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"I love these old streams- Neversink, Beaverkill, Willowemock, etc.- and they have given much sport and pleasure to thousands of anglers." - Theodore Gordon 1907

TGF Comments on the New York State Department of Environmental Conservation's (DEC) draft Supplemental Generic Environmental Impact Statement (dSGEIS) re Well Permit Issuance for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reserves

(December 30, 2009)

Introduction

TGF is an organization of conservationists and anglers who are deeply concerned with the future of trout and the waters of New York State.

TGF was founded during the 1960's to protect the rivers of the Catskills from potential damage associated with construction and development along their banks. Its members have been assisting communities throughout the Catskill Mountain Region for decades handling various issues, including, but not limited to, environmental conservation.

Process I

The DEC should withdraw the dSGEIS and release a new dGEIS that complies with the State Environmental Quality Review Act (SEQRA) and DEC's Part 617 SEQRA regulations.

Process II

Permitting high-volume fracturing of horizontal gas wells is a SEQRA action requiring a new draft EIS comprehensively analyzing this new method of natural gas extraction. Fundamental differences in the scope and scale of individual gas wells and well pads, the high volumes of fracturing fluids and corresponding waste generation separate this method of gas extraction from prior vertical and horizontal drilling. Merely supplementing the 1992 GEIS regarding deep subsurface drilling and mining activities does not comply with the legal requirement "to analyze the significant adverse impacts [of an action] and evaluate all reasonable alternatives." 6 NYCRR § 617.9(b)(1).

Process II, cont'd

The dSGEIS states that currently there are 6,700 active natural gas wells in NYS. The document presents as a realistic gas extraction scenario the development of 2,000 to 4,000 high-volume, horizontal wells over 10 years *in Broome County alone*, only one of the more than 25 New York counties with Marcellus Shale deposits and one of more than 40 counties with Utica Shale deposits. Gas well development is also expected in new areas, including the Catskill Mountain Region.

The lack of analysis based on data from existing gas wells in New York concerning the characteristics and management of fracturing fluids, flowback and other mine development wastes demonstrates that high-volume hydraulic fracturing of horizontal wells is a new action, requiring the preparation of a new draft EIS that comprehensively analyzes this new method of gas extraction.

Process III

The dSGEIS fails to address a number of fundamental and legally-required areas such as significant adverse impacts on aquatic habitat and aquatic resources, including, but not limited to cold water fisheries; reasonable alternatives including sites, scale and timing; and available mitigation measures.

Uncertainty over the future economics of natural gas and its extraction is not a valid excuse to simply ignore plausible gas well development scenarios, the adverse environmental impacts of the various scales of projected development, and the consideration of alternatives that would mitigate those adverse impacts.

Process IV

The dSGEIS impermissibly segments the environmental impact review of high-volume, horizontal hydraulic fracturing gas extraction by ignoring the adverse environmental impacts of (i) constructing the pipelines and other infrastructure network necessary to support thousands of proposed gas wells, and (ii) the disposal of the high-volumes of industrial wastes, including radioactive wastes, generated by the gas extraction.

Direct Water Withdrawals From Trout and other Fishing Streams

The dSGEIS would allow 70% of the surface water flow, as calculated under the proposed "Natural Flow Regime Method," to be withdrawn from all streams to support hydraulic fracturing.

- The deleterious impacts of withdrawals of such magnitude on cold water habitat and fisheries are enormous.
- Those impacts are not recognized or analyzed in the dSGEIS.
- Available alternatives and mitigation measures, such as limiting withdrawals to larger order (and flow) streams, limiting withdrawals to less than 70% of flow, are not considered.
- The dSGEIS recognizes that "data on historic stream flows must be of a sufficient duration and quality to represent the natural flow regimes of the stream as prescriptions for passby flows are only as good as the hydrologic records on which they are based." (dSGEIS, at 7-19.) The document, however, is silent on the quantity and quality of available stream flow data.

Indirect Water Withdrawals From Trout and other Fishing Streams

The dSGEIS identifies the potential for localized or broader-scale cumulative adverse effects on streams and aquatic organisms that depend on streams from ground water extraction for gas drilling. But outside certain areas subject to specific regulatory standards regulating water withdrawal, the document presents no discussion of plans to mitigate those potential adverse impacts. Rather, it states: "[t]he concern for aquifer depletion due to increased ground water use in New York currently is being reviewed and addressed by the DEC." (At 7-6.) That opaque statement does not provide a reasonable understanding of "those adverse environmental impacts that cannot be avoided or adequately mitigated if the proposed action is implemented," as required by 6 NYCRR § 617.9(b)(5)(iii)(b).

