Vanishing Lake Michigan Sand Dunes:
Threats from Mining

"Those dunes are to the Midwest what the Grand Canyon
is to Arizona and the Yosemite to California.
They constitute a signature of time and eternity.
Once lost, the loss would be irrevocable."
—Carl Sandburg

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LAKE MICHIGAN FEDERATION

Chicago • Muskegon

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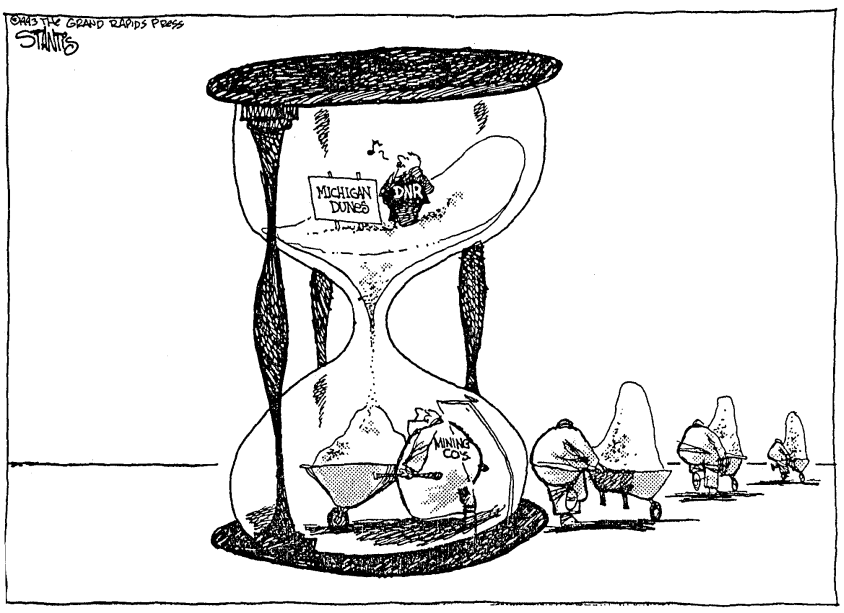

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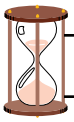


EXECUTIVE SUMMARY

Lake Michigan houses the largest concentration of freshwater sand dunes in the world. Despite this, the state with the highest number of dunes, Michigan, continues to lose dunes every day due to a heavily flawed state law.

This study is the first comprehensive and publicly-released report on the status of sand dune mining in Michigan since regulation began more than 20 years ago. It reveals that more dunes are threatened by mining now than even before Michigan passed the Sand Dune Protection and Management Act of 1976.

The sand dunes were created in the last ice age, over thousands of years, and cannot be replaced once they are gone. Particularly along Lake Michigan's eastern shoreline, unusually fine sand builds up in small mountains up to 300 feet in height. In some places a person can walk for miles through dunes before reaching the lakeshore. The dunes support plant and animal life that can't be found elsewhere, and were the birthplace for the field of ecology.

Sand dunes hold a special place in the hearts of Michigan residents and add significantly to quality of life in the area. In the 1970s, when the public realized that sand mining was responsible for the disappearance of 300-foot dunes that had once been important local landmarks, they called for legislation that would preserve the dunes. In 1989, after the law had failed to prevent mining in nearly 1,000 acres of the dunes that are highest and closest to the lake, a similar outcry led to further strengthening of the law. Since then, however, the public has been led to believe that the problem was solved.

Findings

1. ***The area permitted for mining has grown nearly 50 percent since the law was passed.*** In 1976, 15 active mining sites existed, totaling 3,228 acres. Currently 20 active sites exist, totaling 4,848 acres.

2. ***Dunes continue to disappear at a rapid rate, with a total of 46.5 million tons of sand extracted since the law was passed.*** While the amount of sand being mined has fallen slightly over the years due to a decline in market demand, the level of mining is still significant. 46.5 million tons of sand is equal to more than 2.3 million dump trucks, which would stretch for 11,449 miles, enough to circle Lake Michigan seven times.

