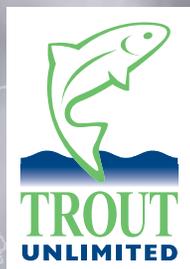
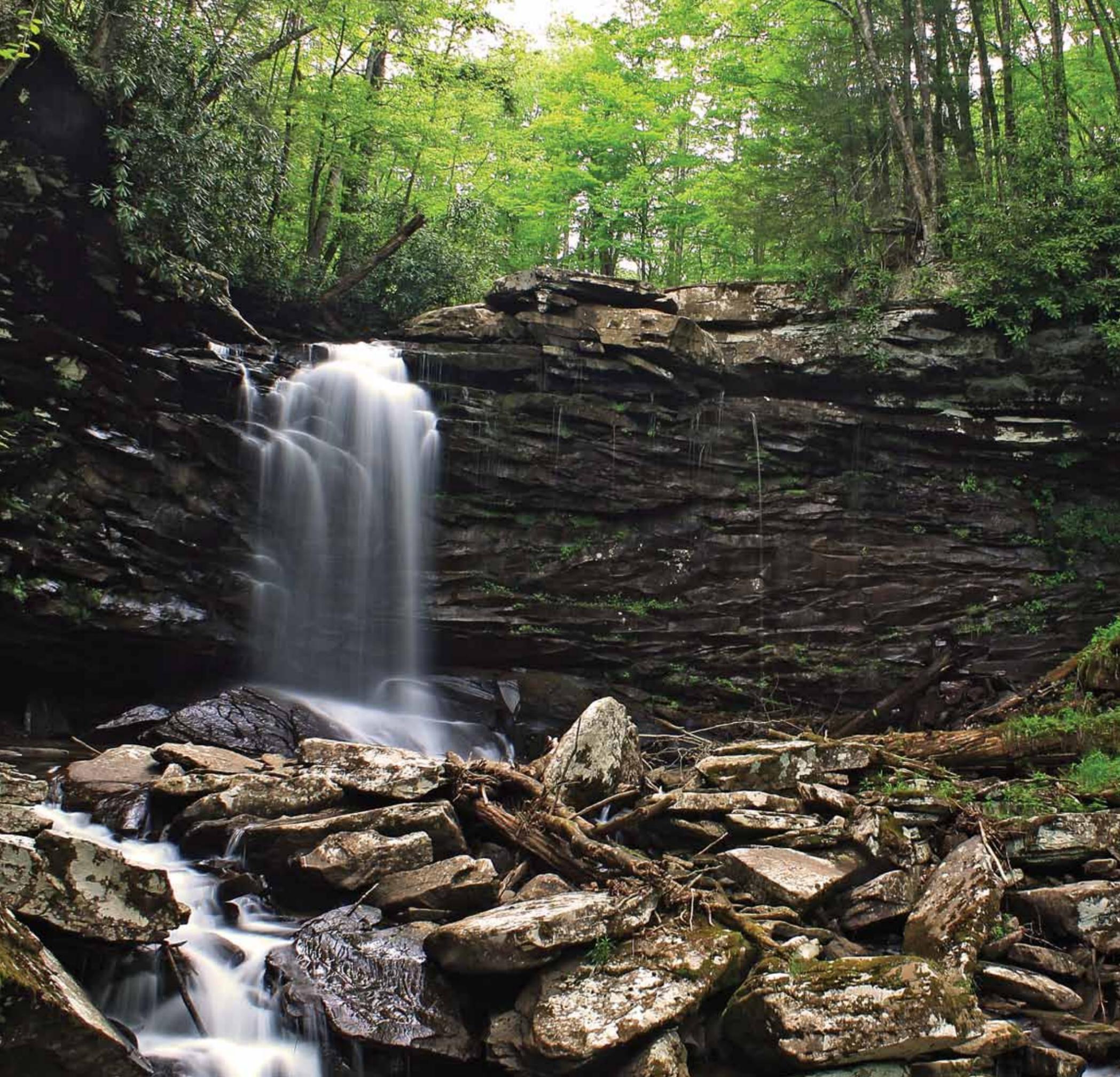


**As natural gas extraction expands across the Central Appalachian region, that industrial-scale energy development is encroaching on public lands that are critically important for fishing and hunting. In this report, Trout Unlimited takes a deeper look into those public places, outlining the potential risks posed by gas drilling operations and providing recommendations from sportsmen and women that promote responsible energy development.**



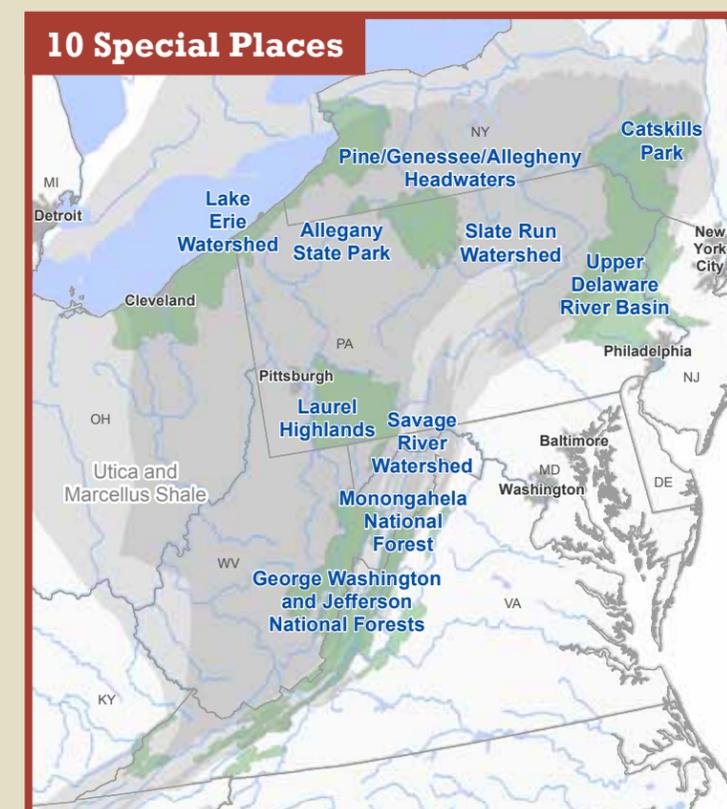


## Introduction

The longstanding sporting tradition in the eastern United States has been a part of the region's history and culture since colonial times and this heritage holds true today. Across the northern Appalachians, thousands of miles of mountains, lush forests and prolific rivers and streams abound, providing critical fish and wildlife habitat. Many of these places, such as the Upper Delaware River in New York, Slate Run in Pennsylvania and the Monongahela National Forest in West Virginia, have provided generations of hunters and anglers with the chance to enjoy the landscape as their ancestors did — a true wilderness hunting and angling experience. Today, these remote places and the fishing and hunting resources they support are at risk.

Large areas of Pennsylvania, New York and West Virginia, and parts of Maryland, Virginia and Ohio, have become the epicenter for energy development in the East. As companies flock to the region to drill for natural gas, this energy development could fundamentally alter hunting on some of the largest tracts of public lands in the East and fishing on thousands of miles of pristine native and wild trout streams, including tributaries of the Great Lakes.

For the 8.8 million hunters and anglers who fish and hunt in the Appalachians, this is a big deal. To protect these critical areas, sportsmen and women are working together to promote responsible energy development and ensure that all reasonable efforts are made to avoid or mitigate the impacts on these special places.



## Drilling in the Marcellus and Utica shales

Lying 6,000 to 9,000 feet below the earth's surface, the Marcellus shale formation encompasses approximately 95,000 square miles occupying parts of New York, Pennsylvania, West Virginia, Maryland, Virginia and Ohio.

Approximately 3,000 to 7,000 feet beneath the Marcellus layer, the Utica shale formation underlies the same states, as well as parts of Kentucky and Tennessee, covering approximately 170,000 square miles. Combined, the two shale formations are expected to produce nearly 16 billion cubic feet of gas per day by 2017, a significant proportion of the nation's expected overall natural gas production.<sup>[1]</sup>

A process known as hydraulic fracturing is used to access these deep shale deposits. Approximately five million gallons of water, along with sand and chemicals, are injected deep underground to open up fractures in the rock and release the gas. The water required for hydraulic fracturing activities can be taken from streams or groundwater sources near drilling sites. If taken during low-flow periods or during spawning season, these withdrawals can harm fish and other aquatic species. In addition, spills, leaks and illegal discharges of drilling fluids or wastewater can be lethal to sensitive fish and game.

Up to 20 percent of the water and chemicals injected into each well returns to the surface, bringing with it heavy metals, radioactive materials and saltwater from the rock formation.<sup>[2]</sup> If not disposed of properly, the wastewater can contaminate nearby land and water resources.

An estimated 1,340 trucks travel to each well pad site, transporting fresh water, wastewater and drilling equipment. New roads constructed to accommodate the heavy truck traffic can bisect important game habitat and can add sediment to trout streams.

Removal of oak, beech and other trees and vegetation can reduce important food sources for game and create openings for invasive plants to take over native habitat. For hunters and anglers, long-used access to public or private lands may be limited in some instances due to active drilling operations.





