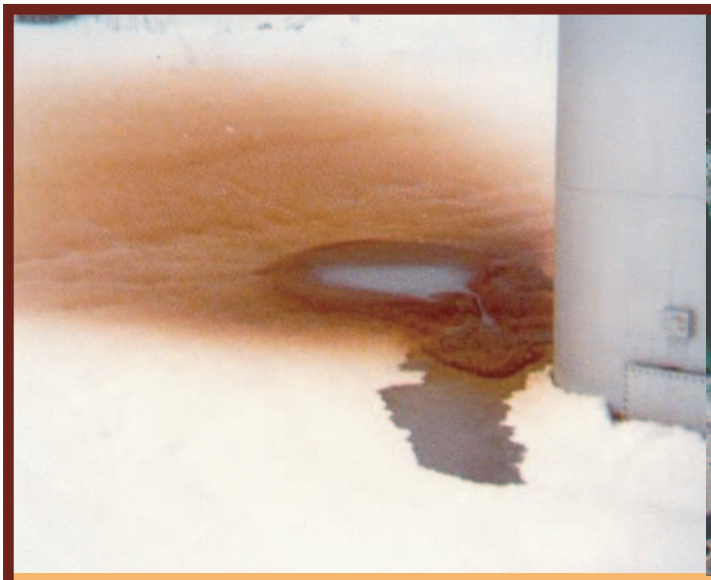

Drilling Our Conservation Heritage

The Future of Oil & Gas Drilling on Michigan's Public Lands

ENVIRONMENT MICHIGAN
RESEARCH & POLICY CENTER

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Executive Summary

From the western dunes to the northern forests, Michigan's natural landscapes provide us with unique beauty, recreation, and ecological value. Unfortunately, oil and gas drilling poses an increasing threat to these treasured lands. Leaks from drilling sites can leave soil and groundwater contaminated with hazardous waste, and new pipelines and roads for drilling sites can disrupt the places Michigan's wildlife call home. Already, hundreds of thousands of acres of state land are open to drilling and as oil and gas prices reach new heights, industry lobbyists are pressing Lansing decision-makers to open tens of thousands of new acres to exploration and production every year. Environment Michigan Research & Policy Center undertook the investigation and writing of this report to assess the state's ability to address this rising risk to Michigan's natural heritage and to recommend stronger policies, or implementation of existing policies, as needed.

Our research indicates that current policies and practices leave Michigan's state lands vulnerable to damage by oil and gas drilling:

1. Thousands of acres of state owned lands are leased for oil and gas development and at risk of pollution and habitat destruction.
2. There is little information available to the public and no ability for citizens to hold the oil and gas industry accountable for its track record on state lands, where spills and leaks can go unnoticed and unattended for years, tainting natural resources and endangering wildlife.
3. All available evidence strongly indicates that the state's environmental agency lacks the resources to monitor the 18,000 gas and oil wells operating in Michigan and the cleanup of all contaminated sites, much less any new drilling that might be proposed.
4. Policies, statutes and tools are readily available to afford increased protection to state lands from harmful oil and gas development.

The state must take action in order to protect Michigan's conservation heritage – its public lands -- from the harmful consequences of its flawed oil and gas regulatory structure.

1. The state must halt new leases for oil and gas development on state lands until ecologically sensitive natural areas have been identified and protected.

2. Michigan must utilize its existing state land protection authorities, such as the Department of Natural Resources' (DNR) oil and gas leasing policies, and the Wilderness and Natural Areas Act of 1972 to protect ecologically sensitive state lands from oil and gas development.

3. Oil and gas companies must be required to provide adequate financial support for the effective supervision of their activities.

4. Oversight of contaminated oil and gas site cleanups should be transferred from the Michigan Department of Environmental Quality's Office of Geological Survey (OGS) to its Remediation and Redevelopment Division (RRD), which has primary responsibility for overseeing environmental cleanup in the state.

5. Annual progress reports on the state's oil and gas program should be required regarding its adequacy at protecting state lands from harmful oil and gas development.

For all other sites, the Department of Environmental Quality and the Department of Natural Resources should:

- Provides full public reporting on all sites in state lands and on contaminated sites. This data should be provided in an accessible format – including a statewide map with identification of potentially impacted natural resources such as forests, waterways, and recreation areas.

- Hire additional staff to monitor and inspect all future state lands to be leased.

- Establish a public oversight committee or process that reflects protection of Michigan's natural resources as its primary mission and encompasses strict conflict of interest rules – no one with employment or contractual relations with any private entity with a pecuniary interest in leasing decisions may serve on the OGS public advisory entity.

Introduction

With 3.9 million acres of state forest and almost three million more of national forest, Michigan is home to the most extensive public forest system east of the Mississippi River. Our state lands and large bodies of freshwater provide incomparable recreational opportunities, forming the backbone of Michigan's $12 billion dollar tourist economy.

These forests are home to legendary fishing and canoeing rivers: the Jordan, the Pigeon, the Au Sable, and the Two-Hearted (Fox) River, immortalized by famed author, Ernest Hemingway. These areas also provide prime hunting grounds and habitat for a wide variety of plants and wildlife, while the trees filter pollutants and help sequester the carbon emissions that contribute to climate change. Michiganders have long appreciated the state's natural beauty, knowing that these natural assets help to define Michigan's culture and long-standing heritage.

