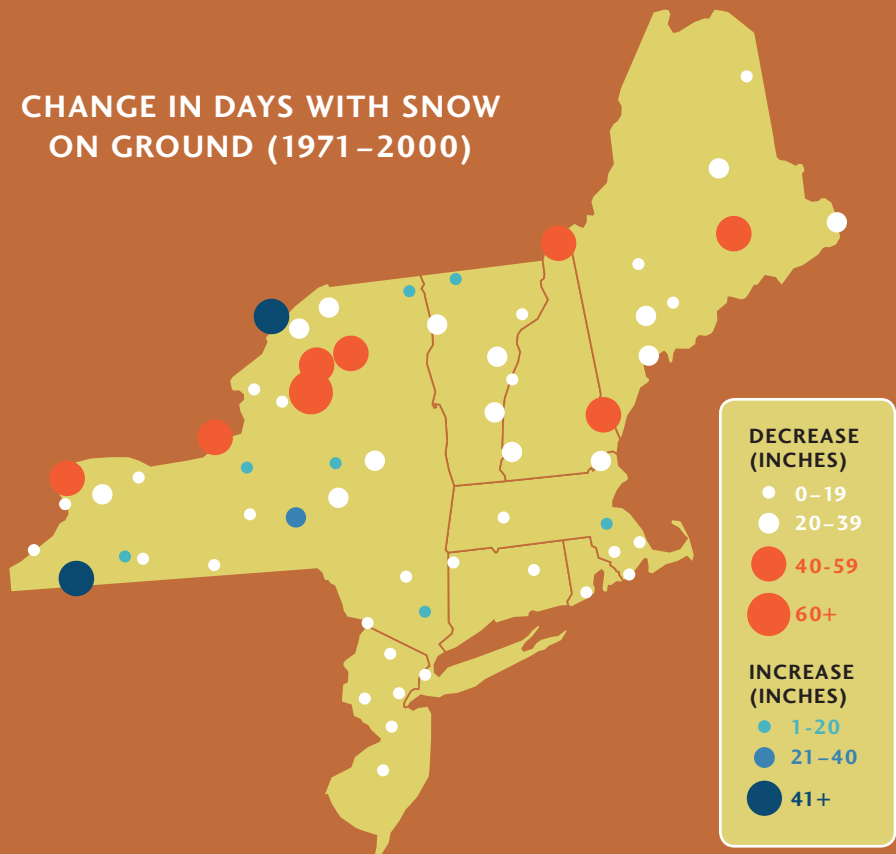
The average golf course can use about 250,000 gallons of water per day during the operating season to irrigate its turf. This is equivalent to the daily drinking water supply for approximately 3,500 people. New York has almost 1,000 golf courses, the third highest of any state in the country.

Golf courses use the most water during the late summer and early fall, times when streams and aquatic life have the least water to spare. During that peak irrigation season, fish and other aquatic life rely on the minimal amounts of water naturally flowing in rivers and streams. Withdrawal of water at this critical time of year can cause lasting damage to ecosystems that can persist well beyond the irrigation season.



Only a few of the state's recreational facilities that withdraw water, in particular those that actually physically alter a stream bank or stream bed, have to meet streamflow standards. Some projects fall under the guidelines of the State Environmental Quality Review Act, (SEQRA) a law that generally requires all local or state agencies to determine whether the actions they directly undertake, fund or approve may have a significant impact on the environment. Some large, permitted withdrawals can trigger this act, but the level of analysis required under the act is inconsistent and is often ecologically unprotective.

CHANGE IN DAYS WITH SNOW ON GROUND (1971-2000)



While the popularity of skiing, snowboarding and other winter resort sports is increasing, natural snow cover has been consistently decreasing due to gradual regional warming. Snowfall in New York has decreased over the last 50 years and ski resorts are increasingly relying on artificial snowmaking to keep customers coming to their mountains.

SOURCE: INDICATORS OF CLIMATE CHANGE IN THE NORTHEAST OVER THE PAST 100 YEARS CAMERON WAKE CLIMATE CHANGE RESEARCH CENTER, EOS, UNIVERSITY OF NEW HAMPSHIRE.