## A Sporting Heritage at Stake

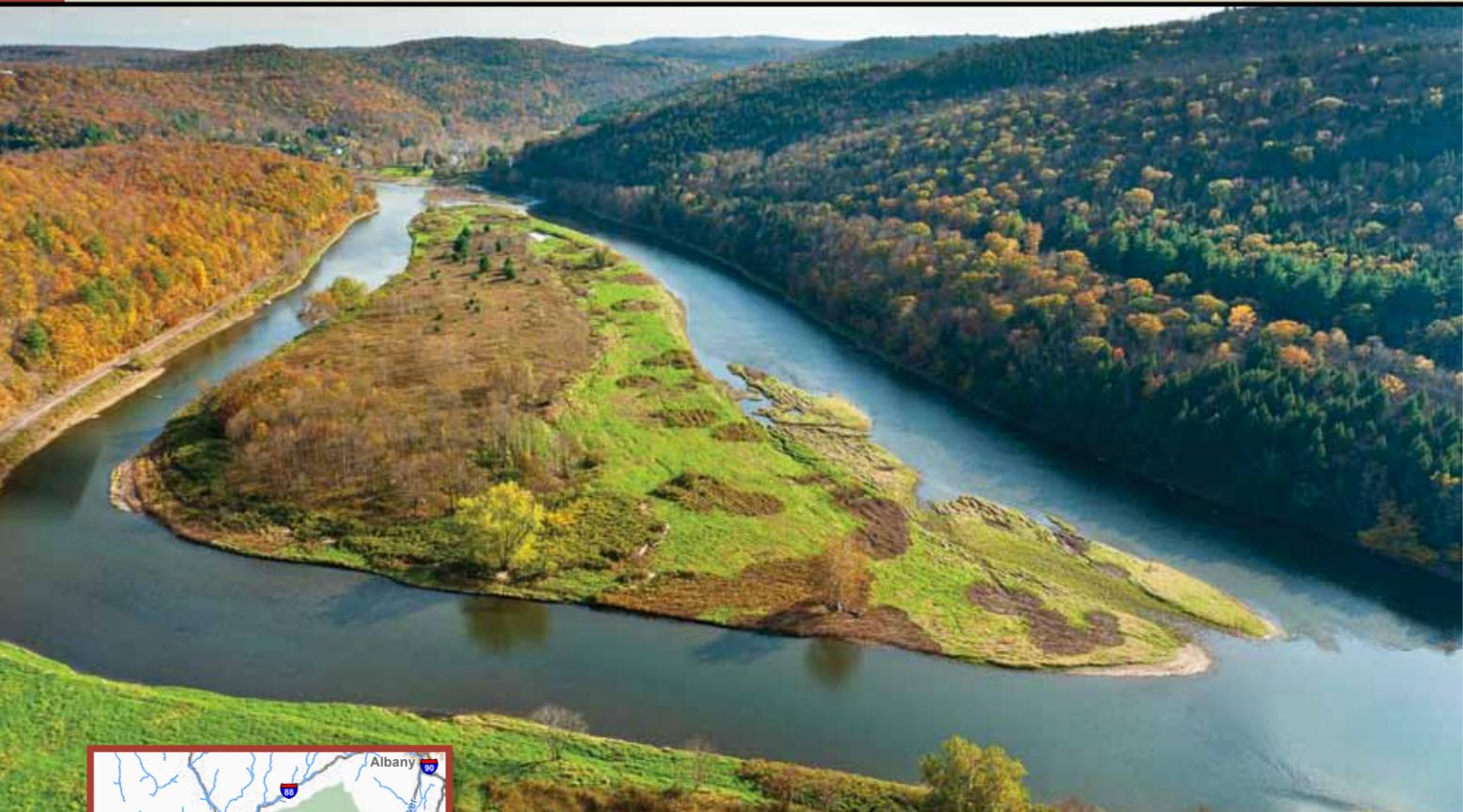
Sportsmen and women have a significant stake in how shale gas is developed throughout the region, as do the communities that rely upon the economic activity resulting from these sporting activities. Hunting and fishing in the Marcellus and Utica shale area is big business. According to the U.S. Fish and Wildlife Service, fishing, hunting and wildlife-related recreation generates more than \$11.5 billion in revenue each year in Pennsylvania, New York and West Virginia — the three states with the largest shale gas deposits in the region.

In 2010, Trout Unlimited members joined other sportsmen and women across the region to identify and propose solutions to the impacts caused by shale gas drilling on valuable fish and game resources and hunting, fishing, trapping and other outdoor sporting activities. Today, that group, the Sportsmen Alliance for Marcellus Conservation, includes hunting, fishing, trapping and other conservation organizations that collectively represent more than 280,000 people.

Trout Unlimited promotes responsible energy development, most often by working collaboratively with government officials, industry, other conservation and sportsmen's organizations, and the public to ensure that all reasonable efforts are made to avoid or mitigate the impacts energy development may have on coldwater fisheries and their watersheds. Current federal, state and local policies governing shale gas drilling and hydraulic fracturing often do not adequately protect the region's natural resources. And even with adequate provisions in place, some areas are so extraordinary — either ecologically, culturally, or both — that gas drilling should be limited or prohibited altogether.

Dozens of places throughout the Marcellus and Utica region, ranging from small county parks to large national forests that hold special value for hunters and anglers, are at risk for short- and long-term changes that could fundamentally alter their character.

This report describes 10 of these special places, illustrating their value to hunters and anglers, explaining why they are at risk, and describing how sportsmen and women can ensure that they are protected.



## The Place

Less than two hours from New York City, the Upper Delaware River watershed provides a wealth of hunting, fishing, trapping and other recreational opportunities for anglers and hunters from New York, Pennsylvania and New Jersey. A federally-designated Wild and Scenic River, the Upper Delaware is one of the best places to fish for wild trout in the East. The insect hatches are prolific and the fish are plenty. As a result, each spring, trout anglers from across the nation flock to this arduous river to test their technical skills on what can be some very challenging trout. In addition to the trout fishery, the Delaware River and some of the larger tributaries are home to other important recreational fish such as striped bass, smallmouth bass, walleye, muskie, channel catfish and American shad.<sup>[3]</sup>

The Delaware River watershed, an area filled with picturesque towns and old growth forests, is home to bear, deer, rabbits, ring-necked pheasant and grouse.<sup>[4]</sup> Mostly undeveloped, the Upper Delaware's dense forests have, for generations, afforded sportsmen and women rich hunting and trapping opportunities. Fishing, hunting and wildlife-associated recreation continues to be a strong economic contributor to the small, rural towns along the reaches of the watershed. Along the Beaverkill, the East Branch, West Branch and the upper main stem of the Delaware River in New York, wild trout fishing generates over \$29 million in annual economic activity for small rural communities — making the Delaware River the economic lifeblood that sustains the region.<sup>[5]</sup>

## The Threat

The Delaware River Basin Commission — the inter-governmental body responsible for managing the river and its tributaries — estimates that thousands of gas wells will be developed in close proximity to the headwater streams of the sparsely populated upper Delaware Basin. Erosion and sedimentation from well pads, access roads, pipelines and storage areas constructed near headwater streams can impact trout spawning habitat and insect populations. Often, these headwater streams are the closest and most convenient source of water for the hydraulic fracturing process and are therefore at risk of being affected by drilling. Already, gas companies are looking to the Delaware and its tributaries as a source for water withdrawals.

The infrastructure associated with natural gas extraction — a network of well pads, new roads and transmission corridors — could have a significant impact on how game travels across the landscape.<sup>[6]</sup> If drilling begins, hunters and anglers may find that access to their favorite fishing or hunting spot has changed or is now off limits due to nearby gas drilling.

GARTH LENZ/ILCP RAVE



## The Need to Protect

Both the Delaware River Basin Commission and New York state currently have a moratorium on shale gas drilling until regulations are finalized. Before drilling is permitted in the Delaware River watershed, anglers and hunters are asking for a thoughtful scientific assessment of the overall impacts that would come with drilling thousands of gas wells. The results from the scientific assessment should determine: (1) if/where it is appropriate to locate well pads; (2) the distance needed between well pads to protect habitat; and (3) special areas where drilling and water withdrawals should be off limits.

Conducting comprehensive planning before drilling begins is critical to ensuring the Delaware's hunting and fishing heritage is protected and that valuable natural resources are not compromised.

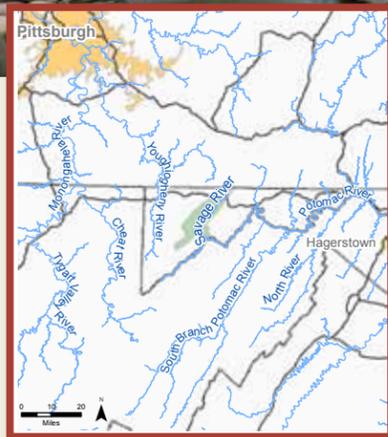
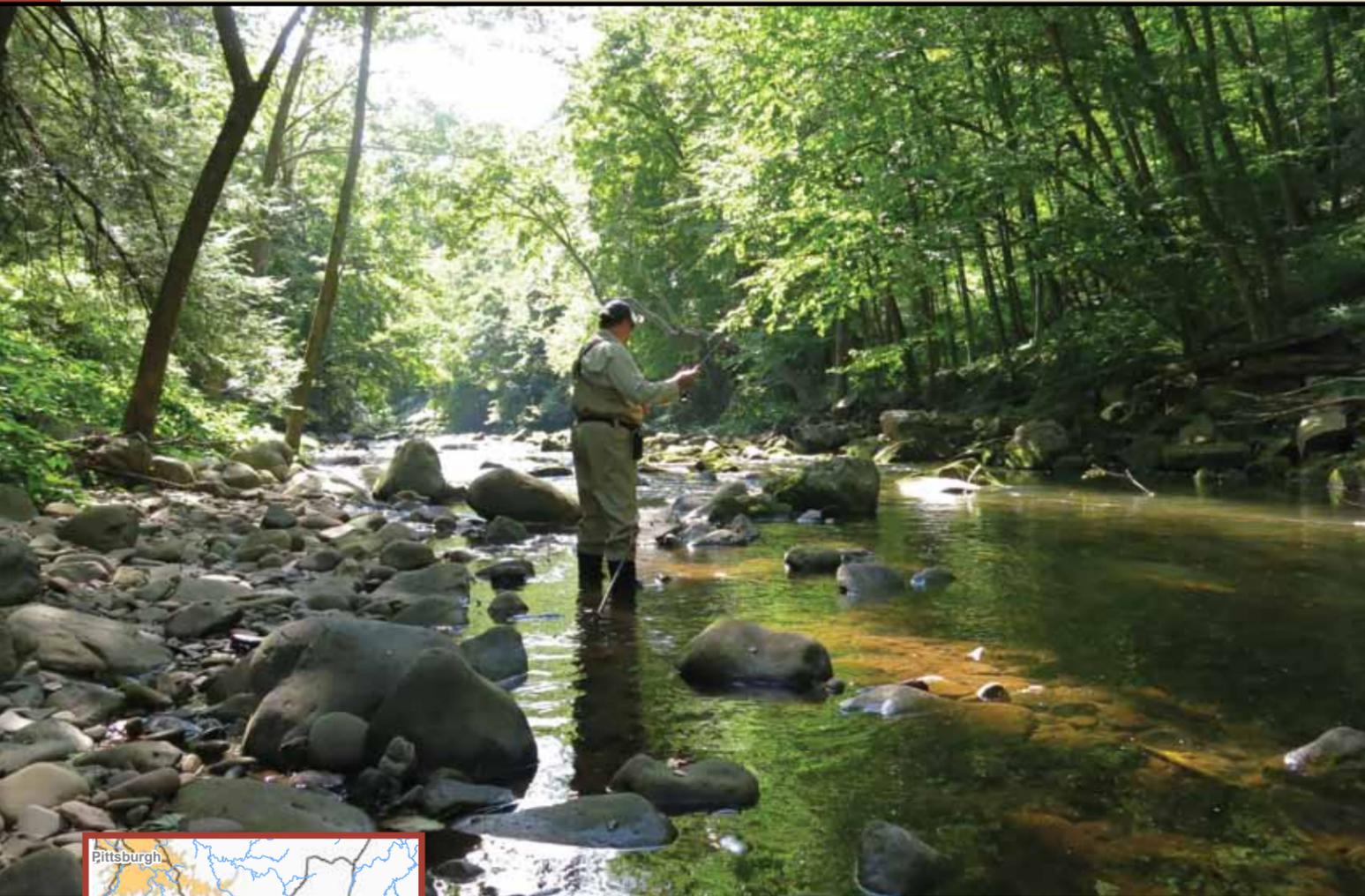