3. ***Michigan sand dunes are being exported to provide jobs in other states.*** Foundries that make metal parts are the primary users of dune sand, and for years sand dune mining has been justified as a necessity to support Michigan's auto industry. Reports show, however, that 63 percent of the sand mined from Michigan is exported to foundries outside the state and that viable alternatives to dune sand do exist.

4. ***Precious sand dunes can be stripped away and sold for as little as $5 a ton.*** Information about the exact price of dune sand is difficult to come by because foundries consider that information proprietary. Anecdotal evidence, however, indicates that most dune sand is sold for just $5-10 a ton despite the fact that the dunes are an irreplaceable natural resource and contribute significantly to Michigan's tourist economy. The dunes draw more than one million visitors annually to the Sleeping Bear Dunes National Lakeshore and more than 500,000 visitors annually to P.J. Hoffmaster State Park in Muskegon County. In 1991, a study by the National Park Service calculated benefits from Sleeping Bear as nearly $39 million since the park's creation, and more than 1000 jobs were created.

5. ***The state is failing to adequately implement the law to protect the dunes.*** Under the law, the Michigan Department of Environmental Quality (DEQ), which is accountable for implementing the law and protecting the dunes, is obligated to deny or terminate permits for companies that do not comply with regulations. Although DEQ files show specific cases where the department felt that permit applications were not up to standards, only one permit has been denied since the law was passed — and that was because of public protest.

In at least one case, a permit was granted to a company that flagrantly disobeyed the law. In 1994, the Attorney General's office sued one company for continuing to mine in state park lands for almost a decade after its 30-year lease with the state had expired. Although the company had taken approximately 250,000 tons of sand illegally, which amounted to one million dollars, the DEQ granted the company a new permit.

6. ***Dunes will continue to be lost in the future, despite the law that was created to protect them.***
   a. In 1976, sand dune mining companies estimated that they had more than 250 million tons of recoverable reserves in their sites. To date, about one-fifth of that amount has been mined, so considerable dunes are still at risk.
   b. 12,000 additional acres of "critical dunes" are at risk because the state has refused to put them under protection. Critical dunes are those that support particularly unique plant communities or are the tallest and closest to the shore. Although it didn't ban mining in critical dunes, the 1989 amendment to the Michigan law gave special protection to those dunes by saying that only companies with existing permits could mine in these areas.

      Using the state's own criteria, Michigan State University has identified an additional 12,000 acres of critical dunes that the DEQ has refused to recognize. These dunes are in double jeopardy. Unless they are recognized by the state, new mining could begin in them tomorrow, or expansions of existing mining could occur. Up to one-third (5,000 acres) are at risk because they are located in areas or counties where significant mining is already occuring. Unless the law is changed, companies with nearby permits could legally expand mining activities into these dunes.

Recommendations

1. **Ban new mining and phase out existing mining** in the dunes.
2. **Improve DEQ oversight capability** until the phase-out is complete, and increase fees to cover oversight costs.
3. Until the phase-out period and ban, **the permit renewal process must be overhauled.** The state must require current information from the sand dune mining companies, develop and utilize an accountabe procedure for granting permits, and convene a state advisory committee to address compliance problems.
4. **Improve the process for public participation and establish concrete information on mining in the dunes.**
5. **Identify remaining dunes for protection** through conducting the study not completed as required by the 1976 Act.
6. **Improve reclamation efforts.**
7. **Acquire dunes for preservation,** through increasing funds available and making dunes acquisition a priority for existing funds.
8. **Local governments should improve dunes protection.**
9. **Corporations should phase out dune sand for industrial purposes.**
10. **A new era of citizen activism should begin.** Lake Michigan sand dunes are unique, irreplaceable natural assets, and the public needs to step up its outcry over their disappearance.