These irreplaceable forests, waterways and natural habitats face a critical turning point, at which lawmakers should be providing more protection, rather than less. This is not being done. Further, oil and gas companies continue to pursue drilling projects in and around some of the most ecologically sensitive areas in Michigan. The message to the public and our elected officials is clear: the scope of the drilling threat in Michigan is vast. Approximately 870,000 acres of state lands are currently leased for oil and gas development, according to DNR officials. Already in 2007, 18,000 new acres of state lands were leased for oil and gas development. In addition, 65,000 acres of state lands were made available in a second lease auction scheduled in early November. With rising oil and gas prices, the industry will, in all likelihood, seek to expand drilling in Michigan's natural landscapes even further.

I. Oil and Gas Extraction Threatens Michigan's Environment

Oil and gas extraction poses two types of risks to the natural resources around it – pollution and wildlife habitat disruption.

<u>Pollution</u>

A number of hazardous, toxic and carcinogenic substances can be present at oil and gas drilling and production sites, in addition to the primary contaminant at contaminated oil and gas sites, BTEX, an acronym for benzene, toluene, ethylbenzene and xylenes, a group of chemicals found

in petroleum. The focus of many remediation or cleanup efforts at oil and gas sites of contamination is on reducing or eliminating BTEX.

Benzene is a known human carcinogen and can cause blood disorders; other BTEX chemicals, such as toluene, affect the human central nervous and respiratory systems.[1] Animal studies have shown low birth weights, delayed bone formation, and bone marrow damage when pregnant animals breathed benzene.[2] Spills or leaks from wells and storage tanks or pipelines at oil and gas sites can result in contamination from BTEX which can evaporate, dissolve, attach to soil particles or degrade biologically. Soil and groundwater contamination can also occur from pipeline leaks or breaks, leakage or improper disposal of hazardous substances used during drilling, wastes from production facilities and improper disposal of drilling muds, pit sludges and contaminated bottoms from storage tanks, and hazardous materials associated with pipelines and equipment. For example,

- Nearly one foot of condensate (liquid hydrocarbons) containing high concentrations of BTEX was discovered in groundwater at the State Blue Lake 1-4 site on state-owned recreational lands site in 1992.
- The State Cleon 1-19 site, in 1993 was documented to have a plume of groundwater contamination 360 feet long and 80 feet wide.
- The State Bagley 4-25 site was found to have benzene concentrations in the groundwater of over 1,000 ppb (the maximum amount allowed in drinking water by the U.S. Environmental Protection Agency is 5 ppb).

Moreover, BTEX constituents can be difficult to clean up once they are released from drilling operations. Environment Michigan Research and Policy Center identified numerous sites, further detailed in this report, where BTEX has contaminated sites for decades.

In addition to concerns relating to soil and groundwater contamination, spills of crude oil can harm wildlife. While crude oil (unrefined petroleum) tends to be less toxic than refined products such as gasoline, it is more likely to persist or remain in the environment. This can be a concern if wildlife comes into contact with crude oil, which can foul the plumage of birds, or harm their reproductive capabilities, if they ingest oil. Oil that contaminates lake bottoms can be harmful to fish that live on

[1] Centers for Disease Control and Prevention (CDC)
[2] Centers for Disease Control and Prevention (CDC)

the bottom of the lake, as well as fish eggs and larvae, which are especially sensitive to oil.[3] Oil spills have also been shown to affect plant growth.[4] For example: a plume of BTEX in the groundwater from the Merit Energy central processing facility in Otsego County has already contaminated two residential water supply wells and continues moving further into a residential area and toward the headwaters of the Manistee River, endangering aquatic organisms in the river.[5]

Brine is extracted with oil and gas and can also be a significant contaminant concern. Brine can kill off vegetation, and create widespread contamination plumes, if unchecked, that can eventually damage streams, lakes or nearby drinking water supplies. In addition to salts (e.g., sodium chloride) brine contains constituents such as arsenic, lithium, and strontium in concentrations substantially above acceptable drinking water criteria.[6]

Disruption of Wildlife and Habitat

Inadequately monitored oil and gas development on state lands could cause considerable disruption of plant and wildlife species and their habitat, especially if there is little existing infrastructure in an area where new wells and production facilities would be permitted, requiring the construction of new roads and pipeline networks. A major concern with new infrastructure for oil and gas production in state lands is that the landscape, split by roads and corridors for pipelines, will become fragmented, altering plant and wildlife habitat, creating competition for habitat, and possibly causing some species to die out. New roads and pipeline corridors allow easier access to state lands, which can lead to increased hunting and poaching. Oil and gas development can put more animals at risk of being hit by cars and recreation vehicles, especially since oil and gas operations require frequent visits to wells and facilities, which creates an almost daily disruption. The noise and presence of machines may also cause wildlife to avoid areas where there is oil and gas development. Noise from oil and gas development can come from a number of sources: truck traffic, drilling activities, well pumps and compressors. Noise may affect wildlife in a variety of different ways. It

[3] STRONGER Report, 2003
[4] Personal Communication with DNR Mineral Programs personnel
5 Personal Communication with Dave Smethurst, Pigeon River County Advisory Council
6 http://www.midnr.com/Publications/pdfs/InsideDNR/publications/DNRPolProc/27.23.14.htm

can cause the temporary or permanent displacement of animals and birds from particular areas and it may even have an effect on wildlife population behavior.