## SPORTSMEN IN THE SPOTLIGHT

*“The Upper Delaware is considered one of the best fisheries in the East as far as wild trout and it supplies drinking water for 15 million people. I’m just concerned about the threat of this river due to gas drilling.”*

—Lee Hartman, Delaware River Committee Chairman for Pennsylvania Council of Trout Unlimited, fishing guide





## The Threat

Shale gas drilling is currently on hold in Maryland until new regulations — likely to be released in late 2014 — are adopted. If the state begins to issue drilling permits, the fish and wildlife resources found within the Savage River watershed may well be at risk. Forest and vegetation clearing for well pads, access roads, pipelines and storage areas would fragment the watershed’s forest system that supports thriving wildlife populations.

State agencies estimate that shale gas drilling on nearly one of every four leases in Garrett County may affect access to or the quality of key trout fishing areas and brook trout streams.<sup>[8]</sup> Although the majority of the Savage River watershed lies within the Savage River State Forest, the headwater portions of most of these 108 streams are located on private lands. Headwater streams are critical for trout spawning and are often the nearest source for the water withdrawals needed for drilling.



## The Need to Protect

Protecting Maryland’s only remaining intact brook trout population, as well as the many wildlife species that live in the Savage River watershed, is critical to protecting the interests of sportsmen and women. More than half of Maryland’s state forest lands are located in its westernmost counties — the very areas that rest over the Marcellus and Utica shale formations. Taken together, the Garrett, Green Ridge, Potomac

and Savage River state forests account for 115,000 acres of unbroken forest areas that sustain fish and game populations and provide a wide range of sporting experiences. As private lands in Maryland’s western counties are developed, fewer places are available for anglers and

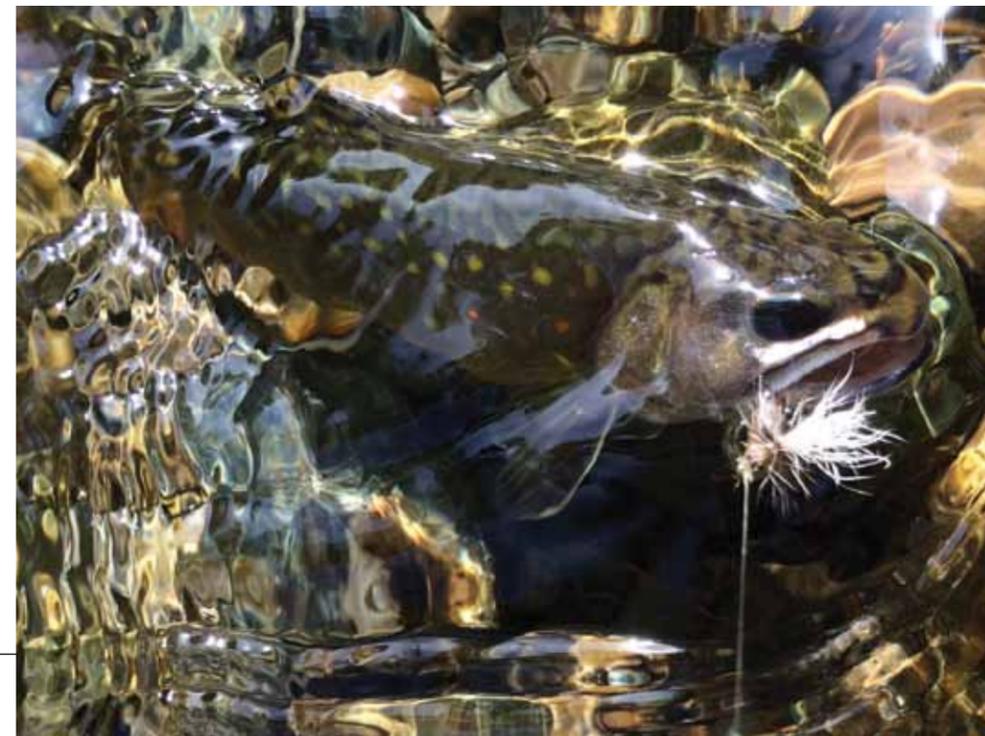
hunters, and the demand for fishing and hunting on state forest lands is likely to increase. To adequately protect these special places, if Maryland moves forward with natural gas extraction, shale gas drilling activities must be prohibited throughout the Savage River watershed as well as on public forest lands, where the state owns the mineral rights.

## The Place

The Savage River watershed, located in western Maryland’s Garrett County, is home to the state’s premier brook trout fishery. Within the watershed there are over 120 miles of interconnected streams, and the highest density of brook trout in the state.

Flowing through old-growth hardwood forests and rhododendron thickets, the river is considered one of the best fly-fishing destinations in the region. No other trout fishery in Maryland possesses the abundance of wild trout in such wild surroundings. Downstream, the Savage River Reservoir is also a popular fishing destination, with numerous species of warm and coldwater fish, including bass and catfish.

More than half of the Savage River State Forest is located within the 74,000-acre watershed. It is one of the most popular public lands in the state and its 54,000-acres are home to white-tailed deer, wild turkey, black bear, beaver, mink, muskrat and river otter.<sup>[7]</sup> A prime hunting area, a portion of the forest has been designated by the state as a wilderness area for its high conservation value and to protect the backcountry experience for hunters and anglers.

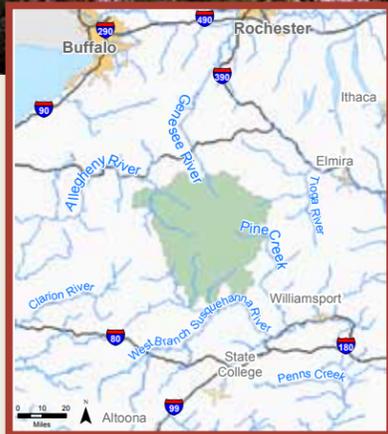


### SPORTSMEN IN THE SPOTLIGHT

*“A huge number of people come here because it’s such a unique watershed full of various outdoor recreation possibilities.”*

– Nick Weber, Past chair of the Mid-Atlantic Council of TU





## The Place

The headwaters of three famed tributaries — Pine Creek and the Genesee and Allegheny rivers — begin their descent from the same mountaintop, each flowing downstream through unspoiled wilderness in northcentral Pennsylvania. The heart of “God’s Country,” just downstream of where the three headwaters originate, is comprised of state forest and game lands and eight state parks, providing sportsmen and women with an abundance of hunting, angling and trapping opportunities.



CURT WEINHOLD

The areas of northcentral Pennsylvania that surround the Pine, Genesee and Allegheny headwaters and tributaries contain some of the state’s few remaining wilderness trout watersheds, have the greatest number of Class A Wild Trout and naturally reproducing trout waters, and hold the annual record for highest bear harvest and rates of grouse flush. Winding roads, steep valleys and dense forests create the rim of the Pine Creek Gorge — a prized trout fishing destination that attracts anglers and tourists from across the East Coast.

## The Threat

Most of the Pine-Genesee-Allegheny headwaters area falls within Potter County — an area that has yet to see intensive shale gas drilling, in stark contrast to its eastern neighbor, Tioga County. Yet Potter County is experiencing the side effects of surrounding energy development. As shale gas drilling continues to spread across northcentral Pennsylvania, new access roads and pipelines—including temporary water lines, gathering lines and transmission lines—are being built on the steep slopes of the Pine Creek Gorge. There has been significant erosion and sedimentation, which affects high quality trout streams.

Shale gas drilling that is occurring on public lands — primarily, state game lands and state forests — can limit access to the areas where sportsmen and women have traditionally hunted and fished. Industrial drilling operations in the woods are accompanied by nighttime lighting and loud noise from compressor stations and the drilling process. These disturbances can dramatically affect key wildlife breeding seasons and the quality of the sporting experience.

CURT WEINHOLD



CURT WEINHOLD

## The Need to Protect

To protect the world-class hunting and angling opportunities available in the Pine-Genesee-Allegheny headwaters area, sportsmen and women are working with state agencies, the Susquehanna River Basin Commission and local governments to: (1) ensure stream flow levels are protected before water withdrawals for gas drilling are permitted; (2) make sure strict erosion and sediment control measures are in place and properly functioning before construction of well pads, pipelines and roads begin; (3) ban drilling-related infrastructure development in the floodplain; (4) minimize the footprint of well pad sites in this headwaters area; and (5) protect the hunting, fishing and trapping traditions on state game and forest lands through adoption of best management practices.

