

PINE CREEK HEADWATERS PROTECTION GROUP

Keeping Our Rivers Clean,
and Our Forests Healthy.

P.O. Box 445 • Wellsboro, PA 16901

The Pine Creek

Observer

Winter 2019

Newsletter of the Pine Creek Headwaters Protection Group

President's Column

Sometimes I get criticized for writing too many gloomy, negative articles about the upper Pine Creek watershed for our newsletter. However, once again, I can only report that since our last newsletter, I must still be mostly negative.

We have devoted many hours trying to limit the probable negative environmental impacts to the Tioga State Forest caused by natural gas drilling and its associated infrastructure requirements. To achieve this "industrialization" of the once quiet and beautiful PA WILDS State Forest lands, the drilling companies want to widen the forest roads, create huge new well pads, use many acres of state forest lands for fresh water impoundments, have miles of above-ground water pipelines, use an unbelievable number of the semi trucks to transport water to and from well pads with all operating at a 24/7 pace. There is to be a half million gallons per day fresh water withdrawal from a slow moving tributary to Pine Creek (Marsh Creek), which we fear might affect the many marshes and wetlands along its 8-mile path to Pine Creek at Ansonia.

Still negative news, Shell Oil recently sold its Tioga State Forest undeveloped gas leases to another company that seems to have a more aggressive develop-

Ron Comstock

ment plan for the watershed. Also, a private individual on the very edge of Pennsylvania's Grand Canyon and Campbells Run (a major tributary to Pine Creek) has also obtained a drilling permit and is already prepping a well pad site.

Now for the really bad news: federal budget cuts are going to result in the closing of the Northern Appalachian Research Lab in Asaph. The Lab has kept Wellsboro/Tioga County on the U.S. environmental map for decades with many national level scientific studies/projects as well as being an invaluable partner in local watershed studies and projects.

LAST BUT NOT LEAST... the Public Herald reported that Pennsylvania waterways are allegedly being contaminated by radioactive waste from gas drilling activity. Please see their website for more information: www.publicherald.org.

In this newsletter, we are printing our statements to DEP in opposition to Seneca's proposal to turn a narrow, twisting dirt road in Tioga State forest into a tractor trailer 'throughway' (Seneca spokesman's term in a Delmar Twp. 'public meeting') for their Shale Gas lease, tract

#007. PA DEP approved this roadway, although Seneca must now obtain permission from all landowners along the route, as the DEP-approved plans involve extensive 'engineering' outside the 50' right-of-way, for road-widening, drainage infrastructure, etc.

The DEP official who signed the approval, Steven Putt, told PCHPG that DCNR never contacted them to express any concern about the new road's impact (including the destruction of a mostly intact canopy over the whole length of the roadway within Tioga State forest). Jason Albright, asst. state forester, has been contacted by PCHPG many times, but has never been able to explain why DCNR/ BoF refuses to speak on behalf of Pennsylvanians' natural resources, nor tell us whether any agreement has been reached with Seneca over the taking of state land and resources (tree removal) for the extra 100-foot wide erosion and sedimentation zone. DEP replies to our arguments are included, as we received them, although several dismiss our concerns with incorrect facts. We urge interested folks to drive up Baldwin Run Rd. to see themselves what will be lost if Seneca goes ahead with this proposal, keeping in mind that Baldwin Run itself is a High-Quality, cold-water native brook trout stream.

Our mission:

Keeping Pine Creek Clean

Our vision:

Pine Creek will be a peaceful watershed with clean, cold water that is a sanctuary for both wildlife and humans.

Contact us!

Website: <http://pinecreekheadwaters.weebly.com/>

Email: pinecreekheadwaters@gmail.com

Phone: 570-724-5097

Please join us at our monthly meetings: Jan.—Oct. every fourth Thursday at 7 p.m. in the room next to the cafeteria at Soldiers & Sailors Memorial Hospital in Wellsboro, PA.

PCHPG Opposes Seneca's Tioga State Forest "Throughway"

Editor's note: The following is a copy of PA DEP's response to PCHPG's comments opposing Seneca's proposed "throughway" in the Tioga State forest.