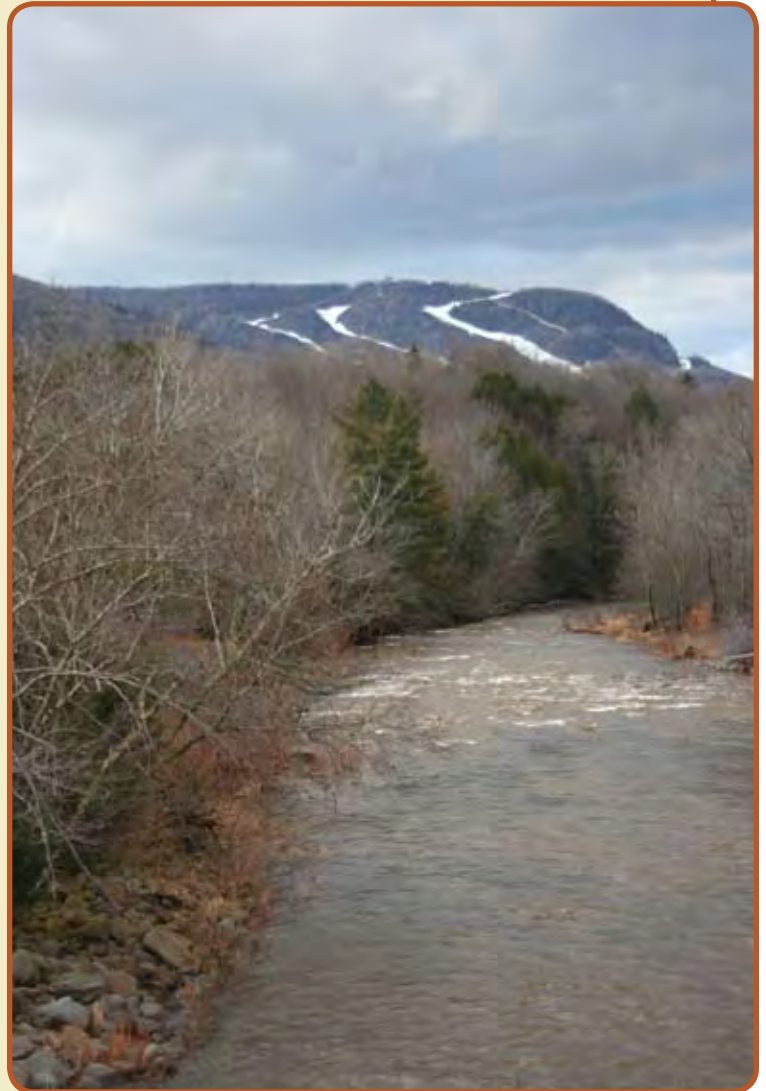


HUNTER MOUNTAIN: “THE SNOWMAKING CAPITAL OF THE WORLD”

Schoharie Creek is located in the famous fly fishing region of the Catskill Mountains and valued for its brown trout population. Hunter Mountain is the self-proclaimed “snowmaking capital of the world” and has been turning Schoharie Creek waters into fake snow since 1959. Hunter Mountain has for many years been the center of streamflow controversy in New York. In the late 1960s it allegedly became the first ski area in the world with summit-to-base snowmaking. Its snowmaking activity was first regulated by the state in 1980s, but further restricted in the 1990s after the state and conservationists took legal action over Hunter’s alleged violation of its allowable water withdrawals. Hunter recently requested permission from the state to increase its water withdrawals to make snow on the west side of the mountain. Anglers, conservationists and the local Trout Unlimited chapter are concerned about the potential impacts on the brown trout fishery due to increased winter low flow conditions and the possibility of anchor ice formation.



Hunter Mountain takes water directly from Schoharie Creek and diverts it to a vast snowmaking facility with 1,100 snow guns capable of turning water into snow at a rate of 9,000 gallons a minute onto the mountain.



Snowmaking for ski areas can have a similar effect on small, mountain streams. New York has around 50 ski areas, more than any other state in the nation. New York’s ski areas are constantly competing to attract customers, and snow quality and snow cover are two of the most sought-after criteria in a resort. Artificial snowmaking operations, however, use massive amounts of water. To cover one acre of ski trails with one foot of snow requires about 150,000 to 180,000 gallons of water.

Snowmaking generates an annual minimal net loss to a watershed because spring snowmelt returns the water originally consumed for snowmaking back to the watershed. Winter, however, is a naturally stressful time for stream environments and the seasonal reduction in already low flows can severely reduce the limited habitat and cause harmful anchor ice to form on the bottom of a river. By the time the spring snowmelt arrives, the damage to the stream has already been done.