About the Study

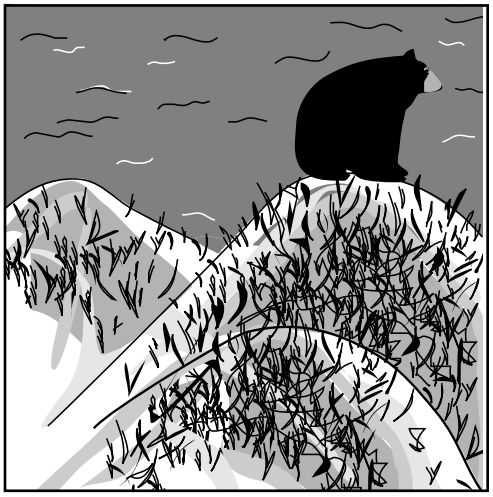
As part of a partnership with West Michigan Environmental Action Council (WMEAC) to develop a complete picture of the impact of sand mining on Michigan dunes, the Lake Michigan Federation:

- Reviewed a variety of previous industry, government, academic and other reports that focused on aspects of sand mining.
- Reviewed the files of all currently active mining sites.
- Conducted in-depth interviews with representatives of the Michigan DEQ.
- Conducted interviews with individuals and neighborhood groups who live near mining operations.
- Conducted an in-depth analysis of the Act governing mining, how the public can participate, what is required of mining companies, the role of Geological Survey Division staff, and what provisions in the Act could provide dune protection.

For more information about the Lake Michigan Federation, see the inside front cover.

INTRODUCTION

The dunes of Lake Michigan's shore have inspired legends for generations. The Native American ***Legend of Sleeping Bear Dunes*** *attempts to explain how those tremendous dunes came to be . . . the story of a mother bear and her two cubs who left Wisconsin to escape a raging fire and swam across Lake Michigan. Sadly, the two cubs didn't make it across to land on the other side. Their mother climbed to the top of the highest hill on the shore to wait for them, but they never came ashore. She fell asleep and the sand blew over her. A Great Spirit took pity on her and put the cubs where she could watch them. The cubs, the North and South Manitou Islands, are near their mother, Sleeping Bear, forever.*



From the Indiana Dunes and Lake Michigan's Illinois Beach State Park at the south end of Lake Michigan to the low dunes of Wilderness State Park at the northern end, and across the lake to Whitefish Dunes, Wisconsin on the western side—the dunes are a large part of the Lake Michigan region's cultural and natural heritage. Their beauty draws millions of visitors each year. Dune and beach-related tourism, especially in the dune-rich eastern shore in Michigan, benefits local economies. Thousands of families each year experience the joy and wonder of the largest assemblage of freshwater sand dunes on earth.

Despite their natural and economic values, some of these extraordinary dunes are steadily vanishing as sand mining continues. Once gone, these magnificent natural attractions cannot be recreated. The reason for their disappearance and recommendations to stem their loss is the subject of this report.

Lake Michigan's rare, internationally unique dunes were created over 10,000 years ago as the glaciers receded and the winds blew sands along the shore. The dunes took years to form and the circumstances that formed them will likely not happen again.

During the rise of the Industrial Age in the early 1900s, industry found Lake Michigan dunes to be an ideal source of high quality sand. When cars like the Ford Model T were being mass marketed, there was suddenly a great demand for the sand to be used in castings to make metal car parts. Foundries that made the parts found the sand in Lake Michigan's dunes ideal - accessible, cheap to transport, and no legal barriers to its removal. The dunes were not highly prized as landforms and habitat as they are today. Instead, they were seen as resources to be used.

The dunes were even seen by some as rough landscapes that, once gone, would leave the land more usable by people. Many of the areas mined were planned to be used for homes or for recreational areas. According to a 1972 anniversary publication by Nugent Sand Company in Muskegon County, Michigan, the company's dune mining would result in "a large, beautiful artificial lake, bordered to a great degree by single-family residences. Other areas are planned for apartments, townhouses, etc. *In all instances the end use of the property is a substantial improvement over the raw area prior to the mining."* (Emphasis added.) One mining company stated that if the dunes were to be left intact, instead of being mined, that their use would be "limited to hiking, nature trails and open space."