September 5, 2019

ATTN: Mr. Bryn Hammarstrom
Pine Creek Headwaters Protection Group
(PCHPG)

**PA Bulletin Public Comment
Response Matrix Baldwin Run
Roadway Improvements PERMIT#
PAD590006, AUTH ID# 1273893
Delmar Township, Tioga County**

Dear Mr. Hammarstrom:

On behalf of the Department of Environmental Protection (DEP), we are submitting the following responses to your PA Bulletin public comments received via email on 5/2/19 and 5/3/19.

Please note: The Department's review of NPDES Permit PAD590006 is primarily through the lens of the Chapter 102 regulations. While general comments and opinions regarding the overall project are appreciated and taken into consideration, comments below will primarily pertain only to the review of NPDES Permit PAD59006.

Comment 1. Among our many concerns are serious questions about the completeness, and integrity, of Stahl Shaeffer's proposed roadway transformation. As one example, although the legend on each page of the plan shows a 'demarcation' for a "Woods Line", we found that line actually USED on only ONE page. We feel this omission is sufficient to make these plans "Administratively Incomplete"! We do not understand how DEP [and DCNR, BoF, and Fish and Boat Commission] staff can possibly understand the impact of Seneca's proposal without knowing that this narrow roadway has an almost COMPLETE canopy within Tioga State Forest [a mixture of both deciduous and evergreen tree species]. The failure to delineate the "Woods Line" [intentionally

or not] on every sheet except #14 should by itself disqualify the proposal as submitted.

Response 1.

- **Woods Line are provided in various documents. Existing and proposed land coverage was specifically addressed in the PCSM Plan.**
- **Riparian planting proposal is a net increase in the forested riparian cover post-construction as compared to pre-construction.**

Comment 2. The legend [and maps] have NO reference to the EXISTING roadway/ right-of way, but only to Stahl's PROPOSED roadway: so the right-of-way (both the 'standard' 25' from centerline [i.e. 50'] roadway, and a 150' E&S zone) seem to be based on the 'NEW' Stahl designed roadway, without reference to the existing roadway. Again, the failure to delineate the EXISTING narrow roadway hides the full impact which the proposed changes would make to TSF from those charged with reviewing Seneca's proposal. It should be noted that there are trees greater than 1' DBH WITHIN the existing roadway, so presently it could NOT be considered a 'regular' two-lane road [and clearly has been this way for generations]. We are also very concerned that MASSIVE earth-moving [and tree-clearing] will be necessitated within the 150'-wide "E&S" zone due to the existing steep slopes coupled with Stahl's plans for water management structures.

Response 2.

- **The existing and proposed roadway footprints are shown on the plan.**
- **All excavation work must be performed within the Limit of Disturbance in accordance with E&S plans.**

Comment 3. Since we understand the 'Waterway and Wetlands' [#105] permit

application has been deemed deficient, and was sent back to Stahl/ Seneca, we are now commenting on an 'Erosion and Sedimentation' [#102] permit application for a project which DEP has said may be modified to 'become complete'. We request a future "public comment" period to address any changes made necessary by Stahl Shaeffer's "deficiency" corrections.

Response 3.

- **A technical deficiency letter was sent to the applicant on February 21, 2019 with an extension request granted April 17, 2019 for Joint Permit Application E59-540 (APS 980162). Responses were received on June 13, 2019. Permit E59-540 was approved on August 13, 2019.**
- **JPA E59-540 (105 permit) scope of work did not change and an additional public comment period is not justified.**

Comment 4. PCHPG feels that the DCNR, as 'parent' entity for the Bureau of Forestry [and Tioga State Forest], SHOULD intentionally become involved in this Stahl/ Seneca proposal, instead of abdicating its responsibility for the State Forest system to DEP. Although it is true that Baldwin Run road is a [Delmar] Township road [unlike the State Forest road following Straight Run], one and two-thirds miles of this township road lie within a state forest. Any proposal to turn it from a narrow, winding 'one+ lane' road into a "throughway" [word used by Seneca's Ben Williams at a Fall, 2018, Delmar Township public meeting] MUST have involvement of the public authority over Tioga State Forest. We are specifically aware of increased responsibility placed on state agencies and their employees by the Pennsylvania's Supreme Court in its decision in PEDF v. Governor Wolf. A strong majority ruled in 2017 that a constitutional obligation exists under Article I, Section 27, "to manage state parks and forests, including the oil and gas they

PCHPG Opposes Seneca's Tioga State Forest "Throughway" [continued]

contain, as a trustee "for all the citizens of Penn's Woods. Addressing reluctance to implement this Supreme Court ruling, the majority "also reaffirmed that the constitutional public trust is self-executing; it does not need farther legislation in order to be applied" [John Dernbach, Distinguished Professor of Law, Widener University].