TROUT WATER OR BOTTLED WATER?

To meet the growing demand for bottled water, bottled water manufacturers are scrambling to find new sources from which to take water. New York state, with its vast water resources and proximity to a number of major cities, has become a prime target for some of these corporations.

Although the bottled water industry accounts for a small percentage of overall water withdrawals in the region, its withdrawals can create severe local impacts on streams. This is especially true for withdrawals for “spring water”, groundwater that flows naturally to the surface, one of the most marketed types of bottled water. Spring water is cold and clean and feeds small headwater streams favored by species like brook trout.

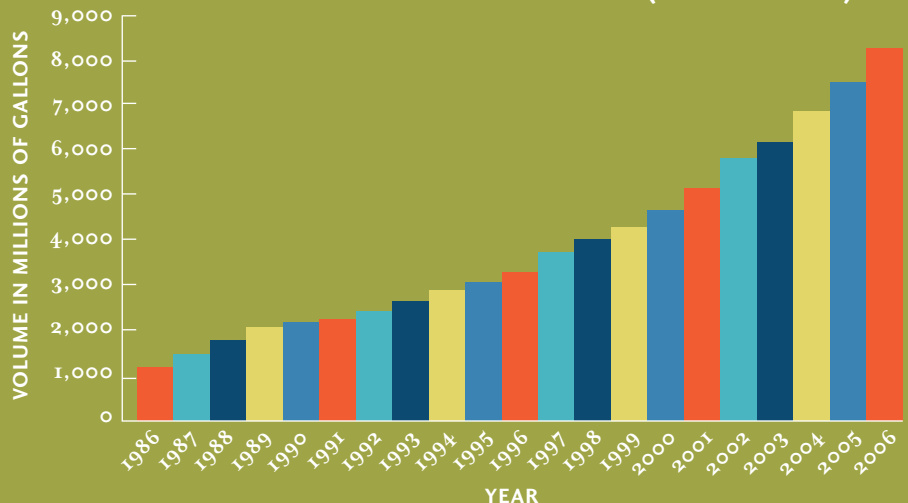
Bottled water plants can withdraw massive amounts of water, sometimes over a million gallons a day — enough to satisfy the daily water needs for around 15,000 people — from these valuable and delicate headwater areas. When the water is bottled and then trucked out of the region, it is gone forever and unavailable to recharge the donor springs or aquifers.

Along with the impact that the mere volume of a withdrawal can have on flows in a spring-fed brook, the loss of cold water coming from these springs and its value to the downstream tributaries cannot be underestimated. Groundwater input keeps these streams cool in the summer and relatively warm in the winter, allowing aquatic life to tolerate otherwise harsh seasonal conditions.



Similar to withdrawals for recreational activities, there is no statute that gives the DEC specific authority to regulate withdrawals for bottled water, whether from a spring, the ground or directly from a reservoir or stream. Some withdrawals, in particular those that physically alter a stream bank or stream bed, could undergo environmental review under the Environmental Conservation Law and/or State Environmental Quality Review Act.

SALES OF BOTTLED WATER (1986–2006)




Bottled water has now overtaken coffee and milk in sales nationally, and is catching up with beer sales.

SOURCE: BEVERAGE MARKETING CORPORATION, AS REPORTED IN BEVERAGE WORLD. 2007.

In 2007, Nestlé Waters North America, producers of Poland Spring, Perrier and Deer Park bottled water, began prospecting for water in Tug Hill, the Adirondacks and the Catskills, the three areas in New York with the best remaining brook trout habitat. Nestlé recently bought an option to purchase a farm in Orwell, NY that has numerous springs on the property. These springs feed Orwell Brook, a tributary to the Salmon River and one of the premier salmon and steelhead producing fisheries in the state. The company planned to withdraw around 1.5 million gallons of spring water a day to bottle and remove — enough to supply a town of 24,000 people with their daily water needs. Under heavy public criticism and after further review, Nestlé decided to look elsewhere in the region for water.