Water Quality

Water quality is the single most important element for a healthy trout population. Temperature and sediment levels in the rivers and streams are critical for trout propagation and survival, and essential for the continued reproduction of the many insect species which are a crucial food source for the trout. Simply put, trout and the insects on which they feed need cold, clear water and a sediment free riverbed to live. As it is, many watercourses and waterbodies in New York State already has problems maintaining low turbidity levels and any increase in runoff will have a devastating impact on trout fisheries. Trout ecosystems are so delicately balanced that there is simply no buffer that will allow it to absorb the changes that will occur from the enormous amount of activity produced from horizontal drilling and high-volume hydraulic fracturing to develop the Marcellus Shale and other low-permeability gas reserves.

Precipitation and Implications

The Catskill Mountain Region of New York State has a history of extreme weather and flooding. Recent major flood events in 2005, 2006, 2007 and 2009 have had a devastating impact on the communities of the Catskills. The dSGEIS fails to properly analyze the impacts of such weather trends within the scheme of stormwater management for gas drilling activities.

Implications to Stormwater Runoff and Management

Surface water runoff could be the single most destructive element that will accompany gas drilling activities. Given the cumulative scale of access roads, pipelines, well pads, etc., stormwater runoff and flooding will create water flows that will significantly raise water temperatures and gather large quantities of sediment from those surfaces and deposit them in watercourses. Such particulate and thermal pollution will inevitably cause increased water temperatures, turbidity and sedimentation in major streams and rivers, and in particular, their tributaries and headwaters.

Stormwater, cont'd

The cumulative impacts of stormwater discharges from multi-well pad sites would increase in-stream erosion resulting in raised levels of total suspended solids (TSS) and turbidity in receiving waters. The DEC fails to evaluate the cumulative impact of such increases of TSS and turbidity on the trout, insect species and fauna that utilize the associated watercourses and waterbodies. Increases in turbidity have demonstrated detrimental effects on freshwater fish, particularly trout, and have the potential to result in significant changes to population dynamics among fish populations and other aquatic species.

Setback distances for gas drilling activity are woefully inadequate. Natural gas drilling activity, which includes spacing units, access roads, pipelines, well pads, etc., should be excluded within at least 1,000 feet of streams and wetlands. Additionally, DEC must prohibit the placement of well pads and all ancillary equipment within floodplains to eliminate the potential for flood related spills of contaminants.


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Stormwater Pollution Prevention Plan

The dSGEIS must provide a better outline for practices that should be used at drilling sites / well pads; in the form of a fully developed Stormwater Pollution Prevention Plan (SPPP) based on the guidance criteria in the *New York State Stormwater Management Design Manual*[1] and *New York State Standards and Specifications for Erosion and Sediment Control*.[2]

On-site erosion and sediment control practices should be an integral component of proactive site management. These practices should be addressed in the dSGEIS and should include, at a minimum a full discussion of factors that influence erosion potential on potential project sites, including soil erodibility, vegetative cover, topography, local climate, and local rainfall.

Stormwater Pollution Prevention Plan, cont'd

The discussion should include an analysis of all onsite soil types and their hydrologic soils group classification. Shallow depth to groundwater or impermeable layers, slow or fast percolation rates, and soils typically occurring on the site can severely destabilize drilling sites and hillsides during flooding, and therefore must be identified.

If specific sites cannot be identified, such a discussion should focus on regional characteristics which should be clearly identified and mapped across New York State for potential drilling activity in those respective areas.

Turbidity

In 1993, the NYCDEP began a watershed wide study in response to an EPA mandate to reduce sediment loading and turbidity in the Catskill Watershed.[3] The EPA granted “filtration avoidance” to NYC in 1993 provided that filtration avoidance criteria were met.[4] The criteria, limits the level of turbidity in “source” waters to limit suspended particles that may serve as a vehicle for the transport of pathogens and other contaminants.[5]

Water quality data have been collected by DEP personnel in the Catskill System for over 70 years;[6] and the data suggests that this system has traditionally experienced semiannual turbidity peaks corresponding with snow melt and precipitation.[7] The Catskills are an example of how the soils and stream banks of watersheds can be highly erodible.[8] As a result, cautionary practices must be used to prevent the transport of significant levels of sediment from watersheds.