Oil and gas development in close proximity to wetlands can cause alterations to their vegetation or hydrology. Clearing the land for oil and gas development compacts soils, causing erosion and surface runoff. Trees and vegetation may be removed for the construction of roads. Construction of well sites and production facilities can cause erosion, increasing the sedimentation of streams and covering spawning beds and other habitat important to fish and aquatic organisms as well as introducing pollutants, such as nutrients, chemicals, and bacteria into waterways. Cloudy or turbid streams threaten the health and survival of fish.

Specific problems have already been documented in northern Michigan. A 1993 assessment of oil and gas activities in Otsego County by the Northern Michigan Council of Governments (NEMCOG), found that drilling had made a significant impact on the area's natural resources, noting that: well sites were in need of restoration, erosion was noted at pipeline installation corridors and access roads. Wells and roads created new pathways for pollution runoff, oil and gas sites were located in forests, wetlands, near water resources and recreational lands, as well as production facilities that were located in forestlands, adding to roads and traffic. Much of the oil and gas development occurred in the headwaters of high quality trout streams, such as the Pigeon, Black and Au Sable Rivers, and gas wells and pipelines were permitted in the city of Gaylord's wellhead protection areas, putting the city's water supply recharge areas at risk from groundwater pollution.

John Richter, president of the Friends of the Jordan River Watershed, notes that in the past several years, members of his group have documented a number of instances of severe erosion and destruction of habitat from oil and gas drilling in northern Michigan. Richter reports that his group pressed OGS staff to require restoration of one oil and gas production site that was severely eroded, and acknowledged there may be more problems, because many well and production sites are "off the beaten track," and because of that, erosion and habitat destruction problems may not always be addressed properly.

There is a strong potential for problems, such as erosion and runoff, and habitat destruction, to occur on state lands if oil and gas development is not monitored stringently. Unfortunately, as described in the following

section, the OGS does not have the capability to provide that level of oversight.

II. Inadequacies of the State's Oil and Gas Program

Information management impedes accountability

State lands leased for oil and gas development: It is difficult to determine the extent of oil and gas development on state lands because of the scale and amount of information on the DNR's statewide mineral lease map, especially since hard copies of the map are not available from DNR. Interpreting lease catalogues, with lands listed by legal description, requires the use of county plat mats, making identification of specific lands a time consuming process for members of the public.

While the DNR's policy for restricting oil and gas leases on state lands encompasses many sensitive areas, the lease auction review period is brief and likely to be only cursory, according to Richter, of the Friends of the Jordan River Watershed. He says, "Due to the drastic downsizing of state government, the departments or agencies that may participate in such reviews lack the ability to provide effective oversight." Dave Smethurst, a charter member of the Pigeon River County Advisory Council who has been involved in monitoring oil and gas operations since the early 1970s, says, "Comprehensive assessments needed to protect sensitive natural areas from harmful oil and gas drilling activities are not conducted."

Contaminated sites: The primary legislative authority for Michigan's pollution cleanup program is Part 201, Environmental Remediation, and Part 213, Leaking Underground Storage Tanks, of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended. The state's environmental cleanup program originated in 1990 with enactment of the state's "Polluter Pay" law, which was amended in 1995 to become Part 201. The Remediation and Redevelopment Division (RRD) of the Michigan Department of Environmental Quality (DEQ) oversees the majority of contaminated site cleanups in Michigan. The Office of Geological Survey (OGS) oversees cleanup of contamination at oil and gas sites. The procedure for addressing contamination problems by the Office of Geological Survey, such as when a leak or spill is found, is for staff housed at the district offices to instruct the company to remove visibly stained soils and take samples of soils to verify that the contamination has been removed. If the samples show pollution at levels below Part 201 cleanup criteria, the cleanup is deemed satisfactory. If samples are above the criteria, the OGS can request a cleanup plan under the oil and gas law

(Part 615). The OGS can also assess the site or "score" it for placement on the state's Part 201 list and require a cleanup plan. The OGS does not have a procedure for determining whether sites are addressed by Part 615 or Part 201 and makes decisions on a case-by-case basis, with variability between the district offices of the OGS.

The Office of Geological Survey discontinued maintenance of a statewide database of all contaminated oil and gas sites in the mid 1990s. It does, however, utilize an electronic database, termed MIR, at http://ww2.deq.state.mi.us/mir/ for logging data and events, such as field inspections and compliance activities. Although a query of the official state list of contaminated sites, the Part 201 online database (http://www.deq.state.mi.us/part201ss/), results in a list of 175 oil and gas contaminated sites, OGS has reported the existence of about 500 to 1500 contaminated sites[7] and also recently created another list, with approximately 700 contaminated oil and gas sites, further complicating the question as to the exact number of contaminated oil and gas sites in the state. This new list is said by OGS to include "most of the sites of environmental contamination that have been identified by OGS since approximately 1986."