CLIMATE CHANGE

HEALING TROUBLED WATERS

 The state has made some strides with respect to helping curb climate change. Most notably, it is participating in the Regional Greenhouse Gas Initiative, a cooperative effort by Northeastern and Mid-Atlantic states to reduce carbon dioxide emissions. With respect to mitigating the impacts of global climate change, and preparing fish and wildlife for its inevitable effects, the state has been slow to act. It has made little progress in strengthening the laws that protect and restore valuable water resources.

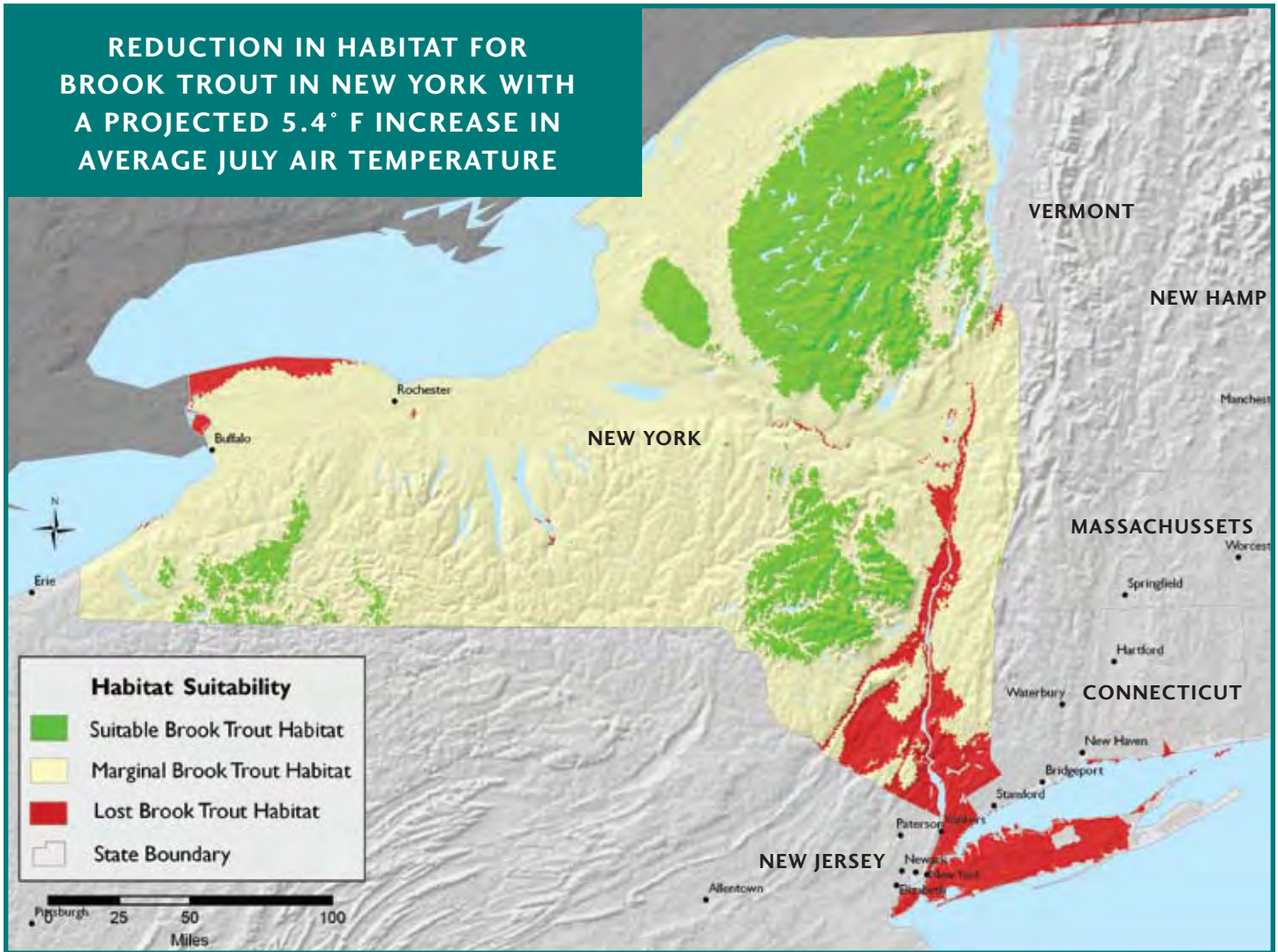
Global climate change will have multiple, profound effects on New York state and its rivers and streams. According to a 2007 article in the *Journal of Hydrology*, air temperatures have already risen in New York by approximately 1.8° F in the last century, with the rate increasing in the last decade. This warming has contributed to an average increase in precipitation in the Northeast of about 8%. The effects of these changes around the state are already apparent in the form of earlier spring snowmelt runoff and a decrease in the number of days that rivers and streams are frozen.

