Ontario County Soil & Water Conservation District

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January 2010

Road Bank Stabilization

Gas Wells & Water Quality

What's That Bird?

Does AEM Work?

Bluebird House

Trees
Shrubs
Groundcovers
Fertilizer
Marking Flags

American Cranberry

2010 Annual Tree and Shrub Sale

Conservation seedlings and bluebird houses are now available for purchase through the 2010 Ontario County SWCD Tree and Shrub Sale.

Healthy, locally grown seedlings adapted to local climate and soils are available for a modest cost. Native species that provide beneficial habitat for native birds and butterflies and other small animals are featured.

There are many advantages of planting native species, including the need for less fertilizer, pesticide and irrigation once the plants are established.

As much as a 30% reduction in cooling and heating costs can be achieved with careful landscaping.

Well-designed and properly placed windbreaks can reduce energy costs by as much as 20 – 40 %. Soil erosion control, snow control, temperature moderation, noise control and energy savings are benefits of windbreaks.

Farm animals protected by windbreaks have higher rates of weight gain and fewer health problems during the winter.

More extensive information about the plants available in the tree and shrub program is available on our website, www.ontswcd.com. The Tree and Shrub Guide lists uses of the plants and gives guidance on where to plant particular species to optimize growth.

Orders and payment must be received by March 19. Purchases may be picked up April 23 & 24 at the Ontario County Fair Grounds Dairy Barn.

Bluebird houses are also available for sale. These are specially constructed for ease of cleaning and to enhance brood survival.

Call the District early for bluebird houses, as nesting occurs in March and the houses should be put up in time to attract nesting pairs. For further information call Tad Gerace, 585-396-1450 ext 21.

Picking up tree and shrub purchases.
Photograph: Bob Stryker

Forms available from our website: www.ontswcd.com
Tree and Shrub Sale
Fish Stocking Order
DEC Farm Fish Pond License Application
AEM Tier I Survey
Request for Onsite Wastewater Treatment System Inspection

Road Bank Stabilization

When you think of watercourses in Ontario County, don't forget the longest water-conveying network in the landscape: roadside ditches.

Roadside ditches move stormwater runoff to streams and lakes, and can either help keep sediments from entering the water, or contribute heavily to the problem.

Unstabilized road banks allow soil to wash away, polluting streams and undermining the adjacent roadbed. Appropriate use of geotextiles, seeding and mulching can establish a road bank surface that will filter sediments and keep soil in place. Traffic safety is enhanced.

SWCD offers advice and assistance in designing stabilization projects.

Pictured: Bill Hershey, Bob Stryker and Tad Gerace working on a ____mile project on Vincent Hill Road in the Town of South Bristol.

Fabric allows seeds to sprout through the mesh.

Tad Gerace staking fabric.

Bob Stryker and Bill Hershey working on the Vincent Hill road bank stabilization project.

Applying seed and mulch

Photographs: Tad Gerace

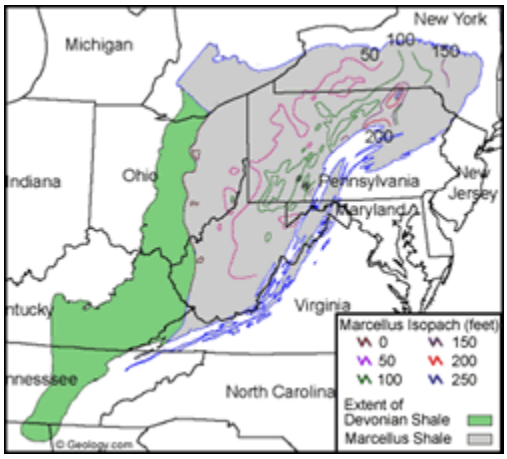
Water Resources: Natural Gas Production from Marcellus & Utica Shales

Introduction:

The prospect of extensive gas well drilling in the Marcellus shale formations New York has raised both hopes and alarms. Anyone who has been paying the least attention knows the national need for clean energy resources. The income generated by employment opportunities, leasing of land, and royalty payments is more than welcomed. Municipalities anticipate increased tax revenues and economic activity. All of these are very real benefits.

The alarms are also real and must be carefully considered as these impacts may remain long after the wells are depleted and closed. Water quality and land use protections are the primary concerns. As many of the industry procedures were established in Texas and Pennsylvania, the history of drilling there is instructive.

What and where is the Marcellus Shale? Marcellus Shale is a 350 million year old rock formation containing significant natural gas resources generated by organic matter deposited in the sediments when the shale was formed. **Utica shales** are present in New York and extend into Quebec. Interest in Utica shale formations has been increased by the current exploration in the Marcellus formations.