Not only is there confusion regarding the number of contaminated sites, locating information on specific sites is time consuming and not always successful. Descriptive summaries of Part 201 sites cleaned up with public funds are no longer maintained. There is no consistent file management system and no central location for files: some are housed in Lansing headquarters and others are located throughout the state in district offices. There is also no consistent type of information in permit files. Some files contain background documents and current information. Other files contain only outdated reports, with no reference to the location of additional information.[8]

Those who wish to gain a statewide perspective of the impact of oil and gas development are left to review thousands of individual permit files. Knowledgeable owners of property with oil and gas sites or individuals or groups who live in close proximity to oil and gas sites may find it relatively uncomplicated to investigate specific permit files of interest. Citizens attempting to gain an understanding of the overall track record of the industry, however, will have difficulty given the state's poorly kept,

[7] Correspondence with OGS Personnel
[8] *The Case Against Oil and Gas Drilling: Michigan Fails to Clean Up Oil and Gas Pollution*, Alliance for the Great Lakes, 2003 (www.greatlakes.org)

incomplete records. Information simply is not available for ensuring accountability of the state's oil and gas program activities.

Lax supervision of oil and gas pollution cleanups

Critics charge that there is too much subjectivity on the part of OGS staff as to what they require of a company that has a leak or spill – how much soil should be removed, how much investigation to undertake, and whether or not groundwater should be studied for contamination. Smethurst, of the Pigeon River County Advisory Council, is concerned that too little is known about the extent of BTEX contamination, noting, "There have been 'tons of BTEX' spilled out into the environment since the beginning of oil and gas drilling in Michigan. Unfortunately, we don't know how big or little the problems are and whether contamination is continuing or has dissipated. We just don't know."

Kevin Sagasser, an environmental consultant in Gaylord, says there are significant differences in how the Office of Geological Survey handles cleanups versus the Remediation and Redevelopment Division (RRD). He says, "Under RRD oversight, investigation of releases requires assessment of all potential exposure pathways such as impacts threatening groundwater and the connections between groundwater and surface water, termed the groundwater-surface water interface or GSI. By contrast, the OGS established cleanup protocol specifically ignores relevant exposure pathways, such as GSI. In addition, the OGS focuses solely on assessment of soil impacts, often without determining whether groundwater impact exists. This approach would be unacceptable under supervision of the RRD." This is consistent with the findings of an earlier analysis of cleanup of contaminated oil and gas sites by the Lake Michigan Federation (now the Alliance for the Great Lakes), that concluded, "One of the most disturbing findings is that information on the extent of pollution at most of the sites has been limited to visual examinations or limited sampling of soil and groundwater. There have been few comprehensive studies of pollution at the sites to completely define the extent of soil, groundwater, and potential surface water contamination."

Furthermore, Sagasser notes, "For cleanups conducted under the state's oil and gas law, Part 615, if the company has a leak or spill, it does not need to verify amounts by sampling or testing, if they "estimate" that the volume of the spill is less than 42 gallons. No actual basis or support documentation is required in support of the "estimated" volume released and no actual tracking is done to support such losses, especially in regard to brine releases." Sagasser is concerned that this loophole makes it more

convenient for oil and gas companies to estimates spills to be less than 42 gallons. Sagasser says small leaks can add up to large spills, noting that, "A tiny leak of a tenth of a gallon per minute is only 6 gallons per hour, yet results in 52,560 gallons if undetected for a year." Finally, Sagasser observes that since there is no requirement to notify property owners of leaks or spills from oil and gas facilities, the public must rely entirely on the OGS to address these problems adequately.

In addition, OGS appears willing to approve harmful discharges from pollution cleanups, rather than demanding investigation of less ecologically damaging cleanup methods. For example, the agency allowed Merit Energy to discharge wastes from a contaminated site cleanup into Kolke Creek, a tributary of the Au Sable River. Siding with the oil and gas industry is common practice, according to Rusty Gates, president of the Anglers of the Au Sable, who observes, ""We shouldn't have to go to court to prove that reasonable and prudent alternatives exist to this discharge. There are enough chlorides in this discharge to turn this pristine headwaters ecosystem into dying salt flats."

Overall, there appears to be lax oversight of oil and gas operations, as well as considerable subjectivity associated with cleanups of contamination from oil and gas sites, both creating the potential for significant problems.

Oversight of oil and gas facilities – an impossible task?

Over 56,000 oil and gas wells have been drilled in the state (view a pictorial history at: http://www.michigan.gov/deq/0,1607,7-135-3311_4111_4231-146189--,00.html). There are approximately 18,000 active oil and gas sites, according to OGS officials. OGS staff assert there are requirements for how often sites are inspected and policies and procedures in place that specify the number of inspections for wells and facilities. They say that sites with a higher degree of environmental risk and facilities with complaint records are inspected more frequently; sites with no history of problems are inspected less often.

According to the OGS, its staff conducted 25,002 inspections in 2006 and to date in 2007, has carried out 14,162 inspections. This number of inspections does not seem achievable for a 65-staff office with other program area responsibilities. For 2006, for example, it would mean that an average of 68 inspections of oil and gas sites took place every single day, effectively raising questions as to the quality and length of inspections. Smethurst, of the Pigeon River Advisory Council, believes this is one of the biggest problems of the state's oil and gas program. He

says, "OGS field staff want to do a good job, but there are simply not enough people to do the work, especially in northern Michigan where drilling is most currently active and nine staff oversees thousands of wells and productions facilities." Further, according to Smethurst, the oil and gas industry can afford to pay increased fees to fully fund oversight of the state's oil and gas program, noting "If oil is at $88 per barrel and they (the well operator) pump "only" 200 days per year (a conservative estimate) and the well flows at 300 barrels per day (bpd), that's $5,280,000."