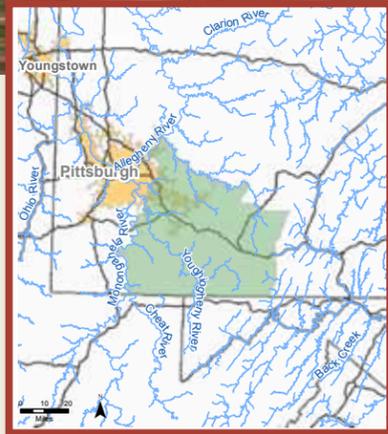
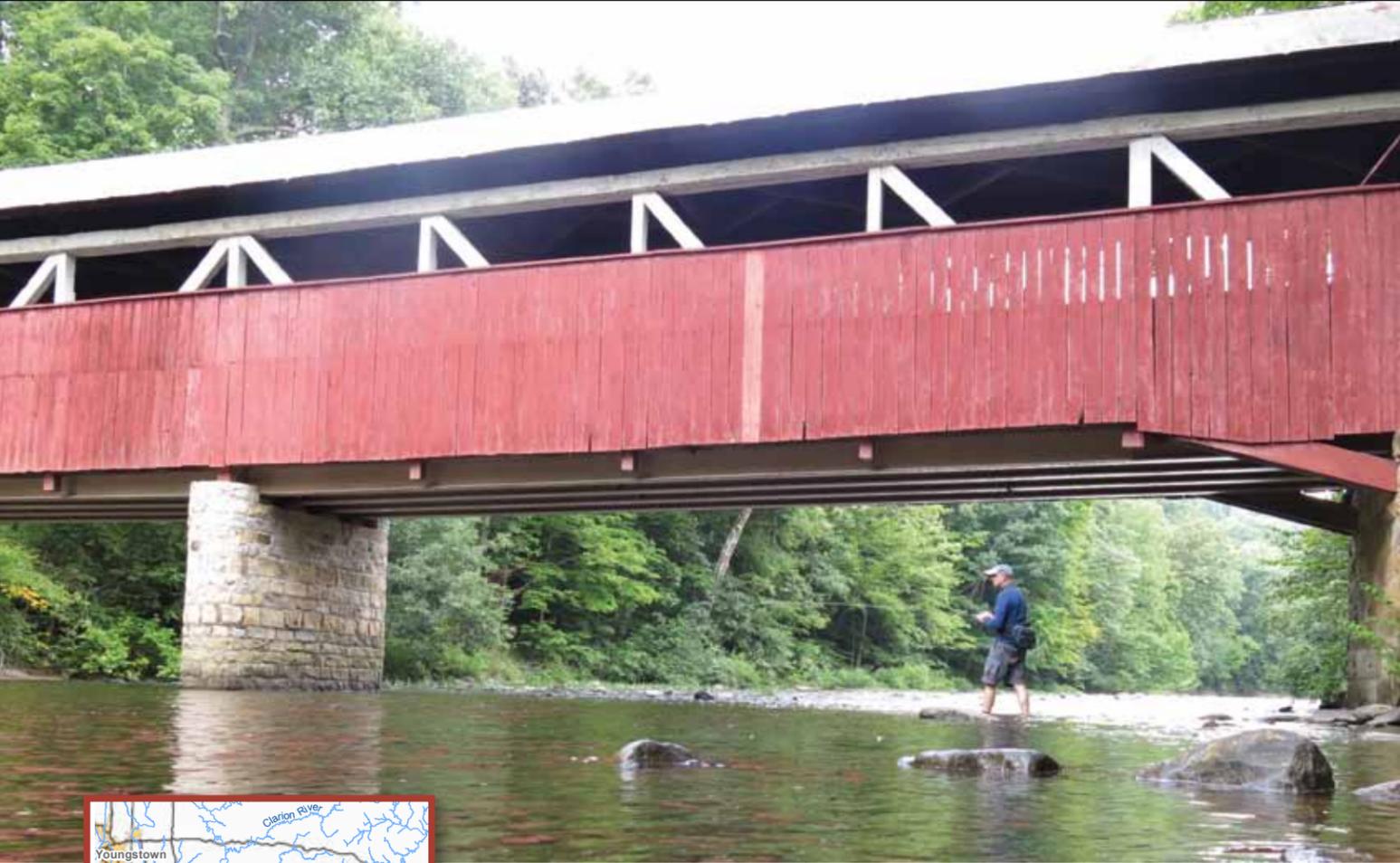


## SPORTSMEN IN THE SPOTLIGHT

*“Potter County is known as God’s Country, and the reason it’s called God’s Country is it’s a place only God could have made.”*

— Dr. Pete Ryan  
President of God’s Country  
Chapter of TU since 1978





## The Place

Crowned by three ridges along southwestern Pennsylvania's skyline, the Laurel Highlands is home to eight of the state's 10 highest summits, including the highest, Mt. Davis, at 3,200 feet above sea level. From mountain laurel thickets, cool headwaters percolate through more than 200 square miles of mostly state parks and forest lands. Class A Wild Trout Streams, such as Camp Run and Laurel Run and dozens of other popular fisheries, form the Laurel Highlands Trout Trail, a 70-mile region attracting anglers from nearby Pittsburgh and neighboring states to fish for trout and take in the scenery.



The hunting heritage runs deep in the Laurel Highlands region. With an ample supply of public hunting grounds, including more than 138,000 acres of state forest and parks, and more than 25,000 acres of state game lands, the Laurel Highlands provide ample deer, bear, turkey, ruffed grouse and small-game hunting opportunities.

## The Threat

Natural resource extraction is not new to the Laurel Highlands. Coal mining's legacy lingers. After decades of restoration work by anglers and conservation groups, many of the region's streams are on the road to recovery from pollution caused by coal mining. Today, the energy industry is seeking to develop gas resources that lie beneath some of the few remaining public hunting and fishing lands in southwest Pennsylvania — premier recreation areas for hunters, anglers and outdoor enthusiasts alike. Ohiopyle State Park, Forbes State Forest and other state parks, forests and game lands within the Laurel Highlands region sit atop some of southwest Pennsylvania's more productive shale gas areas.

Well pad construction, gas transportation lines and access roads will require additional land disturbances, much of which is expected to occur in the intact forest stands and the very areas where stream restoration efforts have taken place to correct the damage caused by previous resource extraction. Among the many impacts of shale gas drilling on Pennsylvania's streams, impacts from road sedimentation is often the most pronounced in steep terrain, such as the Laurel Highlands.



## The Need to Protect

Pennsylvania sportsmen and women are calling on the state to ensure that shale gas development in the Laurel Highlands does not harm fish and game resources. In order to protect these resources, hunters and anglers are urging that additional surface drilling on public lands, where the subsurface mineral rights are owned by the state, be prohibited.

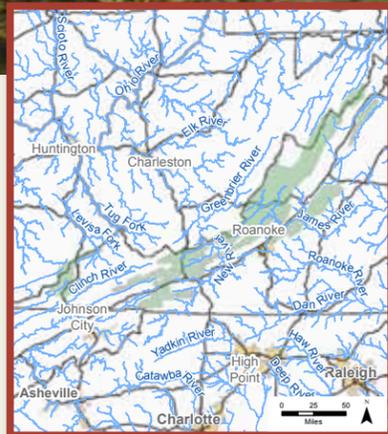
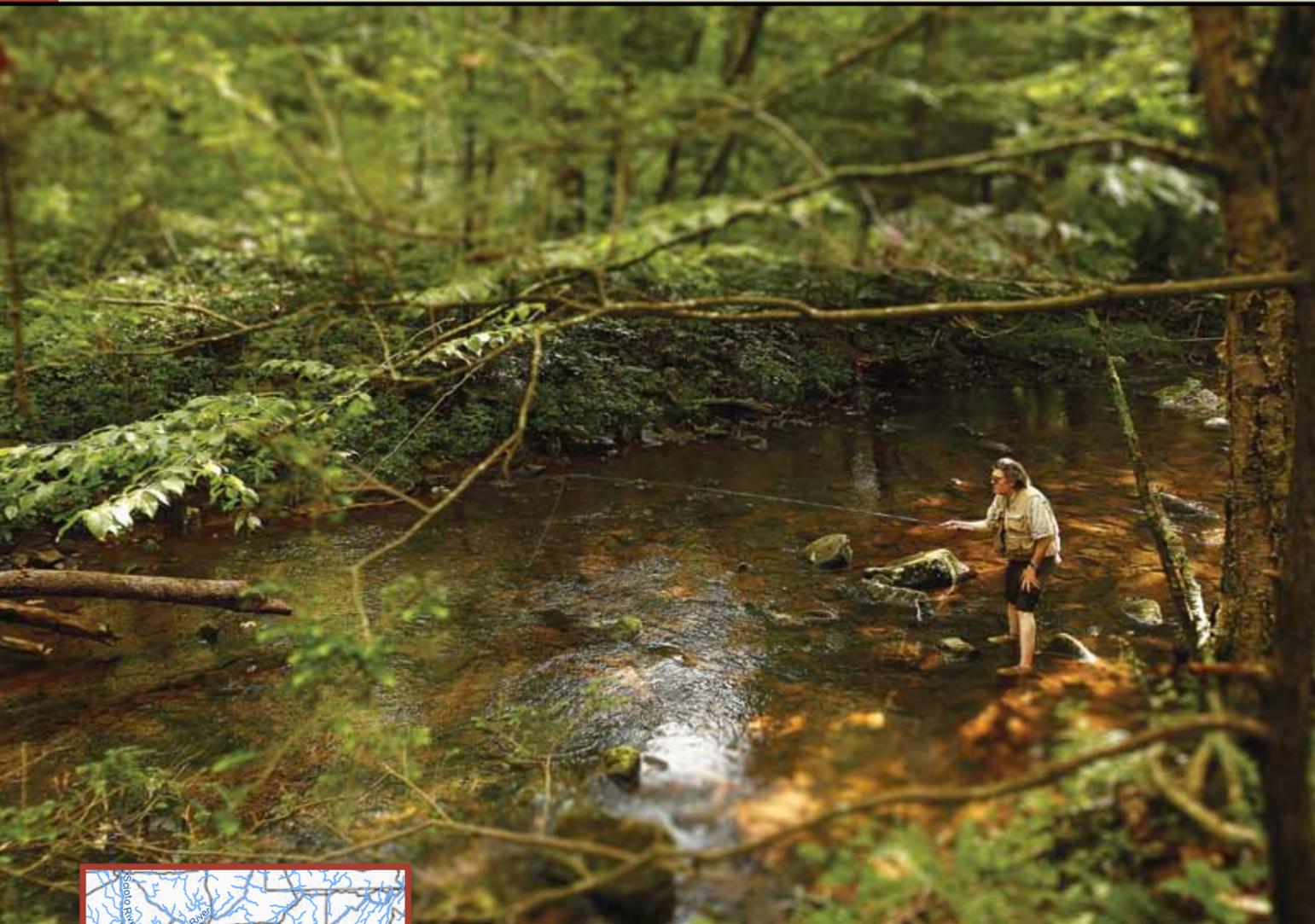
On lands where subsurface mineral rights are owned by private interests, well pad locations, pipelines and road construction should be avoided on high-slope areas and stream crossings should be limited. Careful planning must be required to limit the amount of forest land converted for well pads and associated infrastructure and the total miles of roads that are constructed.