Response 4.

- **Thank you for your comment.**



Photo: State forest road

Comment 5. One week before he retired [in January 2019], Dave Garg [chief of NCRO's E&S office] suggested that NCRO E&S staff might meet with 'interested parties' in Wellsboro, perhaps at the Conservation District' office, on this proposal. We strongly support this idea and would hope BoF and other Penna. agencies would be represented at this meeting, to be scheduled as quickly as possible.

Response 5.

- **Two public meetings were held in the fall, 2018, at the regularly scheduled Delmar Township Supervisor meetings.**

Comment 6. The Pine Creek Headwaters Protection Group (PCHPG) is a 501(c)3 watershed group founded in 1987 (we are now 32 years old) dedicated to the integrity of waters and lands within the 1,000 square mile Pine Creek basin and tributaries in Tioga, Potter, and Lycoming counties. We have played important public roles in notable projects and initiatives of the Tioga State Forest over the years, such as the Pine Creek Scenic and Recreational Rivers designation, the Pine Creek Rail Trail establishment, the Robert McCullough Access facility in Blackwell, the re-establishment of the American Eel to Pine Creek, and the upgrade of Pine Creek west of Ansonia to Special Protection (Exceptional Value) Watershed status. Continuing our long history of involvement in State Forest activities, we want to comment on a proposal to modify a section of Baldwin Run Road that runs through the Tioga State Forest in Delmar Township. We do not oppose upgrading the bridge near SR287, so that trucks or other large vehicles can get to the rest of Baldwin Run Road upstream. Indeed, if this was so important to local fire departments [and residents], why haven't they initiated requests to have this work done using Oil and Gas Impact Fees distributed to counties and townships by the millions of dollars in the past decade? A perfect use of those funds, rather than 'giving' TSF to the first 'free' bridge-builder that comes down the pike!

Response 6.

- **Thank you for your comment.**

Comment 7. We are concerned about the degraded experience Tioga State Forest users will face if tractor-trailer, tanker, and flat-bed truck traffic is allowed up that road to a new well-pad very close to the existing one on Matson Road. In less than a decade our community has lost some of the best hiking and birding trails in TSF to energy development, particularly in the eastern Asaph section on Oak Ridge. The former Matson Road (then a foot path/Jeep trail, not a road) with its complex of trails has been turned into a 3

mile long highway through the former forest. Many trails and picnicking areas are now gone to noise and dust, even after hours, including Baldwin Road itself and Matson Road/Trail, as well as several other forest roads or trails, such as Carpenter Trail, Oak Ridge Trail, Stone Road Trail, Plantation Trail; and Spoor Hollow Road, for hiking, birding, and wildlife observation/enjoyment.

Response 7.

- **Thank you for your comment.**

Comment 8. Many trails and picnicking areas are now gone to noise and dust, even after hours, including Baldwin Road itself and Matson Road/Trail, as well as several other forest roads or trails, such as Carpenter Trail, Oak Ridge Trail, Stone Road Trail, Plantation Trail, and Spoor Hollow Road, for hiking, birding, and wildlife observation/enjoyment. They are all now affected by regular, and frequent, gas-industry trucks; with impacts including: (1) loud noise heard up to a mile away, (2) dust kicked up in clouds that make driving the roads hazardous at times and covers vegetation many yards into the forest, (3) traffic into the forest via new access roads that fragment the forest and essentially eliminate ability to find solitude, and (4) ambient light (especially during ongoing drilling) that reflects off clouds for miles and reduces natural light regimes at night. The noise prevents members and recreationists from hearing many forest-interior songbirds as well as deer snorting, an indicator of where/how many deer are around. Grouse can't be heard drumming anymore. Having a picnic or evening dinner up in the forest is simply not enjoyable due to the noise, dust, and ambient light. Why are there no steps taken to reduce the noise from some of these haul trucks, steps many western energy-producing states have taken? Why isn't the O&G industry required to retrofit fossil-fuel haul trucks with industry-leading engine-brake mufflers as they are in many western gas-producing states?

PCHPG Opposes Seneca's Tioga State Forest "Throughway" [continued]

Response 8.