With increasing air temperatures, rising water temperatures are also widely predicted, along with an increase in the severity and frequency of droughts and floods. Trout are reliant on an abundance of cold, flowing water and cannot survive water temperatures above 76° F for extended periods of time. Furthermore, increasing human demand for water will place additional stress on watersheds and amplify the negative impacts of climate change on fish populations that are already struggling in unnaturally flowing streams.

In June 2006, floods waters of the Delaware River submerged the town of Cocheton, NY. More extreme weather events, such as droughts and floods, are expected as a result of global climate change.



**REDUCTION IN HABITAT FOR
BROOK TROUT IN NEW YORK WITH
A PROJECTED 5.4° F INCREASE IN
AVERAGE JULY AIR TEMPERATURE**



THE TIMES HERALD-RECORD

Fortunately, given natural streamflows and their corresponding healthy watersheds that protect cold water temperatures, trout can be a resilient species. They have adapted over eons to fluctuations in climactic and environmental conditions. It is essential that the best remaining stream habitats and fish populations be protected by maintaining their

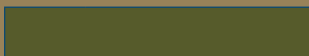
natural streamflow levels, and that an effort be made to restore those streams whose flow levels have been altered in the past due to withdrawals or other means. Leaving a river in its natural state is the best way to protect it from future stress, and the wisest road forward for the state to protect its water resources.

RECOMMENDATIONS

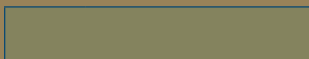
As indicated throughout this report, the patchwork of laws and policies that currently govern streamflows and water withdrawals in New York state does not adequately protect its water resources. Many of the state’s water laws evolved out of crisis or necessity, and not as part of a statewide planning process. Most importantly, none of the scattered permitting and regulatory programs that are in place are supported by strong science that can guide regulators as to just how much water can be withdrawn safely from a watershed without harming instream life.

REGIONAL WATER LAW COMPARISON

	PERMITTING STATUTE FOR MAJOR SURFACE WATER WITHDRAWALS	PERMITTING STATUTE FOR MAJOR GROUNDWATER WITHDRAWALS	STATEWIDE STREAMFLOW STANDARDS	INTERBASIN TRANSFER REVIEW	WATER QUALITY STANDARDS CONTAIN EXPLICIT REFERENCE TO STREAMFLOW	WATER CONSERVATION STANDARDS
MA	Dark Green	Dark Green	White	Dark Green	White	Dark Green
CT	Dark Green	Dark Green	Dark Green	Dark Green	White	White
NH	White	Dark Green	Grey	Grey	Dark Green	Grey
VT	White	Dark Green	Grey	White	Dark Green	White
RI	White	Grey	Grey	White	Dark Green	White
ME	White	White	Dark Green	White	Grey	White
NY	White	White	White	White	Dark Green	Grey



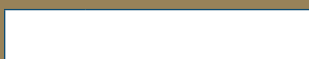
COMPREHENSIVE LEGAL OR REGULATORY TOOLS CURRENTLY EXIST.



THE STATE IS ACTIVELY DEVELOPING NEW, COMPREHENSIVE LAWS OR REGULATIONS OR FILLING THE GAPS IN CURRENT LAWS.



THERE IS A POLICY ONLY IN PLACE, OR LAWS OR REGULATIONS EXIST BUT ARE RARELY ENFORCED, OUT-OF-DATE, OR APPLY TO A LIMITED NUMBER OF USERS.



NO EFFECTIVE STATEWIDE LAW OR REGULATIONS EXIST.

As the state's population continues to expand into rural areas, pressure on small streams and their aquatic populations will only increase. This pressure will be compounded by an increased interest in natural gas drilling in the southern half of the state, a process that can use millions of gallons of water to extract gas from just one well. In order to continue to provide both drinking water for communities and maintain high quality rivers and streams, New York state must reconsider its approach to managing surface water and groundwater withdrawals. While it would be most effective, protective and logical to create one agency and one statute to oversee management of freshwater in the state, this is probably not politically feasible in the near future. Therefore, we provide several recommendations below as guidance for a path forward to sustain the state's waterways and communities into the future.