Turbidity, cont'd

The negative impact from highly turbid water affected the Esopus fishery to the extent that the NYCDEP was sued by TGF and several other groups with interests in the Catskills and the Esopus Creek. Catskill Mts. Chapter of Trout Unlimited, Inc., Theodore Gordon Flyfishers, Inc. v. City of New York, 273 F.3d 481 (2d Cir. 2001).

Runoff volumes including cumulative volumes to be expected between clearing and grading for roads, pipelines and well pads, will create the type of soil erosion that is unavoidable with large projects of this size. Once eroded, particles such as clay can remain suspended in the water body they enter for as long as 6-9 months. Any heavier, larger sediments or silt will be deposited along streambeds destroying the habitat for insects that are the vital food source for trout. Headwater streams which already suffer from levels of turbidity, will be overwhelmed by the influx of highly turbid runoff waters.

Consequences of Turbid Waters

Trout juveniles and larvae have been shown to be sensitive to elevated levels of suspended solids.[9] For salmonid larvae (which include trout), up to 20% mortality, increased predation, and moderate to severe habitat degradation has been linked to exposure to suspended solids levels of 20 mg/l for two or more days.[10] (A suspended solid level of 20 mg/l correlates to a turbidity level of 14 NTU.) Sublethal effects to salmonid juveniles including minor physiological stress has been linked to a few hours of exposure to suspended solid levels of 55 mg/l. Another stress on the fish is that the macrobenthic community suffers a loss to the sensitive mayfly population when exposed to turbidity and TSS.[11] "Mayflies are one of the most sensitive species to pollution, including total suspended solids."[12]

Consequences of Turbid Waters, Cont'd

Aside from the impacts to fish, turbidity in waters has a terrible effect on the ability to safely and successfully fish. Suspended solids in the water and sediments deposited on the streambed prevent anglers from being able to adequately see the bottom and safely wade through a stream. In such waters, anglers take an increased risk of either tripping on rocks or logs, or losing their footing in a deep pool that could not be seen through the murky waters.

Treatment of Flowback and Brine Wastewaters

The dSGEIS recognizes that hydraulic fracturing gas well wastewaters contain high levels of total dissolved solids (salts) and radionuclides that will require treatment before discharge to surface waters. Yet the document provides no analysis of how that may be accomplished in existing wastewater treatment facilities, or of the number and effectiveness of necessary new treatment facilities.

Recent water quality problems on the Monongahela River in Pennsylvania demonstrate the potentially significant adverse effect on water quality from gas well wastewater discharges.

Technologically-Augmented Naturally-Occurring Radioactive Material (T-NORM)

The dSGEIS recognizes that produced waters (flowback and production brine), pipe scale, well bore cuttings, tank and pit sludges, and produced gas contain significant amounts of radionuclides, particularly radium^{226} and radon^{222}. The dSGEIS states that radon gas "is the main human health concern," with radioactive material brought to the ground surface by gas development. But the document contains *no analysis* of the potential adverse impacts to human health of radon exposure or the release of radionuclides into cold water habitats, including its impact on fisheries.

T-NORM II

Neither the 1992 GEIS nor the dSGEIS analyze potential adverse effects on fish and aquatic habitats from the discharge of radioactive elements in gas well wastewater.

- Teleost fish, which includes trout and salmon, are the most radiosensitive aquatic organisms. Reproductive parameters, such as fecundity and embryo viability, would be the most likely to be adversely effected by exposure to radiation. Significantly, radiation to fish eggs can be estimated. *See* Blaylock, et al., "Methodology for Estimating Radiation Dose Rates to Freshwater Biota Exposed to Radionuclides in the Environment" (1993).

Cumulative Impacts

Cumulative impacts are not adequately evaluated in the dSGEIS. The dSGEIS does not analyze the potential for cumulative impacts - on a regional or statewide basis - on the grounds that "*the number of wells which will ultimately be drilled cannot be known in advance....*" (Section 9.2.1). A regional reasonable worst case of gas development of the Marcellus Shale including secondary impacts on a regional and statewide basis can and **must be** developed in order to present a comprehensive analysis of potential impacts. The failure to disclose cumulative impacts deprives the decision makers of a rational basis for going forward. Though future development scenarios are by nature uncertain and inherently difficult to estimate, it is a requirement of SEQRA for environmental reviews to estimate background development trends and the effects of the proposed action.