Why is there interest in drilling at this time?
Two reasons: wellhead prices for gas have risen sharply. Although the economic downturn has dampened demand somewhat, prices are still substantially higher than ten years ago.

A new application of directional drilling allows an initially vertical drill hole to be turned to 90 degrees and penetrate long horizontal distances through shale bedrock. Hydraulic fractures are then created at intervals from the horizontal section of the borehole to contact a larger number of the natural vertical fractures in the rock. Hydrofracturing (also called hydrofracing, hydrofracking, or fracking) produces a far greater volume of gas than the conventional vertical drill hole.

What are the Water Resource concerns?

Drilling Water Supply:

Gas well drilling is a water-intensive process. Industry estimates quote the use of 3 million to 8 million gallons of water in drilling each well. According to some sources, about 32,000 wells are projected to be drilled in New York. Supplying the water without degrading or diminishing local water resources is critical. Where groundwater aquifers are tapped (Texas) limits for withdrawals during periods of low rainfall are observed. Withdrawals from large lakes are considered by industry sources to pose less of a problem. Withdrawals from smaller streams (Pennsylvania) have been damaging during low flow conditions. Minimizing hauling distance is a concern.

Disturbance of Water Sources: Local and state authorities in some areas have required setbacks of drilling sites from streams and from drinking water sources. Significant disturbances of small watersheds and streams on farms and in forests as heavy equipment and supplies are moved around on fields and rural roads have been experienced. This is noted as a “negotiable” issue by industry publications.

Substantial amounts of water are lost to the natural water cycle. 82% of hydrofrac water remains underground forever. For one 3 million gallon well, that equates to 2,460,000 gallons of water lost to the water cycle. Although comparisons to water use on golf courses are often drawn,

irrigation water is both transpired by grass and infiltrated into shallow layers of the soil where it evaporates back into the atmosphere or continues downward to infiltrate into aquifers.

Protection of Drinking Water Aquifers is accomplished by a series of casings driven down the drill hole as the drilling proceeds. The casing must be inserted and sealed correctly. Oversight and strict inspection of this process is essential. Residents are cautioned to test their well water before drilling begins in order to have a baseline report in case they later believe their water supply has suffered from the drilling. As the most common well water tests are primarily to detect bacteria, residents should inform the lab of the prospective drilling and ask for more extensive tests of total dissolved solids, heavy metals and any other materials about which they are concerned. Few reports are available about disturbance of private wells. Industry practice in other states has been to supply bottled water for residents who can prove water supply damage and to have these persons commit in writing to non-communication about the action.

Regulations: Gas well drilling was exempted from federal Environmental Protection Agency Safe Drinking Water Act and Clean Air Act regulations by the 2005 Energy Policy Act. State and local requirements may be more stringent. New York DEC requires air emission standards for individual wells, but does not monitor cumulative emissions. Some substances used or produced in drilling (e.g. hydrogen sulfide, a poison reacting with several different body systems) have been *defined* as “non-toxic” for purposes of regulation.

Wastewater : For gas to flow out of the rock, the water must be removed. Large quantities of contaminated wastewater are recovered from the wells. Contaminants include the chemicals used in hydrofracturing the rock: primarily gels that increase the viscosity of the water and friction reducers along with other chemicals. The increased viscosity of the water enables it to carry a proppant – usually sand – that keeps the fractures open after the pressure is released. The viscosity of these fluids breaks down quickly so they can be pumped back out of the ground. The percentage of chemical additives in a typical hydrofrac fluid is commonly less than 0.5 % by volume. Additives in a three million gallon hydrofrac job would result in about 15,000 gallons of chemicals in the waste, according to a USGS fact sheet. About 18% of the hydrofrac water is returned. This “blowback”, may be partly reused in drilling other wells if feasible.

Along with chemicals, the hydrofrac water picks up materials from the rock with which it is in contact. Brine, heavy metals (arsenic, barium and others), radionuclides and organics make wastewater treatment difficult. NYS DEC recently analyzed 13 samples of wastewater brought thousands of feet to the surface from drilling and found that 11 significantly exceeded legal limits of radioactivity permissible for release into the environment according to a USGS publication. There has been no determination about additional sampling.

Proposals that rock removed from drill holes could be beneficially used for road paving would seem to be problematic because of the radioactive content (cumulative exposures to paving workers/joggers, etc.) and the substantial pyrite content of the rock. Pyrites reacting with oxygen are the source of acid leachate from mines. Specialized landfills may be necessary.