The workload of OGS raises valid questions as to how staff can effectively oversee the daily activities of the oil and gas program associated with the 18,000 active sites, oversee cleanups at hundreds of contaminated sites, and ensure adequate protection for the hundreds of thousands of acres of state lands from the harmful impacts of oil and gas development. By any measure, this appears to be an impossible task.

III. Case Studies

Unfortunately, there is limited information available to the public on contaminated oil and gas sites on state lands. A query of the official Part 201 online list brings up 11 oil and gas sites on state lands. The most recent list of contaminated oil and gas sites, however, includes approximately 60 sites on state lands (the new list was provided to Environment Michigan Research and Policy Center as this report was finalized, so specific review of sites on the list was not possible). Since there are 870,000 acres of state land leased for oil and gas development, it is likely there are considerably more contaminated sites than what has been officially identified. Many state lands are isolated and there is a low probability that pollution will be observed and addressed. Further, contaminated sites on state lands may be more likely to be addressed on a voluntary basis, without the pressure often exerted by private property owners for stringent investigations or cleanups. Because of the exceptional difficulty in locating adequate information, this report also highlights contaminated oil and gas sites on private lands, where property owners or local residents have called attention to pollution issues.

Environment Michigan Research & Policy Center's review of approximately 25 files of contaminated oil and gas (including all of the state oil and gas sites on the official Part 201 list) sites found a pattern of exceptionally slow response by the OGS from the documentation of contamination at sites to the initiation of studies or remedial actions, and

identified a number of sites where cleanups were insufficient. The following case studies highlight the most common problems.

Sites on state lands:

Contaminated well site on state forestlands deemed too remote to clean up. Efforts at addressing soil and groundwater contamination at the State B-1 well in Roscommon County in state forestlands demonstrates how oil and gas contamination may be addressed on state lands. Soils contaminated with crude oils were found above and below the water table, and the groundwater was contaminated. OGS staff explains in their report that because groundwater supplies would not be used for drinking, and a pond was 1,000 feet away from the site, contamination levels above state cleanup criteria would be "less than significant." Because of the remoteness of the site, it appears that no further cleanup will be performed, beyond an experimental soil cleanup project that already failed (contaminated soils still visible).

No groundwater studies at Kalkaska County state-owned recreational lands. Nearly one foot of condensate (liquid hydrocarbons) containing high concentrations of BTEX was discovered in groundwater at the State Blue Lake 1-4 site on state-owned recreational lands site in 1992. The condensate was removed, but no further investigation has been performed to determine the extent of groundwater contamination.

Questions remain regarding the status of several state owned sites. The Abshire State Cleon site of contamination, located in Manistee County, was found to have oil on the water table; contamination of soils at the site was determined to be too deep to remove. The company installed a groundwater treatment system and operated a soil cleanup process during the early 1990s. The most recent document in the file is a 1996 letter from the OGS to the site owner, which references a monitoring well that shows groundwater contamination at levels above the state's criteria and orders the company to continue its monitoring, while beginning the process of removing the site from the list of contaminated sites. Nothing more current than the 1996 letter is available in the file.

There are similar questions regarding the State Cleon 1-19 site, also in Manistee County, which in 1993 was documented to have a plume of groundwater contamination 360 feet long and 80 feet wide. In 1997, the state requested the ability to conclude cleanup activities. The OGS noted there were still low levels of benzene and xylene in the groundwater, but that the company could get closure of the site by requesting a deed

restriction on the use of the groundwater from the property owner, the State of Michigan. There is no more recent information on the status of this site in the file.

The State Bagley 4-25 site in Otsego County was found to have crude oil on the water table, soil contamination, and benzene concentrations in the groundwater of over 1,000 ppb (the maximum amount allowed in drinking water by the U.S. Environmental Protection Agency is 5 ppb). The most recent information in the file from the owner of the site requests approval from OGS to close the site, citing their analysis that showed the site was similar to their other sites, and that they likely did not contaminate the site. The state ordered the company to continue monitoring. There are no more current documents in the file on the site's status.

Contamination remains after cleanup of two state-owned sites in Wexford County. Two contaminated sites in Wexford County, the State Wexford 1-17A and the State Wexford 2-6, were cleaned up in the late 1990s, but continue to have levels of contamination above state criteria. The State 1-17A-site cleanup began in 1989, with a groundwater treatment, as well as a treatment process to clean the soils, soil vapor extraction. The systems worked intermittently, and were eventually shut down in 1999, when the cleanup was deemed a success. Afterward, however, benzene was found in a number of areas in the groundwater above state criteria, leading to a conclusion by the OGS that some contamination was still present below the water table. No further information on the site's status is contained in the file. The State Wexford 2-6 site, with contaminated soils and groundwater, had similar treatment systems. In 2001 the site was determined to be clean, but shortly afterward, contaminated soils were found and removed. A 2006 report indicates that contamination in the groundwater in some areas is still above state criteria; monitoring continues.