Cumulative Impacts, cont'd

Section 7.13 of the dSGEIS briefly mentions cumulative impacts from water withdrawals, noise, aesthetics, traffic, and community character without sufficient analysis, and completely fails to undertake any analysis whatsoever of the many other potential cumulative impacts such as the aforementioned section regarding water quality.

Based on the fact that an evaluation of cumulative impacts is required by SEQRA, the dSGEIS should not be finalized until a comprehensive cumulative impact and induced growth analysis is completed and released for public review and comment.

Alternatives

SEQRA requires analysis of alternatives to the proposed action but the dSGEIS does not present any meaningful analysis of alternatives. First, each EIS must contain a “no action” alternative. Characterizing the prohibition of developing natural gas from the Marcellus Shale as the “no action” alternative is not appropriate. The “no action” alternative would be continuation of the current program without alteration. The text on alternatives contain no analysis and improperly dismiss two legitimate alternatives (phased permitting and the use of non-toxic technologies and additives) with potentially fewer unmitigated significant adverse environmental impacts in violation of SEQRA’s requirements.

Ecological Resources

The dSGEIS does not fully address the cumulative impacts to various natural resources that would be affected by gas development processes. The DEC fails to evaluate the cumulative impact from increases of TSS and turbidity on the fish, fauna and other aquatic life that utilize the associated watercourses and waterbodies.

(Drilling fluid splashing past the liner, Dimock, PA, Spring 2009)

The dSGEIS does not fully address the potential cumulative impacts associated with spills of brine, spent fracturing fluids, chemical additives, and petroleum products.

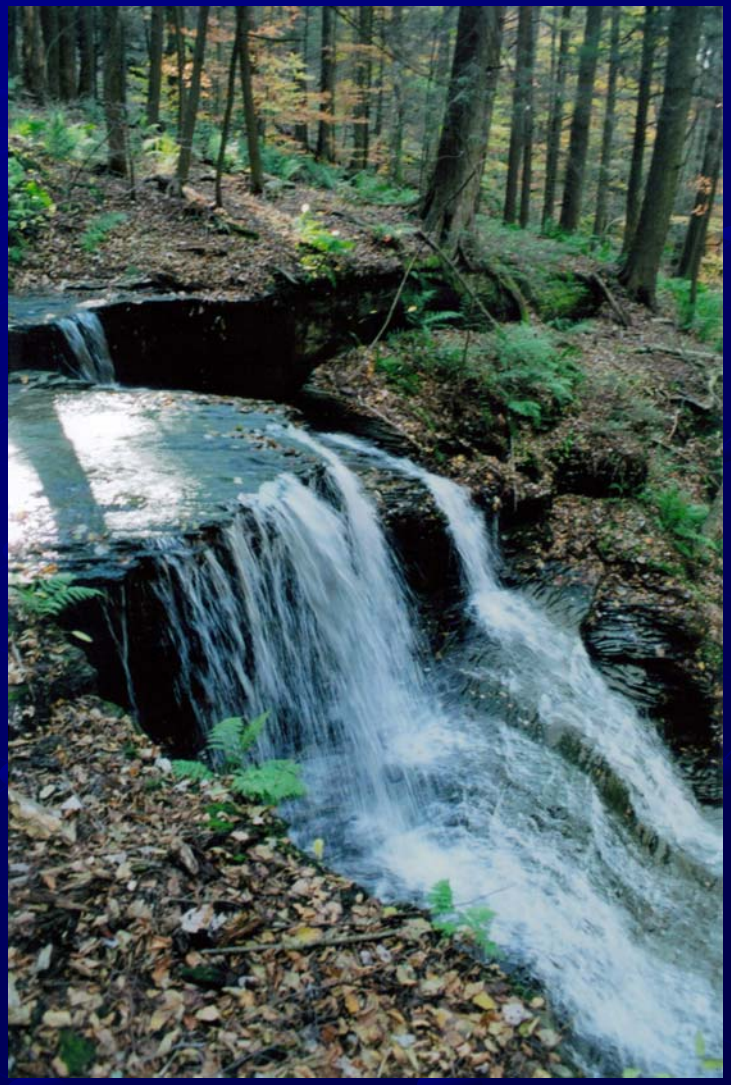
Ecological Resources, cont'd

DEC must provide adequate setback requirements for all watercourses and waterbodies, including wetlands, so as to afford equal protections of these resources in the event of a spill. Additionally, DEC must prohibit the placement of well pads and all ancillary equipment within floodplains to eliminate the potential for flood related spills of contaminants.