Wastewater Treatment : Blowback fluids are commonly stored onsite in plastic-lined pits until removed for disposal. Care must be taken to keep the fluid secure and contained. Current disposal practice in Pennsylvania requires passing drilling fluids through wastewater treatment

plants designed to remove bacteria and organic solids. The effectiveness of this procedure is characterized as "not well understood". Salts and other dissolved solids in brines are not usually removed by wastewater treatment. The operational failure of one municipal wastewater treatment plant that resulted in major environmental damage to the Monongahela River has been linked to the processing of hydrofrac water. Injection of the waste fluid into depths either shallower or lower than drinking water aquifers occurred in Texas. Another disposal practice common in Texas places wastewater in open tanks to evaporate; solids are buried as dry waste.

Water used for consumptive purposes is supposedly not to be removed from its natural drainage basin. Questions have arisen about water withdrawals and discharge occurring in different watersheds and drainage basins where large quantities of water have been trucked in and out. The amount of water lost to the natural water cycle is substantial. Although comparisons to the amount of water use on golf courses are often drawn, 82% of hydrofrac water remains underground forever. For one 3 million gallon well; 2,460,000 gallons of water are lost to the water cycle.

What are the Land Use Concerns? Fragmentation of farmlands and forestlands by drilling pads and roads is a significant impact. Placement of the drilling sites can isolate parts of fields, making them difficult for farmers to reach for fieldwork. Construction of the roads necessary to service the drilling pad takes up considerable land. Compaction of the soils under these access roads can remain severe long after the roads vanish. Density of well sites is expected to be high in the New York drilling area. The constant (24 hours a day, 7 days a week) traffic, lights and noise can be difficult to live with for both humans and livestock.

Forested lands often suffer degradation of streams and disruption of habitats. Species that adapt poorly to fragmented habitats are especially harmed. Many miles of pipeline construction will be necessary to gather the gas and then move it to consumers, further fragmenting natural areas.

The wear and tear on rural roads is considerable. The largest tanker trucks can carry about 9000 gallons of water per trip. For a 3 million gallon drill, that would mean at least 334 tanker loads to supply the drilling water. Smaller tankers average 5500 gallons, which would require 546 trips. Wastewater removal would require more trips. Rural roads and culverts are usually not built for this kind of intense traffic.

Other Issues: Landowners with mortgages should carefully read their documents to ensure that entering into a lease does not compromise their standing with their lending institution. **Landowners should confer with <u>their own</u> attorney before any agreements are signed**. Gas drilling companies have the right of eminent domain for gathering pipelines as well as larger pipelines. Drillers must include an affidavit in their application for a permit from DEC stating that it controls at least 60% of the land within the spacing unit (anywhere from 40 – 640 acres) by lease or ownership. The owners of the remaining 40% of the land are "uncontrolled owners." Uncontrolled owners are subject to compulsory integration and are given these three choices:

Status	Costs	Rewards
Integrated Royalty Owner (If the owner does nothing, owner is integrated as an Integrated Royalty Owner)	No liability for costs, no third party liability, driller cannot enter property.	Royalty equal to the lowest royalty stated in a lease in the unit (but not less than 12.5%).
Integrated Participating Owner	Owner pays a proportionate share of well costs (estimated cost due at the time of election of this choice)	Shares both risks and rewards.
Integrated Non-Participating Owner	Owner reimburses driller out of proceeds of production for share of well costs, plus a penalty equal to 200% of such costs.	Share rewards after deduction of 300% share of the well costs.

What's That Bird at the Feeder?

Article and Photographs by Tad Gerace

Mourning Dove:

a grayish-brown, squatty, native with a pointed tail and white banner marks. Pinkish feet and bluish eyelids are noticeable through light binoculars. Doves are ground foragers with powerful, speedy flight. Doves are often seen on roadside power-lines, flocks sometimes numbering in dozens. Their call is an easily imitated "hoo-hoo-hoo" heard almost year around and especially just before dawn.

Red-Bellied Woodpecker:

a newly common backyard suet feeder, having adapted recently to upstate New York winters from Carolinas. It has a brilliant red top-knot, red underbelly, white chest and horizontal white and black backside. The loud announcement call and characteristic diving flight pattern make it easily identifiable. Breeding pairs nest in dead hollow trees and typically raise three young.

Carolina Wren:

a curious, year- round small brown species with an upright tail and standout white eye-stripe. These birds are increasing in numbers due to their interesting ingenuity in adapting to diverse surroundings. Carolina Wrens are often seen low in the bush, scurrying around, foraging for food. They can be attracted to feeding stations by offering mealworms. This welcome, inquisitive guest will repay the provider with an impressive musical spring song. They take kindly to homemade nest boxes.

Attracting Birds in Winter

To maximize the number of species of birds you see in at your feeder in the winter, offer a variety of foods at different heights above the ground.

Black oil sunflower seeds (higher in oil than the white striped variety humans eat) are a favorite of cardinals, woodpeckers, blue jays, goldfinches, purple finches, titmice, chickadees, and nuthatches. Nyger is the most popular seeds to feed goldfinches. Chickadees, titmice, chickadees, and downy woodpeckers eat safflower, a white seed slightly smaller than black sunflower seed.