<u>Sites on private property:</u>

Expensive publicly funded cleanup botched at the Stony Lake Oilfield, in Oceana County. After a local township supervisor, Joel Mikkelsen, forced the state to investigate and pursue cleanup activities at this site, soils were "heat treated" to reduce contamination levels, but sediments at the bottom of a small lake were left contaminated and a large brine plume

was deemed "uneconomical" to remediate. In addition, a study requested by the OGS after completion of the two million dollar publicly funded cleanup, concluded that contaminated soils were backfilled over some treated soils on the site – fouling one of the state's most expensive oil and gas cleanup projects. OGS staff referred the site to the Office of Criminal Investigations, which declined to follow up on the botched cleanup. "No one is held accountable," says Mikkelsen, who plans to continue his fight to get the site cleaned up.

Neighbors of Laketon Oil Field in Muskegon County wait decades to get safe drinking water supplies. Decades of pollution have left the Greenridge subdivision in Muskegon County's Laketon Township, adjacent to the Laketon Oil Field, with groundwater contaminated with brine and unfit for drinking. When an agreement to address pollution at the oilfield that caused the groundwater contamination was reached between the state and the current owner, residents of the nearby subdivision were left without a promise to restore their drinking water. To make matters worse, open excavations and piles of potentially contaminated soils have been left unattended at the site since 1995.

Sporadic investigations leave site contaminated for decades. Problems at the Sindlinger #1 well site in Allegan County were discovered in 1988 and 1990 and some leaks were repaired in 1992. Contaminated soils, with levels of petroleum pollution at very high levels – 8,000,000 parts per billion (ppb), were removed nine years later, but no sampling was done to verify that all of the contamination had been removed. There is documented groundwater contamination (brine and petroleum), and the potential for impacts to wetlands near the site is also noted, but there has been no further investigation. The site was eventually scored for Part 201 in 2005, almost 20 years after problems were first documented.

Pollution on the Kuenzer family farm in Manistee County left despite objections. Progress at cleaning up pollution from wells and tanks at the Kuenzer farm, which was prompted by owner George Kuenzer, was sporadic and eventually failed. Subsequently, the oil and gas company and the OGS decided not to take any further cleanup actions, instead leaving pollution to dissipate over time. This could only be approved if the property owner, Kuenzer, would agree to a deed restriction on the use of the groundwater on his farm. Kuenzer did not agree and denied further access to the farm by the company and state officials.

Current and ongoing issues:

Spills from Merit Energy contaminate drinking water. Pollution problems at the Merit Energy central processing facility in Otsego County have resulted from numerous spills dating back to the early 1980s, when it was owned by Shell Oil and as recent as July 2007. A plume of BTEX in the groundwater has already contaminated two residential water supply wells and continues moving further into a residential area and toward the headwaters of the Manistee River. [9]

Spills in the Pigeon River Country cause groundwater contamination. A large contamination plume consisting of BTEX was discovered in 2006, and in 2007, a number of spills occurred in the forest. But, says Ken Glasser, chairman of the Pigeon River Country Oil and Gas Advisory Committee, says everyone said, "it won't happen here," in the Pigeon River Country, held up as a model for developing oil and gas reserves and protecting natural resources. [10]

Company ignores warning of corroded pipeline, resulting in a brine leak. Kevin Sagasser, an environmental consultant in Gaylord, describes problems that he and other private property owners have experienced with getting old/degraded/faulty equipment and leaks addressed. According to information on his web site at: http://www.sagasser-associates.com/429.html, Sagasser alerted an oil and gas company to corrosion of a pipeline, but the company did not address the problem and eventually a brine leak occurred. Sagasser is particularly concerned that oil and gas companies are not required to notify landowners of these types of problems. He stated, "Without having any knowledge of spills or leaks on their property, the rights of the owner are unjustly compromised and their health is very much jeopardized."

These case studies show a pattern of inadequate oversight, including flawed or ineffective cleanups, lack of follow up, extensive time periods between the documentation of contamination to investigations and cleanup attempts, as well as a tendency to ignore contamination problems, unless spurred to action by citizens. Most importantly, these case studies show how the OGS is failing to protect the state's natural resources.

[9] Personal Communication with Dave Smethurst, Pigeon River County Advisory Council
[10] Personal Communication with Ken Glasser, Pigeon River County Oil and Gas Advisory Committee

IV. The Promise of Michigan's Preservation Laws Have Yet to Be Fulfilled

Recognizing the problems inherent in oil and gas drilling, Michigan lawmakers have twice enacted statutes designed to protect the state's pristine areas from such extractive industries. Unfortunately, neither of these laws has been aggressively applied. The 1972 Wilderness and Natural Areas Act enables the DNR to permanently protect up to 450,000 acres of Michigan's public land. 40,808 acres of mountains, waterways and old growth forests were dedicated as the Porcupine Mountains Wilderness Area; the first acres to be permanently protected under the Act. To date, only seventeen areas have been formally dedicated under the legislative process set forth in the Wilderness and Natural Areas Act, totaling just over 48,081 acres. Moreover, as we've documented in our last report[11], another 45,469 acres of state lands, including portions of Tahquamenon Falls and Warren Dunes, have been nominated for similar protection, but the DNR has yet to render final decisions on their status. Fortunately, the DNR has taken the initiative to classify all of these nominated natural areas as "non-development", giving them the initial protection they deserve.