- **Thank you for your comment.**

Comment 9. Proposals to widen and remove Baldwin Run Road's canopy encroach on Areas of Special Consideration, in direct conflict with the spirit of both Article I Section 27 of the State Constitution and the State Forest Resources Management Plan. The concept of Areas of Special Consideration was designed to protect the Junctions and values of our public lands from exploitation. No development, including roads, impoundments, or drilling activities, are to be conducted in these areas for good reason. Some of these impacts could be alleviated by allowing the State Forests to require

- (1) functional engine-brake mufflers when operating on forest roads,

Response 9a.

- **DCNR manages state forests and forest roads.**

- (2) water trucks to wet roads during dry periods and places on forest roads,

Response 9b.

- **Water trucks wetting of roads is a currently utilized best management practice.**

- (3) limiting gas-industry truck traffic to the current approved forest and township roads, rather than allowing convenience to dictate new industrial pathways [causing ever more development in the State Forest].

Response 9c.

- **Managing traffic on local and forest roads is under the purview of DCNR and local municipalities.**

It is clear that allowing this development to proceed unchecked will guarantee endless year-after-year development on Oak/Broad Ridges and their slopes, with no hope for peaceful recreation there for

years to come. Straight Run Rd, a Tioga State Forest road [NOT permitted for Seneca traffic], has also been torn-up by O&G pick-ups, and is in its worst shape since Hurricane Agnes!

Response 9d.

- **Thank you for your comment.**

Comment 10. The noise from gas development activity in the TSF is unacceptable for many of us residents who live near and recreate in the forest. Citizens across the state are entitled to an intact State Forest as well.

Railroad car switching several times a day less than a mile from the TSF, transloading of drilling materials (sand primarily, but also water from NY), trucks hauling materials into and out of the forest, choppers in the air frequently (often stationary for periods), ambient lights from drilling operations, flaring with reflections off clouds/fog that travel for miles, compressors running: all of this degrades the experience of forest solitude we are accustomed to. Hunting, listening to bird sounds, and related activity is less enjoyable or even impossible because of all this. The effects of excessive ambient light and noise on wildlife populations are largely unknown with little research ongoing to determine those effects. Bats, already in serious decline from a fungal disease, must be impacted, as well as interference in insect mating/ reproduction.

Response 10.

- **Thank you for your comment.**

Comment 11. Tioga State Forest must consider the impacts management decisions have not only on the forest itself, but also on the surrounding business communities. Tourism is Tioga County's second largest business, and most of the tourism revenue is directly dependent upon Tioga State Forest. While DCNR has contributed greatly to our local economies with the construction of the Rail Trail, the continuing support of numerous state parks, and mainte-

nance of miles of forest roads, the explosion of gas exploration in the county has caused potential visitors to become concerned that the area will lose its "PA Wilds" character. Once lost in the visitor's mind, that perception could take generations to restore. There are already areas in the District that are being over-developed by the gas industry and have certainly lowered the "the visitor appeal" for those areas. The Pine Creek watershed (State Forest areas) is especially noted for its wild character, and needs to be afforded special protections from gas development by central and district offices to protect the region's "Tourism" economic health

Response 11.

- **Thank you for your comment.**

Comment 12. Within the Asaph and Marsh Creek Landscape Management Units (LMUs), we are most concerned with drilling-related activities where many of our members, as well as local and state residents at large, recreate year-round. PCHPG is opposed to allowing use of additional forest roads for haul truck traffic beyond the existing route onto Oak and Middle Ridges above Marsh Creek at these LMUs, including any more of Baldwin Run Road. We have publicly supported development of a freshwater pipeline from Marsh Creek/ Rte. 6 directly up the mountainside to drill pads/ impoundments, to reduce the number of trucks hauling fresh-water. On behalf of all the hikers, trout fishers, bicyclists, birders, wildlife observers, hunters, and sight-seers who live near, visit, and/or recreate here in the Tioga State Forest, we thank you for listening to our concerns.

Response 12.

- **Thank you for your comment.**

Comment 13. Seneca Resources Corporation (Seneca) holds an Oil and Gas Lease for State Forest land [Contract No. M-110007-16 (Tioga State

PCHPG Opposes Seneca's Tioga State Forest "Throughway" [continued]

Forest Tract No. 007)]. This lease includes lands and waters along approximately 1.65 miles of Baldwin Run Road. The comments provided here are based upon a review of Seneca's Erosion and Sediment Control Plan where there would be impacts to the noted Pennsylvania Bureau of Forests' leased lands and waters along that 1.65 miles of the Baldwin Run Road (Sheets 20-25 and 28-36): The lease identifies Non-Development Areas and Areas of Special Consideration in Exhibit H.