The dSGEIS does not provide a comprehensive analysis of the potential cumulative impacts to wildlife. DEC does not address the cumulative impacts to wildlife as a result of noise associated with multi-well pad development. DEC also fails to analyze the effects of flowback water surface impoundments on vernal pools, waterfowl, and migratory bird species. An individual and cumulative impacts analysis on bats, including the state and federally endangered Indian Bat (Myotis sodalis), must also be conducted by DEC to fully address the potential for impacts to bat hibernacula.

Ecological Resources, cont'd

The dSGEIS does not provide a comprehensive analysis of the potential negative impacts to rare threatened or endangered (RTE) species, or unique ecosystems as a result of habitat destruction and fragmentation resulting from individual and multi-well pad development. Further, the dSGEIS fails to restrict gas drilling activity near sites having unique characteristics, flora or fauna. State lands, State park lands, wildlife refuges and all other areas having particular ecological importance offer a great diversity of habitats. Micro-ecosystems, unique flora and fauna, old growth forests, fen wetlands and various other areas of sensitive biodiversity are not properly studied in the dSGEIS for the potential impacts from gas drilling activities.



Ecological Resources, cont'd

The dSGEIS should include a description of species presence and abundance, age, size, distribution, dominance, community type, productivity, and value as habitat for wildlife. Both migratory and resident wildlife species should be identified and described with the same ecological parameters used for existing plant communities. The dSGEIS should include a discussion of the cumulative impacts resulting from the destruction of vegetation and wildlife habitats.

The dSGEIS needs to provide:

- a discussion regarding tree removal and expected impacts;
- survey maps for vegetation, wildlife, watercourses, waterbodies, wetlands, and RTE species within areas of potential gas well development;
- a discussion of impacts to aquatic ecology;
- plans for vegetation replacement; and
- plans for reclamation

Geological Resources

The dSGEIS fails to present an adequate assessment of the possibility of faults and other features serving as conduits that could allow transmission of formation water or fracturing chemicals into the local freshwater aquifers or towards tunnels and aqueducts. This discussion should include an analysis of the likelihood of linear features and un-mapped features contributing to the migration of formation water or fracturing chemicals in the subsurface and possibly to the surface.

The dSGEIS provides too little information about the targeted shale and the overlying formations. There are little or no data concerning hydraulic conductivity, porosity, groundwater contours, or natural flow directions, either horizontal or vertical. The dSGEIS also fails to address the real possibility of impacts to existing rare geologic formations.

Geological Resources, cont'd

The Finger Lakes Region and Catskill Mountain Region both are home to formations and gorges which embody unique geological and hydrogeologic resources. The dSGEIS must include a study regarding the characteristics of such formations that addresses:

- bedrock topography in, of and around buried glacial channels;
- relationship of the channels and other underground flow patters to the many seeps and springs permeating hillsides;
- connectivity between the channels, groundwater flow patterns and surface waters.

Finally, the dSGEIS must include a study regarding the characteristics of the relationship of channels and other underground flow patters to abandoned vertical and horizontal wells already existing in New York State.

Hydrologic and Geomorphic Study[13]

Due to the sensitivity of New York's trout fisheries and the fact that these fragile ecosystems are already stressed by other circumstances, TGF insists that a detailed and complete hydrologic and geomorphic study be included in the EIS in order to accurately assess the current conditions of New York's rivers and their tributaries as fisheries. Such study must disclose all potential significant adverse impacts from gas drilling and describe the mitigation measures necessary to avoid or minimize those impacts to the maximum extent practicable as required by law.

Historical and Recreational Impacts

The continued preservation of one of the most unique cultural and recreational resources in New York State is in serious jeopardy. The trout streams of the Catskills and Delaware watershed are world renown and attract thousands of anglers each year because of the historical and aesthetic values of the region as well as the quality of the trout streams as fisheries. Any negative impacts to the trout habitat in this region will have far-reaching effects which could devastate fishing, and the many aspects of the local economy related to it, throughout New York and in particular the Catskill Mountain Region and Delaware watershed. The dSGEIS fails to properly address such potential impacts.