The State Land Reserve Act, enacted in 1998, activates a never-before-used section of the state Constitution that enables the Legislature to indefinitely set aside state lands from development. The law also emphasizes acquiring private in-holdings and gives the state "first right of refusal" when any private land within a Reserve's boundaries is offered for sale. In order to qualify to become a State Land Reserve, areas must consist of a minimum of 640 acres of state-owned land and contain a designated natural river, protected wetlands, critical sand dunes, or other significant natural features.[12] To date, no state lands have been designated with this Land Reserve protection. Richter, of the Friends of the Jordan River Watershed describes how his group attempted to obtain state land reserve designation for the Jordan River Management Area, shortly after the law was passed. Unfortunately, he says, "It was virtually impossible, because the rules were continually changed, raising the standard for the effort to an impossible standard."

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[11] Environment Michigan Research and Policy Center's, *Pure Michigan? Report: August 2006*
[12] MLUI, Great Lakes Bulletin News Service, December 1, 1999

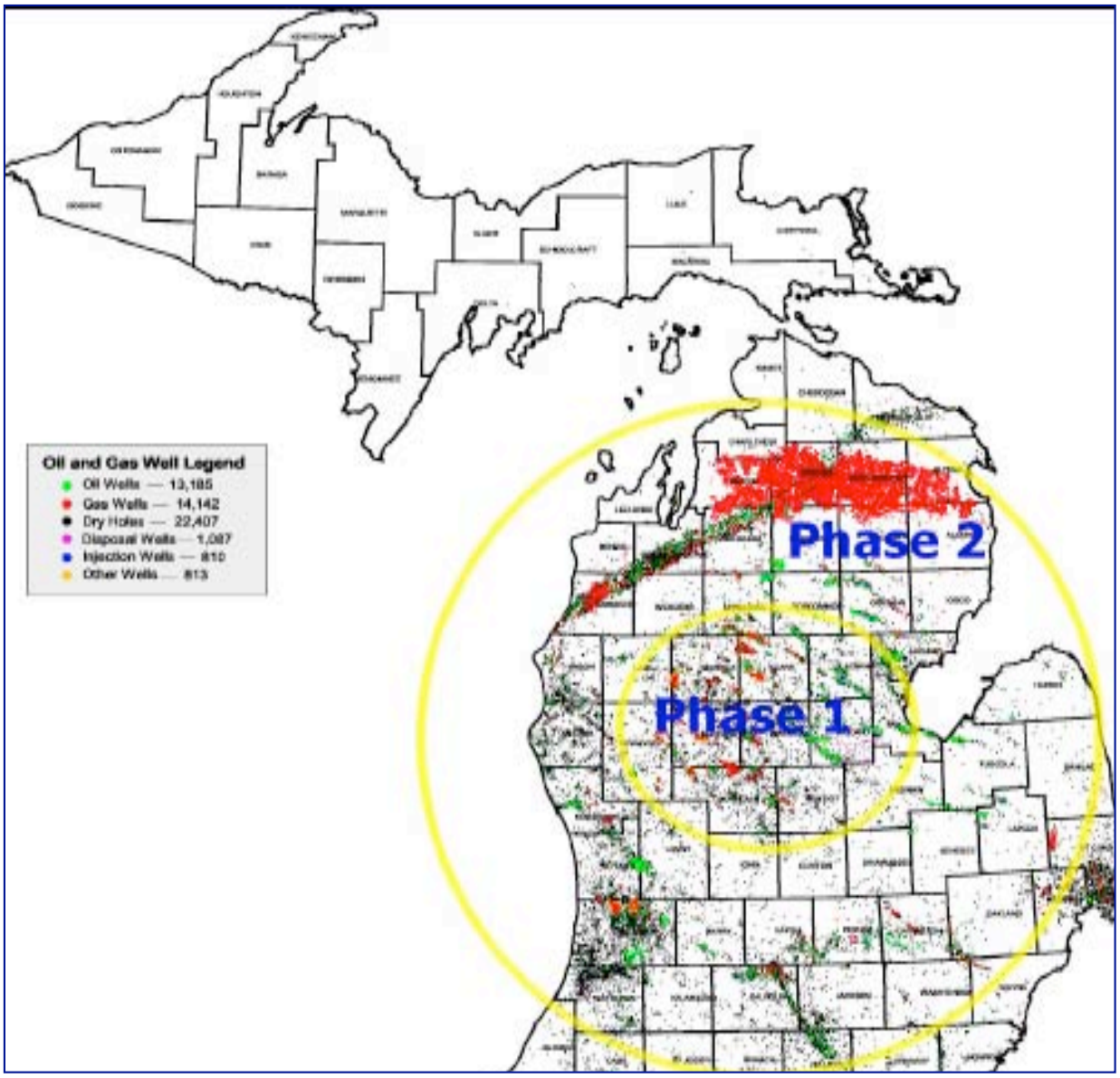
V. Looking Forward: Industry Demand for Drilling on the Rise