(a) Non-Development Areas are defined in the lease:

"(i) No surface disturbance or development of any nature shall be allowed with the 6,665 acres more or less delineated as Non-Development Areas and shown on Exhibit 'H'."

(b) Areas of Special Consideration are defined in the lease:

"(ii) Tract 007 contains approximately 8,913 acres more or less of special ecological features as shown on Exhibit 'H.'" The noted 1.65 miles of Baldwin Run Road within the leased area on State Forest lands include BOTH Non-Development Areas and Areas of Special Consideration. The very high ecological and recreational quality of these mapped areas should be considered during this permit review process.

Response 13.

- **The landowner maintains the Oil and Gas Lease with Seneca resources. The Department's review of the impacts and resources associated with the project will be through the lens of the Chapter 102 regulations.**

Comment 14.

GUIDELINES FOR ADMINISTERING OIL AND GAS ACTIVITY ON STATE FOREST LANDS - Revised 2013.

Streams - These guidelines state that no earth disturbance activities associated with natural gas development should occur on the surface within 300 feet of any Exceptional Value (EV) or High Quality (HQ) stream or body of water. Baldwin Run is a Chapter 93 Designated HQ-CWF (High Quality-Cold Water Fishes) stream. Approximately forty-five (45) individually numbered/labeled Baldwin Run reaches in the Erosion and Sediment Control Plan are within 300 feet of the proposed disturbance. Approximately thirteen (13) of those forty-five (45) would be directly disturbed by the proposed work

Response 14.

The Document noted above is a DCNR, Bureau of Forestry produced document. The Department's review of the impacts and resources associated with the project will be through the lens of the Chapter 102 regulations.

Comment 15.

GUIDELINES FOR ADMINISTERING OIL AND GAS ACTIVITY ON STATE FOREST LANDS - Revised 2013.

Wetlands - These guidelines state that no earth disturbance activities associated with natural gas development should occur on the surface within 200 feet of any stream, wetland, vernal pool, spring seep, other wet areas or any other body of water. Approximately fifty-three (53) wetlands noted in the Erosion and Sediment Control Plan are within 200 feet of the proposed disturbance. Approximately eleven (11) of those fifty-three (53) would be directly disturbed by the proposed work. Additionally, all of the noted wetlands are EV (Exceptional Value) wetlands, since, per the Pennsylvania Code, Section 105.17, wetlands are Exceptional Value (EV) wetlands if they are wetlands that are located in or along the floodplain of a wild trout stream and the floodplain of its tributaries. Baldwin Run, from its headwaters to its mouth, is designated Class A Wild Trout Waters.

Response 15.

- **See Response 14.**

Comment 16.

GUIDELINES FOR ADMINISTERING OIL AND GAS ACTIVITY ON STATE FOREST LANDS - Revised 2013.

Steep Slopes - The Soils chart on Sheet 02 of the Erosion and Sediment Control Plan provides characteristics for the six different soil types (LsD, MdB, MsD, OsD, OTF, and WeC) noted within the Seneca leased lands on State Forest Lands along the 1.65 miles of the Baldwin Run Road. The chart notes the following characteristics for these soil types - Easily Erodible, Cut Banks Cave, and Low Strength/Landslide Prone. The proposed work calls for cuts into all six of these soil types with varying steep bank slopes [example slopes at a few proposed cut sites - 83%, 67%, 53%, three at 50%, and 40%]. The noted guidelines state that additional setback restrictions may be instituted on a case-by-case basis (e.g., steep slopes, high recreation areas, or other significant conditions).

Response 16.

- **See Response 14.**

Comment 17.

GUIDELINES FOR ADMINISTERING OIL AND GAS ACTIVITY ON STATE FOREST LANDS - Revised 2013,

Recreation - The Erosion and Sediment Control Plan Cover Sheet (Sheet 01) notes Land Use types: Residential, Forested, Gravel Surface, Dirt Roads, Meadow, Open Space, Paved, Row Crops. This should also include Recreation and Ecological Protection, as that entire area is one of the most visitor-utilized areas and one of the most ecologically significant areas within the entire Tioga State Forest. Again, the noted guidelines state that additional setback restrictions may be instituted on a case-by-case basis (e.g., steep slopes, high recreation areas, or other significant conditions).