Catskill Mountain Region

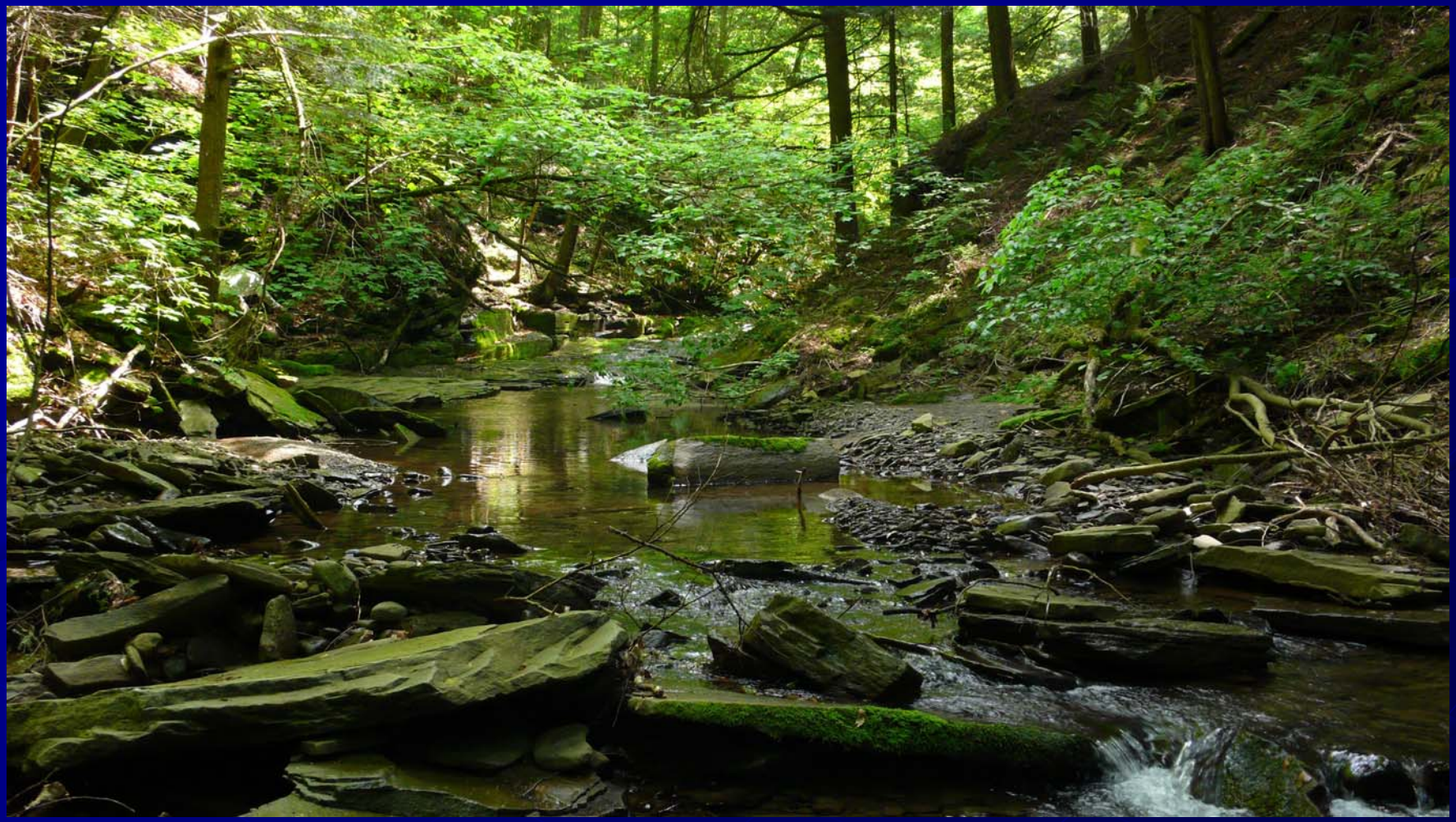
In the Catskill Mountains of New York State flow the Beaver Kill and Willowemoc Creek as well as the Neversink, Esopus and Delaware Rivers, which are world class trout streams revered among anglers across the nation as the birthplace of American flyfishing and the home of our namesake, Theodore Gordon. Their tributaries and main stems have given life to unique ecosystems resulting in State parks and federally protected land. These famous waters have been established as historical and recreational treasures that continue to attract thousands of anglers, hikers, paddlers, hunters and birders every year.