### SPORTSMEN IN THE SPOTLIGHT

*"The only thing I've ever asked anyone to do in my volunteer and personal endeavors in conservation is to do it the right way. We have a personal stake in our future."*

— Len Lichvar, Mountain Laurel Chapter, member of local sportsmen club





## The Place

The George Washington and Jefferson national forests stretch along the heart of the picturesque Appalachian Mountains, extending the length of Virginia and crossing into parts of West Virginia and Kentucky. Approximately 80 percent of Virginia’s public hunting lands and 60 percent of the state’s brook trout streams are located here. Home to the headwaters of eight major rivers, the George Washington and Jefferson national forests generate significant revenue from fishing and help support fisheries downstream in the Shenandoah, Potomac and James rivers and the Chesapeake Bay, contributing to Virginia’s \$734 million fishing industry.



## The Threat

Virginia’s shale gas region underlies more than half of the George Washington and Jefferson national forests — the largest stretch of core interior, continuous forest land in the state. About 87 percent of the Marcellus Shale acreage within the George Washington National Forest occurs in watersheds where brook trout populations are intact or have historically existed. Each phase of the drilling and fracturing process — from water withdrawals from headwater streams to erosion and sedimentation resulting from construction of new access roads, well pads, and pipelines — can potentially lead to short- and long-term impacts on trout populations.

## The Need to Protect

In fall 2014, the U.S. Forest Service decided, as part of its revised forest management plan, not to lease additional lands in the George Washington National Forest for oil and gas development. The plan allows for energy development on 10,000 acres on which oil and gas companies already hold leases. An additional 167,000 acres where private mineral rights are held will also remain open. Combined, that equates to 16 percent of the forest.



SAM DEAN

Virginia sportsmen and women support the Forest Service’s decision not to lease additional lands in the George Washington National Forest for oil and gas development and are advocating for similar policies for the neighboring Jefferson National Forest. Together, hunters and anglers want to work with federal, state and local agencies to ensure that any shale gas development planned on forest lands where private mineral rights are held occurs in a responsible manner. Strict standards that protect forests, fish, wildlife and water on forest lands should be required including: establishing setbacks from waterways, limiting the amount of surface disturbance and requiring re-vegetation as quickly as possible with native plants, shrubs and trees. Pre- and post-construction stormwater management plans should be adopted for all access roads and well pad development that include proven measures to limit stormwater runoff and sedimentation from entering streams.

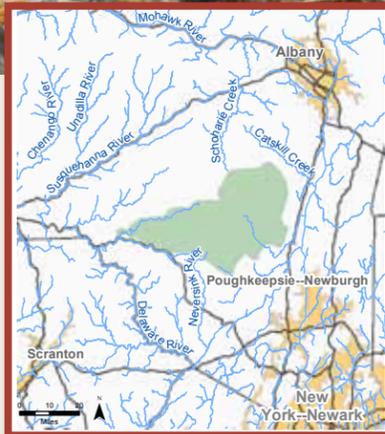


## SPORTSMEN IN THE SPOTLIGHT

*“We need to make sure that the decisions that are made about this land are made in such a way that this is going to be here for my grandkids.”*

– Graham Simmerman, chair of the Virginia Council of TU





## The Place

Known as the birthplace of American fly-fishing, New York's Catskill Park is a fishing destination for anglers from across the nation. Brook, brown and rainbow trout thrive in many Catskill streams, such as Esopus and Kaaterskill creeks, and in larger rivers such as the Neversink and Beaverkill. Many of these same streams feed into the drinking water supply for more than nine million New York City residents.

For centuries, the Catskill landscape has been synonymous with a wilderness sporting experience. Hunting is a way of life in the Catskills, evidenced by the names of many of its water bodies and towns, such as Hunter Lake, Hunter Pond, Hunter Mountain, Deer Lake and the town of Hunter. Deer, bobcat, mink, fisher and coyotes are plentiful and an estimated 1,500 to 2,000 black bears live in or near the Catskill Park.<sup>[9]</sup>

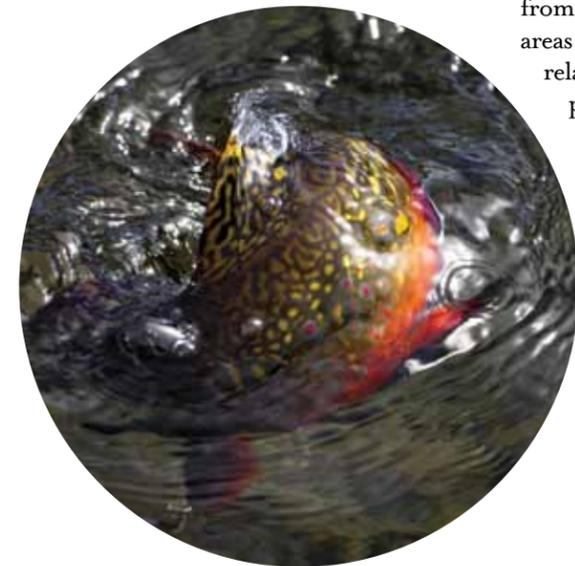
## The Threat

Combined, New York state and New York City own almost half of the land within the Catskill Park, lands that the state has proposed as off limits to gas drilling. The remaining privately owned lands, found mostly on the edges of the park, provide important fish and game habitat.

The industrial activity associated with shale gas drilling is inconsistent with the slow way of life that has defined the Catskill Park for centuries. Erosion and sedimentation from drilling-related construction activities could affect waters that would have direct impacts on trout and the extensive angling opportunities that exist there. Clearing forest cover and vegetation for well pads and pipelines creates openings in the landscape that alter game habitat and put sensitive wildlife species at risk for predators. The culture of hunting, trapping and fishing in the Catskill Park could be significantly affected without having adequate protections in place.

## The Need to Protect

Anglers and hunters are passionate about the Catskill Park because of its significant fish and game habitat and its proximity to major population centers along the East coast. To protect the park's resources, sportsmen and women want New York officials to uphold the proposed ban on surface drilling on all state lands within



the park and to establish a strict set of standards for if/how energy development may occur on private lands within and near the park.

If drilling occurs on private lands, there should be setbacks between well pads and the edge of state lands, as well as setbacks from surface waters. Pre-lease planning should occur to identify significant habitat that may be the most vulnerable to impacts from shale gas development and those areas should be off limits to drilling-related activities. Best management practices should also be required for any drilling on private lands to limit impacts to the park's rich natural resources and to fulfill the intended reason for establishing the Catskill Park — to maintain the landscape as “forever wild.”

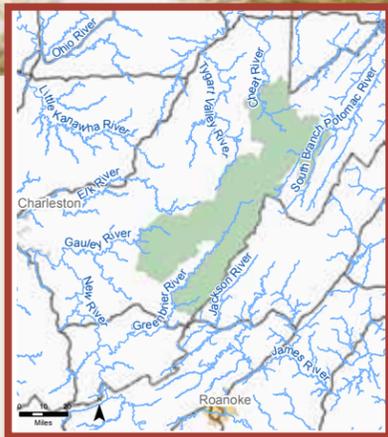
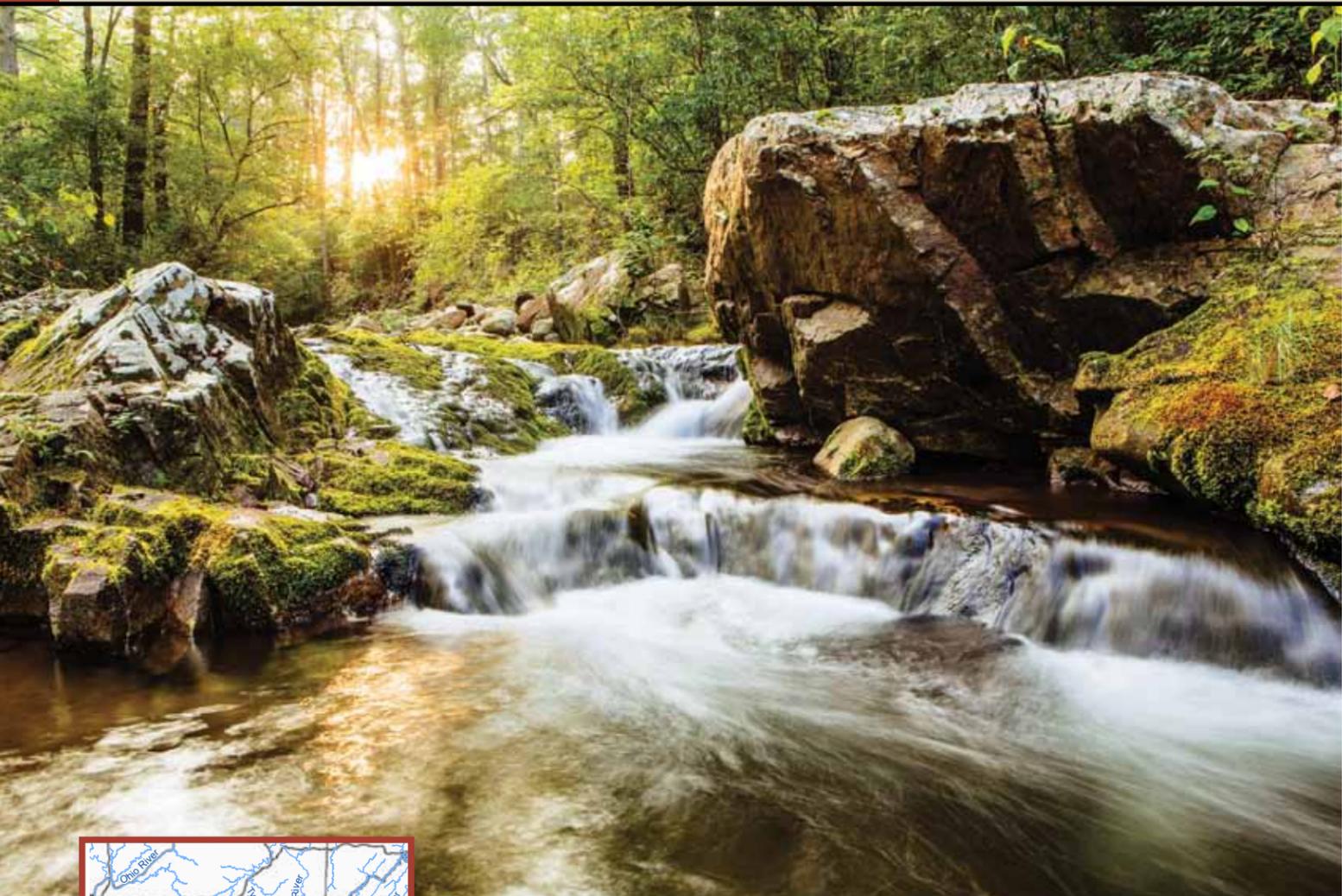


## SPORTSMEN IN THE SPOTLIGHT

*“We don't have a great deal of open space in the Northeast, and I think it's important for us to preserve what we do have.”*

– Evan Lavery,  
Owner of Beaverkill Angler





## The Place

The Monongahela National Forest is the fourth largest national forest in the east. Located almost entirely within West Virginia's deep shale gas region, the forest has five federally-designated wilderness areas and one national recreation area contained within its boundaries, as well as the headwaters of six major rivers: the Cheat, Potomac, Greenbrier, Elk, Tygart and Gauley rivers.