PCHPG Opposes Seneca's Tioga State Forest "Throughway" [continued]

Response 17.

- See Response 14.

Comment 18. The Erosion and Sediment Control Plan includes an additional fifty (50) foot wide NPDES Permit Boundary on EACH side of the proposed work area, creating a one hundred and fifty (150) foot wide NPDES corridor. This request for an extended one hundred and fifty (150) foot wide NPDES 'footprint' is UNACCEPTABLE, potentially allowing a massive Interstate-wide clearing, DESPITE the delineated fifty (50) foot wide "Limit of Disturbance" WITHIN that NPDES Permit Boundary. The NPDES Permit Boundary should match the Limit of Disturbance boundary, which is also the historical township road right-of-way width. Any modifications to the project limit of disturbance would be coordinated with the Tioga County Conservation District and PADEP for approval.

Response 18.

- Any work outside the delineated Limit of Disturbance (LOD) would require an additional review and approval by DEP.

Comment 19. There are no delineated "Proposed Woods" lines, "Proposed Clearing" lines, or accompanying acreage impacts, but only the so-called "Limit of Disturbance" lines. Even though the Erosion and Sediment Control Plan legend includes a map-indicator-line for the (existing) Woods Line, these are not delineated on any of the TSF Sheets (sheets 20-25 and 28-36), nor are there any notations of the acreage of clearing or the acreage of over-story removal. This lack of delineation is a very serious shortcoming in the plan, as any loss of over-story would have significant if not devastating negative impacts both ecologically and recreationally, if all vegetation,

including all over-story, was removed only from WITHIN the fifty (50) foot wide Limit of Disturbance corridor, that would be a substantial loss of approximately ten (10) acres of vegetation and shading from State Forest lands, to the detriment of the HQ/CWF stream which this area both feeds and protects:

Response 19:

- **Woods Line are provided in various documents. Existing and proposed land coverage was specifically addressed in the PCSM Plan.**
- **Riparian planting proposal is a net increase in the forested riparian cover post-construction as compared to pre-construction.**

Comment 20. There is a currently approved route, partly on Seneca-leased lands in the western end of Tioga State Forest Tract #007. Pine Creek Headwaters Protection Group asks that our Commonwealth restrict Seneca traffic [and the accompanying damage to Tioga State Forest] to the previously approved heavy truck routes.

Response 20.

Thank you for your comment.

Should you have any questions regarding the responses, please contact me at (570) 321-6581 and refer to Application No. PAD0006, Authorization No. 1273893, to discuss your concerns.

Sincerely,

Steve Putt

Environmental Program Manager
Waterways and Wetlands Program
PA Department of Environmental Protection

The Trillion-gallon Problem

Shanti Menon

Editor's Note—rather than rewriting the following germane article on the subject of waste water from hydraulic fracturing and our environment, we present it here for your convenience, credits included.

The following brief article is reprinted from EDF (Environmental Defense Fund) Solutions, Vol. 50 No. 2, Spring 2019.

Across America, a flood of polluted wastewater from oil and gas operations is looking for places to go. EDF is figuring out how to treat and dispose of it safely.

Nichole Saunders, a law student in Tulsa, Oklahoma, was studying at her desk late one night in 2011 when the walls started shaking. A 5.7 earthquake — one of a series of unprecedented tremors resulting from oil and gas industry activity — was rocking the state. Saunders was unnerved. "Once we had tremors and a tornado warning at the same time. I didn't know if I was supposed to stay inside or run out." Scientists linked Oklahoma's sudden jump in earthquake activity to pressure from wastewater injected into underground disposal wells by the oil and gas industry. The state limited those injections, but the volume of wastewater has been rising rapidly nationwide. The industry now produces a trillion gallons of it every year — enough to fill more than a million Olympic swimming pools.