Catskill Mountain Region, cont'd

Equally important to the trout of the Catskills are the headwater and intermittent streams that form an extensive network of waterways which stretch to the furthest corners of the Catskill Region. Trout fingerlings are found in such waters as well as the principal tributaries, meaning these headwater and intermittent streams qualify for trout spawning (TS) classification, and should be protected to ensure that trout and trout spawning habitat is not degraded.

Catskill Mountain Region, cont'd

The ephemeral and intermittent streams of the Catskills that flow during snowmelt or after large rainfalls are considered extremely important for river and fish survival. Such streams form a high proportion of the channel system and thus, contribute a large amount of nutrients from primary production and litterfall to downstream reaches.[14] Both perennial and seasonal streams and wetlands provide valuable habitat.[15] They offer habitat for critical stages in a fish's lifecycle such as spawning and the maturing of fingerlings. Headwater streams are vital for maintaining many of America's fish species, including trout.[16] Small streams, even if they are fishless, are important producers of insects that drift to the downstream fish assemblage. Headwater streams are the first aquatic systems that see the input from the terrestrial environment.[17]



Catskill Mountain Region, cont'd

As vital trout producing waters, which include brook trout (the only trout native to the eastern United States), the streams and rivers of the Catskills must produce consistently-flowing, cold, clear water year-round to enable its trout populations to thrive. Such sensitive ecosystems will be destroyed by the foreseeable negative consequences that gas drilling activities in the Catskill Region will have on water quality and supply. In addition to concerns regarding water quality, supply, trout and fish habitat, TGF is apprehensive about the effects to historical and recreational preservation.

Furthermore, the Catskills and adjacent lands in Pennsylvania contain some of the largest contiguous forest blocks east of the Mississippi River. This area acts as an important species corridor between the Catskill Park, the Shawangunk Ridge, the Hudson Highlands and the Poconos.

Protected and sustained by contiguous forest and a web of pristine streams and rivers, the Catskill Region and the Delaware River watershed support numerous rare species and natural communities, and provide drinking water to millions of people. The landscape of peaks, forests, meadows, wetlands, marshes and floodplains harbor hundreds of bird, reptile and amphibian species, including bald eagle, eastern hognose snake, timber rattlesnake, five lined skink and marbled salamander. Fish species include the rare ironcolor shiner, brook trout, bluespotted sunfish and ancient bowfin as well as migratory fish such as American shad, alewife, striped bass, sea lamprey, and American eel. The Catskills contain the greatest diversity of freshwater mussels in the Delaware River basin. Of particular significance are the federally endangered dwarf wedgemussel and the state-threatened brook floater. The Region's rich and varied collection of insect species, particularly dragonflies, are an excellent indicator of healthy, pristine waters; the globally rare brook snaketail and extra-striped snaketail are dragonfly species of particular concern.

The cleared swaths of land for drilling pads, roads and pipelines to connect the drilling activity will dissect these important forest blocks and corridor. Further, streamside road and pipeline crossings, which include culverts and bridges, can impede or prohibit fish movement in a river system. Being confined to isolated stream segments can severely impact already stressed trout populations and limit genetic diversity of the species.

The dSGEIS fails to address the consequences of such fragmentation of the landscape and the cumulative impacts of the gas drilling activity across the Catskill Mountain Region. Such omissions are a gross violation of SEQRA. The lack of a comprehensive analysis of cumulative impacts and growth reasonably projected to be induced by natural gas production is a serious flaw in the dSGEIS. Due to the potential for devastating impacts for the Catskill Mountain Region's lands and waters,

TGF is of the opinion that horizontal drilling and hydraulic fracturing to develop the Marcellus Shale in the Greater Catskill Region cannot and must not be allowed to proceed.

Conclusion

TGF calls for a ban on horizontal drilling and hydraulic fracturing to develop the Marcellus Shale in the Greater Catskill Region. Thus, a ban on drilling would occur in those Counties of Sullivan, Delaware, Otsego, Schoharie, Albany, Greene and Ulster. TGF also opposes any such drilling throughout New York State on or near State Forest lands, State park lands, wildlife refuges and all other areas having particular ecological importance, such as wetlands and floodplains as well as habitats that house threatened species of wildlife or plant life. TGF opposes drilling activity in the Delaware River watershed and protected streams of a CT and/or TS classification or higher.