A water source is important for birds in winter. Heated birdbaths are available and relatively inexpensive. Never put antifreeze in water available to wildlife – it's toxic.

Does AEM Really Work?

Agricultural Environmental Management programs are a primary focus of Soil and Water Conservation Districts throughout New York State. Ontario County farms have participated in AEM since the inception of the grant-funded program. Thousands of dollars worth of cost-shared projects have been completed with the goal of reducing pollutant loading in streams and lakes. Farmers work with local AEM resource professionals to develop economically and environmentally sound Best Management Practices and plans.

Justifying the large outlay of public and private funds required for the recommended practices and installations would seem to call for some quantifiable facts. Fortunately, those are available and clearly document water quality improvements when AEM practices are followed.

Dr. Joseph Makarewicz, Professor of Environmental Science and Biology, SUNY Brockport, has undertaken such a scientific study in the Conesus Lake Watershed, located in Livingston County. The report was published in the *Journal of Great Lakes Research* in 2009.

Conesus Lake is a eutrophic (nutrient-rich) water body. Algae blooms and macrophyte (water plant) growth have been recurrent problems, hampering recreational use and impairing aesthetic values. Although the lake has a shoreline urban corridor served by a perimeter sanitary sewer, other land uses are predominantly agricultural.

Seven subwatersheds tributary to Conesus Lake were selected for Makarewicz's study, offering a range of land size areas, daily discharge rates of streams and agricultural practices employed. The largest subwatershed (North McMillan Creek) was designated as a reference watershed and no AEM practices were implemented. Extensive water sampling was done at the base of each watershed for the duration of the study.

Cultural and management changes (Best Management Practices: BMPs) on the farms in the other six watersheds were many and varied; suited to the needs of the individual farmers who volunteered to participate in the study. Soil testing (resulting in reduced fertilizer inputs), planting of cover crops, reduced tillage on erodible soils, elimination of winter manure spreading, were among practices implemented in various locations.

In general, significant reduction in total phosphorus, soluble reactive phosphorus, nitrate, total Kjeldahl nitrogen (nitrogen excreted from an animal) and total suspended solids were achieved by the second and third year of implementation. Sampling in the Graywood Gully subwatershed, where the most intensive best management practices were introduced, revealed the greatest percent reduction (average 55.8%, range 47%-65%) and the largest number of reductions in 4 out of 5 materials analyzed.

Historic records of macrophytes and algae dating back more than a decade were researched. Macrophytes, algal growth and filamentous algae (biomass) were monitored downstream in the nearshore areas of Conesus Lake for 2-3 years before the study and for 4 years during and after the installation of BMPs on subwatershed farms. Biomass decreased by 30-50% within one or two years of BMPs being implemented. Biomass in the subwatershed where no BMPs were introduced was statistically indistinguishable from pre-BMP years.

Two conclusions may be drawn from these ongoing studies: Agricultural Environmental Management practices do work to protect water quality; and, there may be a 1-2 year time lapse between BMP installation and observable improvement in the receiving water body. As there is no economical way to remove nutrients and sediments from a lake or other water body once these substances have entered, the time, effort and funds required for AEM work are well spent.

Ontario County SWCD Staff Directory

Senior District Manager:
- Patrick J. Emerick – CPESC, CPSWQ
  - Administration
  - Soil Erosion Control
  - Streambank Stabilization
  - Water Resources Council

Field Manager
- Robert Stryker - CPESC
  - NYS Certified CAFO Planner
  - Municipal Highway Assistance
  - Drainage & Conservation Practices

District Clerk/Treasurer/Secretary
- Elaine Borgeest
  - Fish Stocking Program

Conservation Educator
- Edith Davey
  - Education & Training Programs
  - Website & Newsletter

Conservation District Technician
- Tad Gerace
  - Onsite Wastewater Systems
  - Tree and Shrub Sale

Water Resources Technician
- Bill Hershey
  - Ag Environmental Management
  - Drainage & Farm Assistance

Canandaigua Lake Watershed Inspector
- George Barden - CPESC
  - Onsite Wastewater Systems
- Jamie Noga
  - Administrative Assistant
- Kerry Haefele
  - Assistant to Watershed Inspector

Farmers interested in completing an AEM assessment are encouraged to **call Bill Hershey at the Ontario County SWCD 585-396-1450 ext 24.** The Tier 1 form may be found on our website: www.ontswcd.com. or obtained at the District office.

AEM Agricultural Environmental Management

Have you seen these invasive, tree-destroying species?
Please call (585) 396-1450 ext 22.

Emerald Ash Borer 

Asian Longhorn Beetle 

Ontario County Soil and Water Conservation District
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