Exploration and drilling for oil in Michigan has occurred since the 1920s, with different focal points throughout the state over time depending on the interest of the industry in accessing different oil and/or gas formations. Drilling for oil was eventually superseded by more interest in natural gas in the 1980s, with a boom of natural gas development in the Antrim formation. The number of new oil and gas wells appears to be steadily increasing, with a sharp increase in 2005, according to the number of permits issued by the OGS, a new wave of interest which is evident from recent viewpoints expressed by oil and gas industry officials

The Morning Sun, a daily newspaper in Mt. Pleasant, highlighted renewed interest in local gas and oil, in its August 6, 2006 edition, quoting Dan McGuire, of T-Rex Resources of Mt. Pleasant, saying, "But rising oil prices are turning formerly marginal drilling sites into attractive prospects. There is lots of exploration work here in mid-Michigan. We will have several more drilled in the next several months in mid-Michigan. It's a combination of things. One is economics, the price of oil and gas going up spurs interest in these things that could be economically marginal."

A recent update on oil and gas in Michigan for 2007, published by the Petroleum Transfer Council, (www.ptc.org), also reports on renewed interest in former oil fields, noting that formations in central and southern Michigan are being revived with the use of 3-D seismic surveying to identify oil that had been overlooked in past years.

There are also companies that are proposing to revive former oilfields through "enhanced oil recovery" which involves injecting carbon dioxide into an oil formation, where the carbon dioxide mixes with the oil, enabling it to flow more easily and be accessed. The Great Lakes Energy Research Park, recently proposed for Alma, Michigan, has announced its intention to construct a plant that would "gasify" coal, burn the gas, provide steam for power generation, and inject carbon dioxide, along with the other emissions of the plant, into former oilfields in order to recover an estimated 1 billion barrels of oil in Michigan. The map below shows the areas throughout Michigan where the Great Lakes Energy Park project plans to use enhanced oil recovery technique – ultimately almost the entire state.



Map from www.mandmenergy.com

VI. Conclusions

This report demonstrates that Michigan's oil and gas program is in need of revamping, and that most likely, its problems are wide-ranging. Staffing is woefully inadequate to oversee the oil and gas industry. Fortunately, however, there are solutions. The oil and gas industry,

especially with oil prices at an all time high, has the ability to support proper oversight of its drilling. There are also readily available mechanisms for ensuring natural resource protection in conjunction with oil and gas development.

Protection of Michigan's valuable conservation heritage- its publicly owned lands- from the risk of new and expanded oil and gas drilling merits prompt and decisive attention by the state's leaders. Proactive measures must be taken now, before a rush to drill removes the window of opportunity for protecting our conservation heritage. Michigan owes those who worked to set aside valuable public lands, as well as current and future generations, an oil and gas program that puts protection of state natural resources above the desire for profit by the oil and gas industry. Several key protection mechanisms, such as a policy for restricting oil and gas development in sensitive public lands and the state land reserve designation, are already in place. The state's oil and gas programs must be fully supported by funds from the oil and gas industry and revamped to incorporate the capacity to be accountable to the public. Finally, state leaders, including the governor, must muster the political foresight and will to avert damage to one of Michigan's most important legacies – its conservation heritage.

Recommendations for Protection

A top priority is to halt new leases for oil and gas development on state lands until all 450,000 acres of ecologically sensitive areas that meet the Wilderness and Natural Areas Act criteria are proactively identified and protected from oil and gas development. Other protective mechanisms, such as state land reserve designations should be utilized as appropriate. Most importantly, the state's oil and gas program must be revamped to provide accountability to the public and legislature through increased funding, improved information management, reporting, and oversight mechanisms.

Ideally the state would first provide the strongest protection available to our ecologically sensitive areas and after that, restructure the oil and gas leasing program for improved accessibility and accountability by:

1. Halting new leases on public lands until the state has the ability to protect its sensitive natural areas.

Elected Officials: Should institute a moratorium on new leases for oil and gas exploration and production in public lands until the Michigan

Department of Natural Resources has updated and fully utilized its policy for restricting oil and gas development in state lands and has identified additional ecologically sensitive lands that should be protected.

At a minimum the state should fulfill the Wilderness and Natural Areas Act of 1972 by identifying all 450,000 acres of Michigan land to be designated and implement these policies to:

2. Provide protections to critical state lands.

Michigan Department of Natural Resources: Update and fully utilize its existing authority to restrict oil and gas development on ecologically sensitive state lands and ensure appropriate use of the state's statute that allows for the designation of "land reserves," state lands off limits to oil and gas development.

In order to successfully protect our critical areas, the state would need to implement a reorganizing policy that would:

3. Improve public accountability.

Elected Officials: Should require the Michigan Department of Environmental Quality to be accountable to the public by developing and maintaining a statewide map of contaminated oil and gas sites, and require the Michigan Department of Natural Resources to maintain an accessible statewide map of existing mineral leases, as well as creating a consistent information management system, so that information can be efficiently accessed and utilized by both staff and the public.

Michigan Department of Environmental Quality: Transfer the responsibility (and associated fees) for remediation of contaminated oil and gas sites from the Office of Geological Survey to the Remediation and Redevelopment Division.

Elected Officials: Should require the Office of Geological Survey to report annually to a governing body, such as the legislature, on the state's oil and gas program regarding its progress at protecting state lands, accountability to the public, and information management.