In the 1960s, citizens began to think that mining the dunes was not so much of an improvement, especially since massive barrier dunes (the tallest dunes closest to the shoreline) like Pigeon Hill in Muskegon were demolished. In response, the state of Michigan passed the Sand Dune Protection and Management Act in 1976. After the Act was passed, many people were convinced that the freshwater dunes were finally going to be protected. Because of this, during the 1980s and 1990s, environmental groups and agencies focused on the harm done to dunes from building in them. Little attention was given to the mining issue since many members of the public and

environmental groups believed the Act protected the dunes and that mining in the dunes was strictly limited and being phased out.

Decades after the passage of the original 1976 Act, it is clear that mining is still a major problem. Acre after acre of dunes is being lost to mining, dune dependent species are being put at risk, and the region's natural heritage squandered. The intent of this report is to put an end, at long last, to decades of dunes destruction. This document details the major threat to sand dunes from mining, and describes how the 1976 Act is not addressing those threats. Finally, recommendations to better protect the dunes are provided.

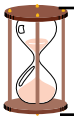
The following points are addressed by this report:

1. Ecological values and economics associated with the dunes
2. Major users of dune sand
3. Adequacy of the Act and its implementation
4. Case studies
5. Alternatives to using dune sand.

The following sources of research were used:

- In-depth interviews with the staff of Michigan Department of Environmental Quality's Geological Survey Division (DEQ);
- Reviews of mining site files, many of them with hundreds of documents, at the DEQ;
- Meetings and phone conversations with neighbors of mining operations;
- Reviews of information on the ecological significance of the dunes and a variety of industry, government, academic and other reports that relate to sand dune mining;
- Visits to the lakeshore dunes; and
- In-depth analysis of the Act governing mining, how the public can participate, what is required of mining companies, the role of DEQ staff, and what provisions in the Act provide protection for the dunes.

The people who live around, visit and love Lake Michigan have the right to expect that their dune protection laws work. This report is intended to make Lake Michigan dune protection a reality.



LAKE MICHIGAN DUNES ARE VITAL TO THE REGION

Ecological Values

Lake Michigan's shoreline contains the largest assemblage of freshwater dunes in the world. Part of the rich biological heritage of the Great Lakes, the dunes are one of the earth's natural wonders. The dunes are rare, internationally important landforms. Their uniqueness comes from their important plant and wildlife species. Most importantly, the dunes are significant because of their proximity to freshwater, and the variety of environmental settings and microclimates they support. According to The Nature Conservancy, "The sand dunes of the Great Lakes support more unique species and communities than any other part of the (Great Lakes) system." Not everything is known about these dunes yet, but valuable research continues to contribute to our knowledge of climate, animal and plant interrelationships, endangered species, exotic species and healing properties of plants.

Dunes evolve from barren sand at the water's edge to dune grass slopes of marram and sand reed, grasses that "catch" blowing sand and slowly build the dunes. Over time, shrubs such as red osier dogwood and sand cherry occupy the increasingly higher dune hills until trees take root. Eventually, the dunes evolve into a mature forest. This succession creates distinct dune zones—beach, foredune, trough, and backdune—that support specific plant and animal communities. An uncommon collection of plants and wildlife in an equally unique setting.