STREAMFLOW STANDARDS **New York should adopt meaningful statewide streamflow standards that protect aquatic and streamside life.**

The DEC does protect healthy streamflow levels in its water quality standards by stating that there should be no alteration in flow that will impair the waters for their best uses. The agency, however, needs to develop technical guidance to this standard so it and other agencies can evaluate whether a major water withdrawal could negatively affect streamflow levels and aquatic life. Given that the water quality standards only apply to a limited number of water withdrawals, the state should also develop more comprehensive streamflow standards applicable to all uses that affect streamflow. The standards should be based on the natural variation in streamflows. Proper streamflow standards provide the necessary benchmark from which all other water allocation decisions can be made.

GROUNDWATER AND SURFACE WATER PERMITTING STATUTE


New York should adopt a comprehensive groundwater and surface water withdrawal permitting statute.

New York should adopt a statewide water withdrawal permitting statute. A concise and transparent permitting statute would give developers and other water users more consistency in terms of what they can and cannot do while at the same time protecting rivers. The statute should require that any entity proposing to withdraw a certain amount of water, such as over 50,000 gallons per day, apply to the DEC for a permit. With such a statute in place, the state could develop a sensible allocation framework that prioritizes essential uses such as drinking water and stream ecology over non-essential uses like lawn watering and recreational uses in case of a water shortage.

INTERBASIN TRANSFERS **New York should regulate all major interbasin transfers of water.**

The state should regulate all major interbasin transfers of water, such as those transfers involving over 50,000 gallons per day. New York water that is bottled and transported out of a watershed for retail sale should be treated as an interbasin transfer, as should all water that is moved out of a watershed. In evaluating interbasin transfers, the state should take into account the effects on both the donor watershed giving up the water as well as the watershed that is taking the water. Transfers should be approved only after all other available measures – including water conservation – have been implemented and appropriate streamflow levels in both watersheds have been assured. As a general rule, communities should be strongly encouraged to grow within the bounds of

their local water budgets, obviating the need for costly large interbasin transfers that can upset the hydrologic balance of both watersheds.

 **LOCAL DEVELOPMENT DECISIONS**
New York needs to coordinate with towns and water suppliers so development decisions are made in line with water availability and watershed health.


There should be coordination among the state, counties and water suppliers to ensure that water availability and effects on streamflow levels are taken into consideration by local zoning and development decisions. The cumulative effects of multiple private groundwater wells should also be taken into account, along with wastewater and storm water discharges. Where possible, water should be kept local and recharge encouraged, in order to help maintain the natural hydrologic balance in the watershed.

 **WATER CONSERVATION**
New York needs an enforceable and effective water conservation law.

While the state has a water conservation policy, for the most part, it is not regulatory and rarely acknowledged outside of large scale water suppliers. Water suppliers must discuss demand management in their permit applications, or ways in which their customers can reduce their demand for water. The state should adopt a more comprehensive program that creates incentives or mandates for better demand management and water conservation by all users along with delivery efficiency by water suppliers. Ultimately, conserving water is the least expensive and least ecologically damaging way to provide more water for fish and faucets alike.

A water conservation law could include the following aspects:

- Limiting unaccounted-for-water to no more than 10%;
- Establishing reasonable, enforceable caps on per-day residential water use;
- Establishing streamflow triggers that result in mandatory limits on outdoor water use, including lawn watering and other unnecessary irrigation;
- Implementing a water conservation pricing structure — where fees rise with consumption, or full-cost billing where the true, unsubsidized cost of delivering and treating water is reflected in the price;
- Adopting other water conservation activities such as leak detection programs, increased education and recycling of treated wastewater;
- Encouraging construction or acquisition of additional storage facilities or ponds or sensibly placed groundwater wells that could be utilized in low streamflow conditions.

 **INFORMATION**
New York needs to collect, manage and analyze information regarding its aquifers and streamflow levels.

New York needs better data regarding the size and capacity of its aquifers, current water withdrawals, and projected demand. New York should develop a comprehensive database and map regarding existing and potentially available groundwater and surface water resources. Perhaps, most importantly, New York needs more streamflow gages for informational purposes, to guide its permitting decisions, and ultimately to create, modify and improve any streamflow standards.

Hudson River, Rhinecliff, NY



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