Saunders, who now works for EDF, found herself tackling wastewater problems from day one on the job. As disposal space grows costlier and more limited in parts of the West, the industry is casting about for new ways to handle this polluted stream of waste. This year, the EPA and water-stressed states such as New Mexico, Oklahoma and Texas could open the door to all kinds of wastewater disposal and reuse, including expanding the discharge of treated wastewater into rivers and streams and reusing treated wastewater on lawns, golf courses, ranches and farms. Some

The Trillion-gallon Problem [continued]

have even considered using it to replenish drinking water supplies. There's one mega-problem: nobody really knows what's in this water. Without an understanding of what's in wastewater or how to clean it, risky proposals to discharge or reuse it could threaten precious groundwater, crops, livestock and people's health across the parched American West. Saunders and other EDF experts are spearheading a broad movement to investigate wastewater and examine the risks before state and federal authorities open the spigots.

Science raises red flags

In hard-rock formations such as the Permian Basin, which straddles Texas and New Mexico, oil and gas companies extract petroleum by injecting billions of gallons of water mixed with chemicals into the rock at high pressure. The wastewater that comes out the other side can contain more than 1,000 chemicals, including cancer-causing arsenic and benzene. Some of these occur naturally underground, others are purely industrial. "The wastewater can be salty, thick, viscous and radioactive. Pretty gnarly stuff," says EDF scientist Cloelle Danforth. In the 1920s, wastewater released directly onto Texas soil created the Texon Scar, a patch of blighted earth visible from space. Cleanup of the scar is still ongoing today, nearly 100 years later.

The composition of wastewater varies from well to well. Samples are hard to get and difficult to analyze. Some of the chemicals used are industrial secrets. Three years ago, EDF convened a panel of researchers, industry experts and government officials to discuss the growing wastewater problem. This early intervention kicked off a spate of new research, and today EDF and more than a dozen academic partners are beginning to shed light on what's in the water, how toxic it might be and how various treatment technologies could perform. Danforth is helping to put together a database of all wastewater chemicals detected thus far. Of the 1,200 chemicals listed to date, most are not well studied, and some have not been evaluated at all.

This makes it difficult to determine when wastewater is clean enough to discharge and what impacts it might have on a farmer's fields, a rancher's cattle, fish in a river or drinking water.

Rushing to reuse

Even as the science begins to raise red flags, research is being outpaced by the rapid rise of water-intensive drilling in places like the Permian Basin. Some in the industry want to rush into wastewater reuse and discharge now, seeing a window of opportunity in today's industry-friendly EPA led by Andrew Wheeler. The safeguards that regulate wastewater discharge were created decades ago, when the industry discharged relatively little. This summer, the EPA will decide if it's time to reconsider the rules. "The current protections are already weak," says Saunders. "There's a risk the EPA could make them weaker."

For the moment, there's enough room to handle wastewater with disposal wells that are properly located, designed and monitored to avoid groundwater pollution and earthquakes. In the future, more water could be recycled on-site, and eventually, with a lot more science and strong state and federal safety standards, it could be treated and reused in ways that minimize environmental risks.

Not everyone is willing to wait. An entrepreneurial ex-rodeo clown in Wyoming claims he can treat wastewater for crop irrigation, and is gearing up for a state-authorized test on a wheat field. In the Permian Basin, organizations eager to explore wastewater treatment and reuse have sprung up like Texas wildflowers. A recent joint paper from the EPA and the state of New Mexico renames oil field wastewater as "renewable water." In this Wild West of water pushers, drought and environmental rollbacks, all options appear to be in play. But with so many unknowns, there's no way to be certain that treated is clean enough for these new purposes. EDF and partners are bringing science and accountability to the process, developing tests that could be used to help improve clean water standards and

perhaps create options for less risky reuse of wastewater in the future.

Saunders is bringing the latest research to the Groundwater Protection Council, a national organization of state agencies, where she's helping to author a defining report on wastewater. "There's a lot of enthusiasm to use wastewater," says Mike Paque, the head of the council. "We're on the front end of a long, dry period. And we're not making any more water. But we need to balance this enthusiasm by asking the right questions about what's in the wastewater and what we need to do to treat it. That's what EDF brings to the table." Saunders and her colleagues are knocking on doors all over oil and gas country, urging the industry, lawmakers and landowners to focus on recycling wastewater on-site and avoid riskier options until there's more information. As the rules governing wastewater open to change, Saunders hopes communities will consider how their property and families could be affected for decades to come. "We recognize there's a thirst for water," says Saunders. "But let's get the facts right. Let's be smart about this."



Photo: PA Grand Canyon in the winter