By far the largest tract of public land in West Virginia, the Monongahela provides extensive hunting opportunities, boasting abundant big and small game, including black bear, wild turkey, white-tailed deer, snowshoe hare, woodcock, grouse, beaver, red and gray fox, mink, bobcat, fisher, and otter. Fishing for wild and native trout abounds in the headwaters of great rivers such as the Potomac and the Greenbrier.

## The Threat

Over the past decade, through the hard work of the state's anglers and conservationists, West Virginia has taken significant steps to protect fish and game habitat, including granting Clean Water Act protection status to its native brook trout streams. Despite these protections, as shale gas development spreads across the state, there is increasing pressure to develop both privately held and federal mineral rights located within the Monongahela's boundaries.

Eastern brook trout, the only trout native to the eastern United States, survive in only the coldest and cleanest water. A decline in brook trout population in a stream can serve as an early warning that the health of an entire stream is at risk. The impact from potential erosion and habitat fragmentation due to the construction of gas drilling pads, pipelines and access and maintenance roads could stress native brook trout populations in the Monongahela's streams. Road noise and drilling activities could also drive game out of traditional territories and into less desirable habitat.



West Virginia consistently ranks in the top 10 in the United States for license sales to visitors who come to the state to hunt and fish. Natural resource impacts from gas drilling in the national forest and surrounding land could negatively impact the quality of the West Virginia sporting experience, reducing revenues generated from out-of-state hunters and anglers who may choose to hunt and fish elsewhere.

## The Need to Protect

West Virginia hunters and anglers want to be part of the solution to responsible energy development by working with the U.S. Forest Service to permanently withdraw lands in the Monongahela National Forest from leasing where the federal government owns the subsurface oil and gas rights. On the 38 percent of forest lands where the oil and gas rights are privately owned, sportsmen and women want the Forest Service to require strict monitoring, reporting and inspection of drilling-related activities to limit impacts to interior forests and wildlife and valuable streams and aquatic species.

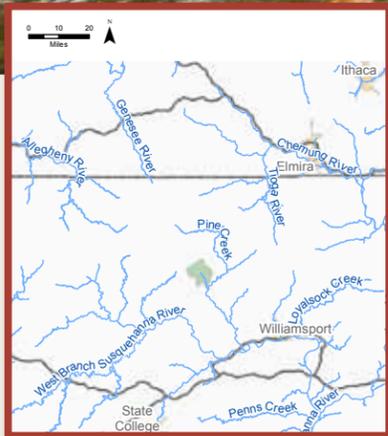


### SPORTSMEN IN THE SPOTLIGHT

*"There's something about getting lost in these little tributaries that have brook trout. About being by yourself and knowing that, if you scream, no one is going to hear you."*

– Philip Smith, Immediate past chair of the West Virginia Council of TU





## The Place

Known for its ledges and deep pockets, Slate Run is an exceptional value freestone stream and legendary trout fishing destination. It begins its descent in from rugged mountains on state forest lands, flowing 7 miles downstream where it enters Pine Creek in the village of Slate Run. Nearly the entire Slate Run watershed — about 45 square miles — lies in and adjacent to the Tiadaghton State Forest, where primitive camping offers hearty anglers a wild experience. Black bear and other large and small game inhabit the watershed and provide for abundant hunting and wildlife viewing opportunities. Small brook trout and nice browns can be found in Slate Run's



headwaters and tributaries, and the stream is considered a Heritage Trout Stream, limited to catch-and-release fishing for its entire length. A neighboring stream — Cedar Run — offers similar serene and challenging trout fishing, particularly in the trophy trout sections.

## The Threat

While the Slate Run watershed is largely untouched by man, industrial shale gas development is encroaching from the south, north and east. Much of the nearby shale gas drilling is happening on state forest and game lands or on private hunting and fishing club lands. Recent attempts by Pennsylvania's decision-makers to lease additional state forest lands and state park lands could affect Slate Run's native and wild trout resources, and the peaceful fishing experience it offers. Shale gas-related development occurring on the steep slopes of the Slate Run watershed could result in excessive sedimentation entering the mainstem and its tributaries, affecting water quality and trout habitat, and smothering food sources.



## The Need to Protect

Sportsmen and women — those who spend a significant amount of time hunting and fishing on public lands — must have a say in how and where shale gas development is allowed to occur on state forest lands. Together, hunters and anglers are calling on Pennsylvania's decision-makers to prohibit additional leasing of state forest and park lands, where the state owns the mineral rights.

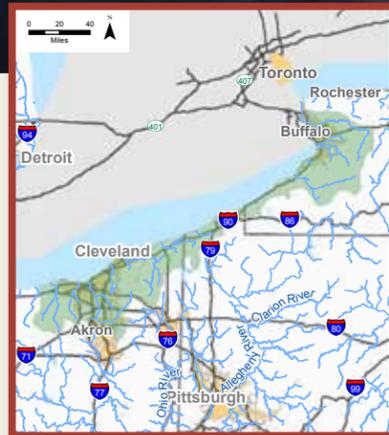
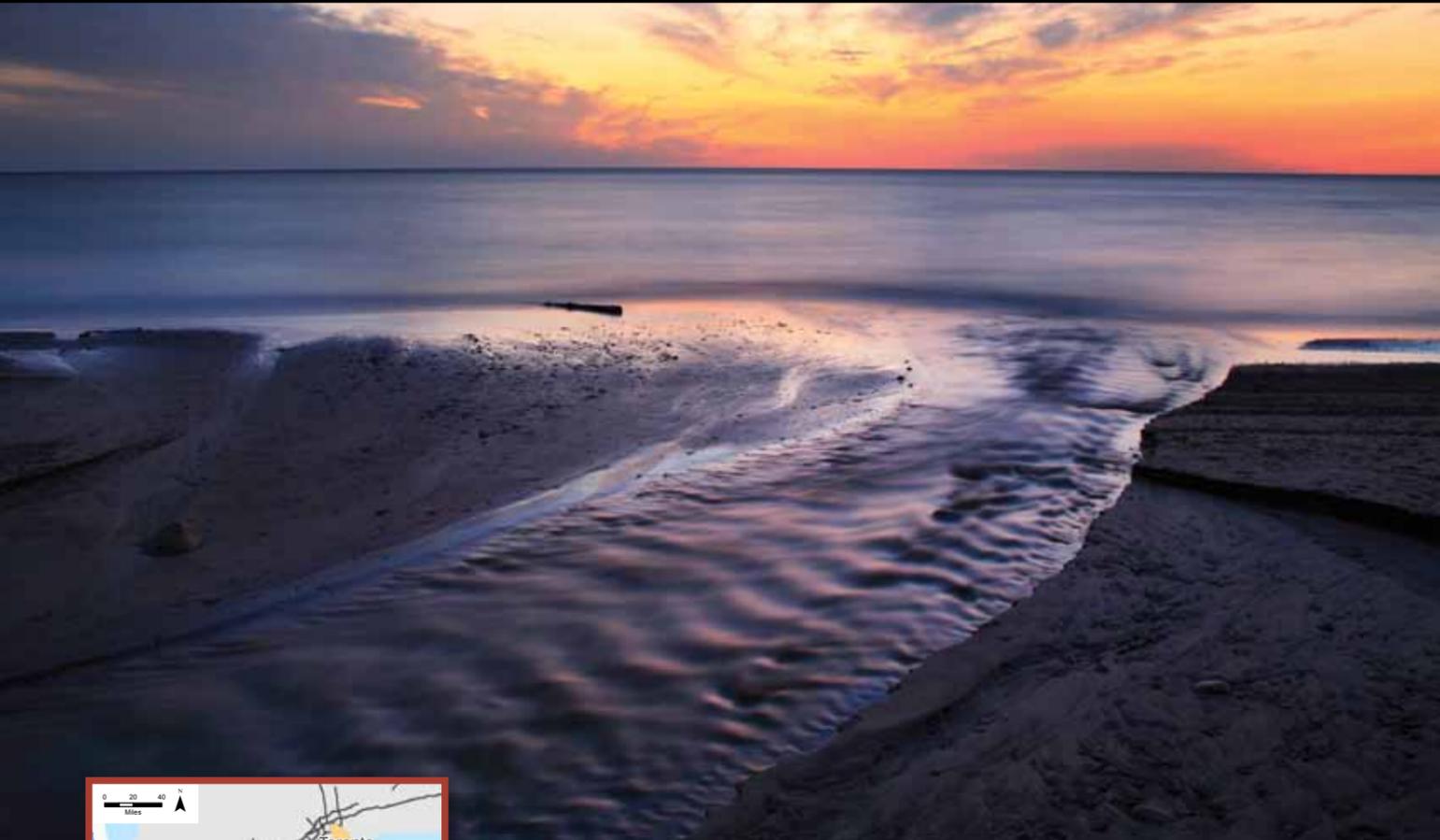
Where mineral rights underneath state lands are privately owned, sportsmen are urging the state to play a role in the planning process, to ensure that impacts to critical fish and wildlife habitat are avoided or minimized, and that the high quality of the hunting and angling experiences in the Slate Run watershed and on public lands is preserved.

## SPORTSMEN IN THE SPOTLIGHT

*"I stumbled on this area absolutely by chance. ... When I dropped down into this valley and saw Pine Creek, I knew this was the spot I was looking for."*

—Tom Finkbiner, Owner of Slate Run Tackle Shop





## The Place

Home to one of the world's largest freshwater commercial fisheries, Lake Erie hosts abundant fish populations, including steelhead, walleye, trout, smelt and bass. The Ohio portion of the Lake Erie watershed contains some of the largest and most historically significant wetlands in the lower 48 — critical areas for migrating and wintering waterfowl and other wildlife.