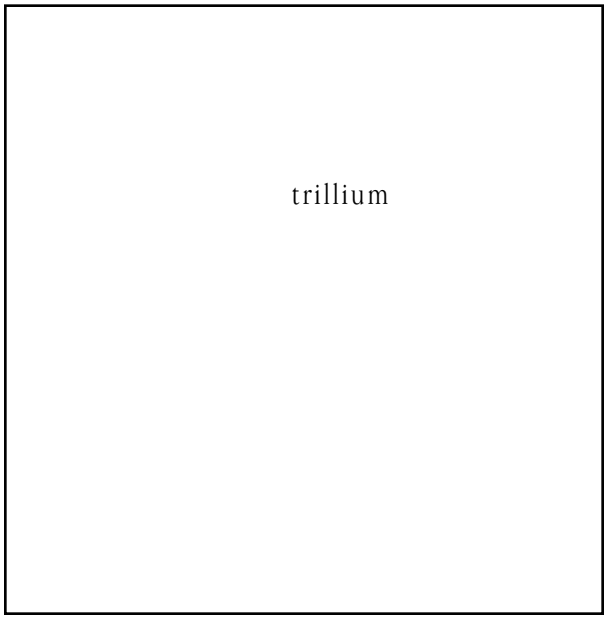
In the late 1800s, a young scientist, Dr. Henry Chandler Cowles of the University of Chicago, documented this unique pattern in his paper, "The Ecological Relationships of the Vegetations of the Sand Dunes of Lake Michigan." Biologists around the world were impressed and amazed with the

A

study's description of the order of the unique dune plant communities and how each established the foundation for the next stage. This young man's work formed the basis for a new science field - ecology.

Today, Lake Michigan dunes are home to many important plants and animals. Shoreline dune areas are home to the Piping Plover, a federally endangered bird species that relies on the shoreline for nesting. In 1996, only 23 known nesting pairs were present in Michigan. Threatened plant species of the dunes include: Houghton's Goldenrod, which is very rare and exists only along the northern shores of Lake Michigan and Huron, Pitcher's Thistle, and the Dwarf Lake Iris, which is Michigan's state wildflower.

Other special inhabitants of the dunes include: the Ram's Head Ladyslipper, White Trillium, Jack-in-the-Pulpit, Green-Headed Cone Flower, and orchids such as Dragon's Mouth, Pink Grass, and Yellow and Showy Lady's Slipper. Most importantly, the dunes are valuable, spectacular and biologically diverse landforms that reside within the extraordinary Great Lakes ecosystem setting. The dunes provide shelter for neighboring coastal marshes and the plants and animals that live in them, assist in providing a high quality of life for shoreline communities, and moderate winds and weather from the Lake. Dunes are irreplaceable. Once destroyed, they cannot be recreated by humans.



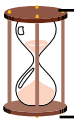
Economics

Not only do the freshwater dunes provide important habitat for plants and animals, they are a significant international attraction that plays a large role in maintaining the Lake Michigan region's tourism economy. During 1998, a little over a half a million people visited the lakeshore dunes park, P.J. Hoffmaster State Park, in Muskegon County.[1] Farther north, the magnificent Sleeping Bear Dunes National Lakeshore has attracted over a million visitors each year for the last five years.[2]

A 1991 study by the National Park Service calculated economic benefits resulting from Sleeping Bear Dunes National Lakeshore visitor expenditures. Total sales benefits from tourism since the park's creation were $38,910,000. Tax revenue benefits were $2,003.86 and over a thousand jobs were created. Results are similar for the Indiana Dunes National Lakeshore. Throughout the 1990s, annual visitation averaged almost 2 million each year. It is estimated that each visitor to the park spent $64 each day, producing a regional cash flow of about $128 million annually. It is clear that the magnificence of the dunes also contributes to local communities and the region's economy.

Population

The dunes shoreline is an increasingly attractive place to live. The U.S. Census Bureau estimates that population in Lake Michigan coastal counties in all four surrounding states has risen by 177,240 people between 1990 and 1997. This represents 11.5% of the total population increase in the four states that surround Lake Michigan in less than a decade and the trend is expected to continue. As more people are attracted to live near Lake Michigan, it will be increasingly important to protect the shoreline's unique quality of life and directly address the loss of dunes by mining.