TGF also urges the DEC to take the following steps:

1. Set aside the current dSGEIS and commit to a continued moratorium on the issuance of any new permits for hydraulic fracturing in the Marcellus Shale or similar formations in New York State until a new draft GEIS is finalized, or in the alternative, until a new dSGEIS is finalized.
2. Request that U.S. Environmental Protection Agency (EPA) Region II convene a panel of experts on water quality to analyze proposals for hydraulic fracturing in New York State and to assess the potential impacts of such activities on water resources in New York, utilizing the precautionary principle as the foundation for its analysis.
3. Develop a new draft GEIS, or in the alternative a new dSGEIS, that contains all appropriate and legally-required analyses and to propose a comprehensive rule-making package that would accompany the new draft document as well as being designed to fully insure the protection of the state's water and other natural resources.

4. Place a restriction on gas production in all areas with high quality cold water habitat until the wastewater and potential ground and surface water issues are addressed.
5. Place the highest quality native and wild coldwater habitat permanently off limits to gas drilling activities.
6. Use current scientific information as the basis for all decisions related to gas development that affect our fish, wildlife, and water resources.
7. Update State permitting processes to incorporate comprehensive environmental analysis, including cumulative impact analysis, in order to protect critical habitat and sustain fish, wildlife and water resources.
8. Strengthen, or create if absent, State laws that ensure best management practices for storm water and erosion controls for all drilling activities in order to protect native and wild trout habitat from sedimentation and erosion impacts.

TGF understands the need to address economic development issues in New York State, but strongly believes that such development can, and must, be undertaken in a thoughtful, responsible manner that does not jeopardize the tremendous natural resources that make this State so special and unique. We hope and expect to see major DEC policy changes based on these comments. Thank you.

John L. Barone
Vice-President of Conservation

Lemuel M. Srolovic
Conservation Committee

Citations

[1] *See* DEC, New York State Stormwater Management Design Manual (2003). Available at: http://www.dec.ny.gov/chemical/29072.html.

[2] *See* DEC, New York State Standards and Specifications for Erosion and Sediment Control (2005). Available at: http://www.dec.ny.gov/chemical/29066.html.

[3] Mark L. Snopek, et. al., Spatial Distribution and Characterization of Sediment Flux in Ashoken Reservoir, New York city Water Supply Studies, American Water Resources Association, July 1996, P. 61.

[4] Id. at 62.

[5] Id.

[6] James D. Mayfield, Short and Long-Term Plans to Reduce Turbidity in Schoharie and Ashoken Reservoirs, at 4.

[7] Id.

[8] Mark L. Snopek, et. al., Spatial Distribution and Characterization of Sediment Flux in Ashoken Reservoir, at 63.

[9] Newcombe and Jensen, Channel Suspended sediment and Fisheries: A synthesis for Quantitative Assessment of Risk and Impact, North America Journal of fisheries Management, Vol 16, No 4, November 1996.

[10] Id.

[11] Ralph Huddleston, Jr., Evaluation of the Effects of Turbidity and Suspended Sediment Associated with Water Releases and Suspended Sediment Associated with Water Releases from the Shandaken Tunnel on the Biological Resources of Esopus Creek, CEA Engineers, P.C., August 2002.

[12] Id.

[13] Similar in scope and detail to the Trout Unlimited study published in December 2002 for the nearby Beaverkill and Willowemoc Rivers entitled “Beaverkill-Willowemoc Watershed Initiative.” We can provide a copy if necessary.

[14] Leslie M. Reid and Robert R. Ziemer, Evaluating The Biological Significance Of Intermittent Streams, USDA Forest Service, Pacific Southwest Research Station;
text available at: *http://www.fs.fed.us/psw/rsl/projects/water/2IntermitStr.htm*

[15] Id.

[16] Judy Meyer, et. al., Where Rivers Are Born: The Scientific Imperative for Defending Small Steams and Wetlands, River Basin Science and Policy Center, 2003; text available at http://outreach.ecology.uga.edu/publications/pdf/scientific_imperative.pdf

[17] Meyer, Stout, Oregon DFW and Kaplan are cited in Ted Williams, Upstream And Out Of Mind: The Feds Abandon Protection For Our Headwater Streams, Fly Rod and Reel; text available at http://www.flyrodreel.com/conservation0603.html