An estimated 450,000 people fish in the Ohio waters of Lake Erie every year and contribute \$680 million to Ohio's economy.<sup>[10]</sup>



Each fall, thousands of steelhead anglers from across the East descend on Lake Erie tributaries, primarily Pennsylvania's Elk and Walnut creeks, Cattaraugus Creek in New York, and Ohio's Conneaut Creek and Vermilion, Rocky, Chagrin and Grand rivers. The Lake Erie steelhead fishery is economically vital for fishing guides and charters, as well as local restaurants, hotels and businesses. According to a study conducted by the Pennsylvania Fish and Boat Commission, steelhead anglers spent nearly \$9.5 million on trip-related expenditures in Erie County, Pa. in 2003, supporting more than 200 local jobs.<sup>[11]</sup>

## The Threat

Most of the Lake Erie watershed that overlies the unconventional shale gas formations is located in Ohio. While shale gas drilling is just getting under way in Ohio, the state is experiencing the ancillary impacts related to Marcellus shale gas drilling and Ohio is quickly becoming a hot spot for Utica shale gas drilling. A portion of wastewater generated from drilling activities in Pennsylvania is carried by tanker trucks across state lines into Ohio and disposed of in deep underground injection wells. During transportation and disposal of the wastewater from Pennsylvania to Ohio, there is the risk of spills, accidents and leaks into Lake Erie tributaries and wetlands.

While the transfer of water out of the Lake Erie basin is currently not permitted under the Great Lakes-St. Lawrence River Basin Water Resources Compact, water withdrawals for shale development are currently allowed if the water will be used in basin. In June 2012, Ohio's governor signed a law that allows companies to withdraw an average of 2.5

million gallons of water per day from Lake Erie, over three months, without a permit. The law does not require a permit for withdrawals of 1 million gallons of water per day from the rivers and streams that feed Lake Erie.



million gallons of water per day from Lake Erie, over three months, without a permit. The law does not require a permit for withdrawals of 1 million gallons of water per day from the rivers and streams that feed Lake Erie. Significant water withdrawals could have an adverse impact on stream flows and fishing in steelhead tributaries and potentially introduce invasive species. It is estimated that the Great Lakes have already lost \$123 million from lost sport fishing opportunities as a result of invasive species in the lake.<sup>[12]</sup> In the years to come, as Utica Shale is targeted for drilling across the region, Ohio is likely to see a significant increase in drilling and experience direct surface impacts in the Lake Erie watershed that may affect revenue generated by sport fishing in the basin.

## The Need to Protect

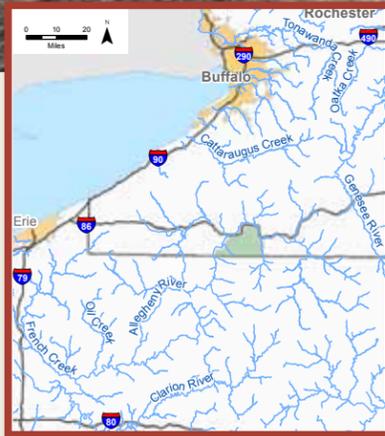
Sportsmen and women are becoming increasingly concerned about the potential impacts from drilling on fish, wildlife, sporting activities and the recreational economy. Anglers and hunters want to work with the industry and the state to: (1) develop rules that limit the volume, timing and location of water withdrawals within the basin to protect the streams, wetlands and bodies of water in the Lake Erie watershed; (2) create a comprehensive invasive species control program for gas drilling activities that includes training for industry workers and routine monitoring, inspection and reporting methods; and (3) conduct a study of the cumulative impacts of disposing of shale gas wastewater in underground injection wells in Ohio.

### SPORTSMEN IN THE SPOTLIGHT

*"We need to proceed cautiously. It doesn't have to be a race to pull everything out as fast as we can get it out."*

—Jerry Darkes, fly-fishing guide





## The Place

The Allegheny Park is New York's largest state park. More than 80 percent of the park has been designated as a Park Preservation Area — a legal designation that limits intense development and allows only passive public recreation activities such as hiking, hunting and fishing.

The park has the largest concentration of wild brook trout streams in western New York and features the largest contiguous area of publicly accessible wild and stocked trout fishing in the state.<sup>[13]</sup> In the winter, ice fishing on Quaker and Red House lakes provide ambitious anglers with winter recreational opportunities. On the southern border, the Allegheny State Park connects to Pennsylvania's Allegheny National Forest, forming a continuous path for wildlife to move across the landscape. Hunters can find trophy deer and plentiful small game, such as ruffed grouse, turkey, woodcock and pheasant.



## The Threat

In 2009, New York state banned the development, extraction or leasing of any state-owned oil and gas resources within the Allegheny State Park. However, approximately 40 percent of the mineral rights beneath the park have been owned by private interests for generations and these rights are scattered throughout the park.

Where it can, New York is acquiring privately-owned mineral rights. A 2011 law declared that any of the 40 percent of privately-held mineral rights within the Allegheny State Park that have not actively been used within the past 20 years will revert to the state, if not claimed before Sept. 22, 2013.<sup>[14]</sup> Where private subsurface mineral rights are reserved, strict oversight is required by the state park agency for any effort to drill within the Allegheny State Park. While the majority of privately-held mineral rights reverted to New York as a result of the 2011 law, at least four private mineral rights holders claimed their future interests in mineral rights underneath Allegheny State Park.

While New York has recently taken steps to protect the valuable habitat in the Allegheny State Park, the threat of litigation over unclaimed private mineral rights under the 2011 law looms, creating uncertainty about how future development of privately-held or contested mineral rights will impact the park's fish and wildlife. Potential adverse



impacts of shale drilling on the park's forests, streams, lakes and hillsides include clearing of trees and vegetation, construction of roads, installation of wells and pipelines, use and pollution of water, introduction and spread of invasive species and fragmentation and degradation of fish and game habitat.

well pads, access roads and pipelines in the park, limiting surface disturbance from drilling-related construction and activities and requiring re-vegetation of cleared areas with native plants as soon as possible after construction activities are complete. To preserve the quality of the sporting experience, at a minimum, drilling activities should be prohibited on popular opening days of fishing and hunting seasons.

## The Need to Protect

Sportsmen and women have a significant interest in protecting the unique resources of the Allegheny State Park and will continue to work in partnership with New York officials to ensure that any drilling-related activities related to privately-held mineral rights, if permitted on park lands, occur in a responsible manner. Adoption of protective measures is imperative to safeguard the park's valuable resources, including restricting the placement of

### SPORTSMEN IN THE SPOTLIGHT

***"We need to make sure if natural gas is being produced, the environment is protected to the highest level."***

—Stan Bishop, Red House Brook Chapter of TU



# Sportsmen State-Based Strategies

## NEW YORK

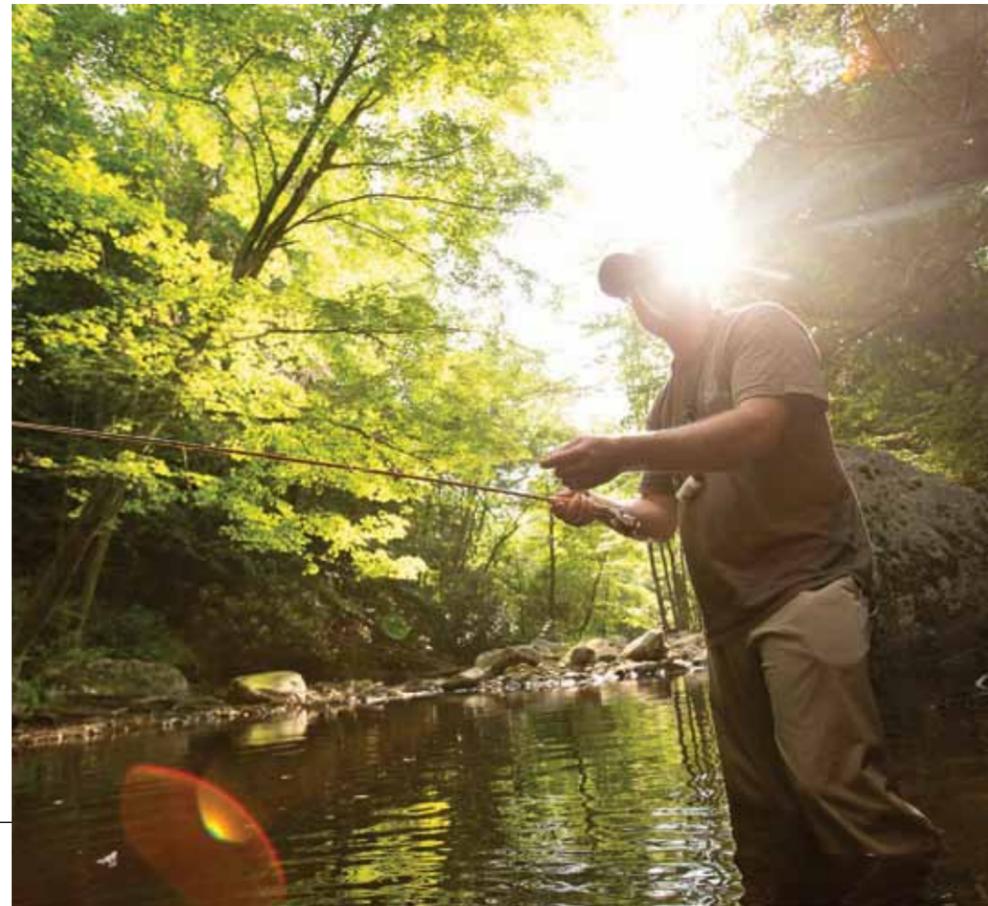
New York state officials have been reviewing the environmental impacts of gas drilling and proposing a set of rules that will govern how hydraulic fracturing and shale gas development will occur in the state. Until the state completes the process, no permits for high volume hydraulic fracturing will be issued. Recognizing that gas drilling is incompatible with the reasons why certain state lands were set aside — namely important wildlife habitat, open space and recreational use — it appears likely that New York officials will prohibit surface drilling on all state-owned forests, wildlife management areas and parklands.<sup>[15]</sup> Surface impacts from gas extraction would affect fish and wildlife habitat and recreational use of those lands, especially large contiguous forest patches that are home to many game species, such as black bear, white-tailed deer, and red and gray fox.<sup>[16]</sup>

Sportsmen and women are urging New York state officials to uphold the restriction on surface drilling on state-owned lands. On lands where mineral rights are held by private interests, if drilling is permitted, hunters and anglers are urging the state to require stringent standards that protect fish, wildlife, water and forest resources. The distance between the edge of a well pad and a surface water source should be determined based upon a site-specific review that evaluates slope, soils and hydrologic conditions. On private lands adjacent to state lands, New York should establish setbacks from the edge of the state forest to ensure that gas development on private lands does not impact the quality of the hunting, fishing and trapping experiences on public lands.

## PENNSYLVANIA

In Pennsylvania, sportsmen and women are working to protect public lands — places where many hunters and anglers spend countless hours — from further gas leasing. Nearly one-half, — or 672,000 acres — of Pennsylvania's state forests that overlie the Marcellus shale play are already leased for oil and gas drilling.

One of the largest expanses of public forest in the eastern United States, Pennsylvania's woodlands have provided generations of anglers and hunters with the opportunity to connect with the land and pass on the traditions of hunting, fishing and trapping to their grandchildren. In a state where more than 8,600 Marcellus Shale gas wells have been drilled on both public and private lands and tens of thousands more are predicted to be drilled in



the next 20 years, protecting public lands is vital to ensuring the longevity of Pennsylvania's hunting and fishing legacy.<sup>[17]</sup> Because of this, sportsmen and women are calling on state officials to prohibit additional leasing of state forest and park lands, unless a cumulative impact study of current/future development demonstrates that critical fish and wildlife habitat and sporting opportunities will not be adversely affected.

To ensure Pennsylvania's best streams, where many of the state's wilderness trout watersheds exist, are protected from the impacts of shale gas drilling, a minimum setback from the edge of a well pad is needed, based upon the quality of the stream and slope and soil conditions, and greater setbacks should be considered based upon site-by-site analyses.



SAM DEAN

## WEST VIRGINIA

A significant portion of West Virginia overlies both the Marcellus and Utica shale formations. To date, more than 2,300 Marcellus shale wells have been completed in West Virginia. To address the new concerns raised by hydraulic fracturing and horizontal drilling, in late 2011, West Virginia passed legislation that created regulations for horizontal well development. The legislation requires that a water management plan accompany a well drilling application, if the company is proposing to withdraw more than 210,000 gallons per day over a 30-day period. However, without a consistent state-wide water withdrawal permitting system in place that applies to all users, state agencies cannot determine if a withdrawal for gas drilling may cause harm to aquatic life or downstream users.

West Virginia anglers and hunters want the state to: (1) create a water withdrawal permitting system that is based upon a river or stream's monthly seasonal flows to maintain important stream functions and protect fish and fishing; and (2) require the use of the state's water withdrawal guidance tool, an online application that determines whether it is safe to withdraw water from a specific stream without harming aquatic life or other users.

Sportsmen and women are working with the industry, state agencies, and conservation organizations to identify and implement practices that are necessary to protect fish and game throughout the drilling process — such as re-vegetation of disturbed areas with native plants as soon as possible and limiting water withdrawals from sensitive trout streams — to assure that West Virginia's sporting heritage is protected.

## VIRGINIA

The Marcellus and Utica shale formations extend under parts of 24 counties in western Virginia, with a significant extent lying beneath the George Washington and Jefferson national forests, where reservoirs that provide drinking water to many towns and cities in this part of the state exist. The U.S. Forest Service recently released a forest plan that prohibits oil and gas development on approximately 84 percent of George Washington National Forest lands, in areas where the federal government owns the mineral rights. By doing so, the Forest Service is helping to protect more than 200 wild trout streams, totaling 750 miles, and thousands of miles of warm water streams that would have been impacted by shale gas drilling.

Virginia's sportsmen and women are working with federal, state and county agencies and the industry to (1) propose withdrawal of high-priority brook trout watersheds from future oil and gas leasing; (2) ensure public lands where the government owns the subsurface mineral rights are not drilled for shale gas; and (3) develop a set of best management standards that will protect fish, wildlife, water and forest resources on lands where private interests own the mineral rights.



SAM DEAN

# Sportsmen State-Based Strategies

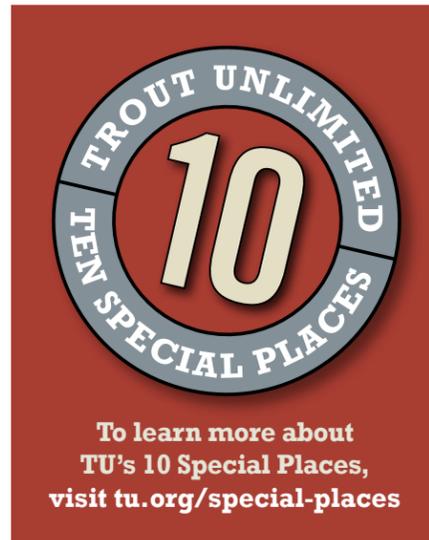
## MARYLAND

To protect Maryland's hunting, fishing and trapping traditions, sportsmen and women have actively participated in the three-year governor's safe drilling initiative that began in 2011, and have provided recommendations to protect Maryland's forest and water resources — and the fish and wildlife that rely upon them — in the shale gas region. They are working with state officials to advocate for (1) protection of sensitive watersheds, such as the Savage River watershed; (2) a ban on surface drilling on state forests where Maryland owns the mineral rights; and (3) to develop strong regulations for gas development on private lands to ensure that natural resources are protected. For each well pad proposed, hunters and anglers are urging Maryland to establish setbacks between the edge of the well pad and surface waters, based on a site specific review of the slope, drainage pattern and soil conditions at the specific site, and to require long-term planning for each well pad in order to evaluate the cumulative landscape-scale impacts of unconventional shale gas development in western Maryland.

## OHIO

Eastern Ohio is experiencing the indirect impacts of Marcellus shale gas drilling and is beginning to face the direct impacts from drilling of the Utica shale. Sportsmen and women are concerned that if water-intensive industries, such as the shale gas industry, withdraw water from streams and rivers at a faster rate than it can be replaced, water levels may drop to a point that fish habitat and fishing opportunity is affected, ultimately impacting Lake Erie's recreational tourism economy. If water is withdrawn from streams and rivers by a pipe or hose and then transported by tanker truck, there is the additional risk that aquatic invasive species could be transferred from one watershed to another and across state lines.

Ohio's hunters and anglers are calling on state decision-makers and the gas industry to limit withdrawals from sensitive streams in the Lake Erie basin, and to create a robust invasive species control program for gas drilling-related activities, including mandatory training, reporting, monitoring and inspection protocols, to prevent the transfer of invasive species into Ohio's watersheds.



<sup>[1]</sup> Standard & Poor's Rating Service: How The Marcellus Shale Is Changing The Dynamics Of The U.S. Energy Industry. Carin Dehne-Kiley, CFA, New York (1) 212-438-1092; Carin\_Dehne-Kiley@standardandpoors.com and William M Ferara, New York (1) 212-438-1776; bill\_ferara@standardandpoors.com

<sup>[2]</sup> <http://marcellus.psu.edu/resources/faq.php>

<sup>[3]</sup> Fish and Wildlife in the Upper Delaware Watershed: A Technical Report for the Upper Delaware Watershed Management Project. New Jersey Resource Conservation District (2002) p.2

<sup>[4]</sup> Fish and Wildlife in the Upper Delaware Watershed: A Technical Report for the Upper Delaware Watershed Management Project. New Jersey Resource Conservation District (2002), p.4

<sup>[5]</sup> Socioeconomic Value of the Delaware River Basin in Delaware, New Jersey, New York, and Pennsylvania: *The Delaware River Basin, an economic engine for over 400 years*. Gerald J. Kauffman, University of Delaware Water Resources Agency. (2011) p.48.

<sup>[6]</sup> Fish and Wildlife in the Upper Delaware Watershed: A Technical Report for the Upper Delaware Watershed Management Project. New Jersey Resource Conservation District (2002). p. 11.

<sup>[7]</sup> Sustainable Forest Management Plan for Savage River State Forest. FOREST SERVICE. (2012). p. 21.

<sup>[8]</sup> "Marcellus Shale Gas Development in Maryland: A Natural Resource Analysis," PowerPoint Presentation by Catherine McCall. Advisory Commission Meeting. February 27, 2012. Available at: [http://www.garrettcountry.org/Commissioners/MarcellusAdvisoryCommission\\_2272012\\_NaturalResourcesAnalysis.pdf](http://www.garrettcountry.org/Commissioners/MarcellusAdvisoryCommission_2272012_NaturalResourcesAnalysis.pdf)

<sup>[9]</sup> <http://www.dec.ny.gov/animals/6960.html>

<sup>[10]</sup> <http://www.dnr.state.oh.us/Home/FishingSubhomePage/fisheriesmanagementplaceholder/fishingfairportstratplan/tabid/6167/Default.aspx>

<sup>[11]</sup> C. Murray and M. Shields. Creel Analysis and Economic Impact of Pennsylvania's Lake Erie Tributary Fisheries in Erie County, Pennsylvania, with Special Emphasis on Landlocked Steelhead Trout (*Oncorhynchus mykiss*) October 1, 2003 – April 30, 2004 (October 1, 2004).

<sup>[12]</sup> Finoff D. and D. Lodge. *Preliminary Results: Annual Losses to Great Lakes Region by Ship-borne Invasive Species at least \$200 Million*. Great Lakes United (July 2008).

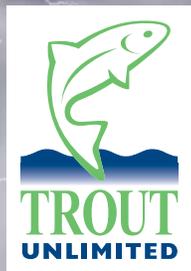
<sup>[13]</sup> <http://www.dec.ny.gov/outdoor/53668.html>

<sup>[14]</sup> 9 N.Y.RPP §329-A (Effective Date: 09/22/2012)

<sup>[15]</sup> Revised Draft Supplemental Generic Environmental Impact Statement On The Oil, Gas and Solution Mining Regulatory Program Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs. New York State Department of Environmental Conservation (2011), p.21.

<sup>[16]</sup> Id. at.14.

<sup>[17]</sup> Johnson, N, T Gagnolet, R Ralls, E Zimmerman, B Eichelberger, C Tracey, G Kreidler, S Orndorff, J Tomlinson, S Bearer, and S Sargent. Pennsylvania Energy Impacts Assessment. (2010) p. 12...



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