THREATS TO SAND DUNES

Although many dune areas are now protected in state or federal parks, mining for sand in the dunes continues to take place around Lake Michigan, primarily in Michigan. Mining in dunes is not an issue in Illinois and Wisconsin since their small stretches of dunes are located in state parks. Although the Indiana Dunes National Lakeshore and Indiana Dunes State Park encompass about one-third of Indiana's shoreline, small-scale mining continues in some shoreline dunes. Indiana has no law regulating sand mining in the dunes; limited regulation occurs at the local level in the form of local ordinances.

Once sand dunes are gone, they cannot be created again.

Mining is not the only threat to the dunes, but this report addresses mining because it is the most destructive and irreversible activity occurring in the

Creeping Joe

by Bob Adams

Creeping Joe, Creeping Joe,
Where did you come from
Where did you go?

I came here from way inland
The logging rivers
Carried my sand
All the way down to Lake Michigan.
Upon the beach the waves rolled me
Winds blew me inland
and now you see
How Creeping Joe came to be.
Indians, Frenchmen, Englishmen, too
All came in big canoes
To hunt, fish, explore, and trade
Then paddle away
Old Joe watched them
in his time — in his day
Next to come were
Men with axe and saw
Mills were built
Trees cut down
And Old Joe, he
Just watched in awe.
By a railroad train
His tiny grains
Of Manistee sand
Scattered far and wide
Throughout the Land.

Creeping Joe, Creeping Joe
We know where you came from
But where did you go?

(from the Manistee County Historical Society)

dunes. Though the building of houses and other construction in dunes can damage and degrade them, it does not remove the entire dune landform and all that is encompassed in that landform, including plants, trees and wildlife. In addition, some dunes damaged from construction could eventually restore themselves over time if homes or other facilities are removed. When sand dunes are mined, however, entire natural systems are destroyed that can never be created again.

strip mining

Even the companies that mine the sand admit that the impacts are severe:

"This removal (of the sand) will eliminate the dunes themselves, essentially. . . . The dunes and the mature forest on them will be gone. They cannot be replaced."[3]

"The nature of the resulting environment will be different for hundreds of years."[4]

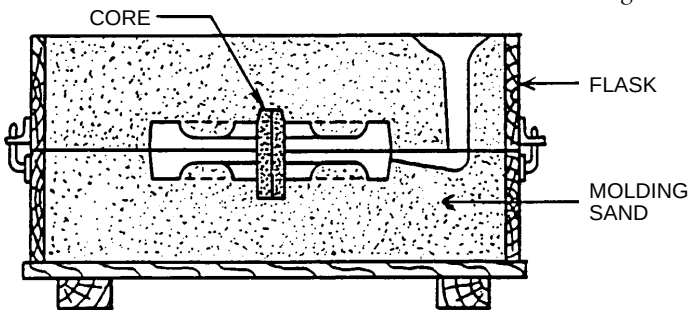
"Stripping and mining would destroy this forest on the site; this forest would require centuries to replace itself."[5]

Mining the dunes is not complicated. It is, however, permanently devastating to dune ecosystems. Forests are clear-cut. Bushes and grasses are pulled out. The sand is removed by bulldozers and trucks. Even sand below the ground is sometimes "sucked out" in a water/sand slurry and piped away. All the wildlife that once lived in the dunes leaves. What is left is nothing like the once towering dune systems. Former mining sites typically end up with small hills, flat areas and in some cases an artificial lake. Eventually grasses will grow, and maybe some cottonwood trees. The area might be developed into homes or condominiums. At several closed mining sites, the land has even been turned into golf courses and are now called Lost Dunes. Once mined, however, the spectacular dunes and their special habitats are gone forever, never to be recreated on earth again.

The major user of dune sand is foundries.

Foundries have used sand to produce metal castings the same way for centuries. Sand is a pliable

material, so a mold made with it can be easily detached from the part without damaging anything. The basic process involves pouring molten metal into a mold made of a sand and binder mixture. After pouring, the metal cools, the sand mold is broken up and the sand is removed from the solidified casting.



Cross Section of a Typical Mold

According to statistics provided by the United States Geological Service (USGS), silica sand is the major component of foundry molding and cores, glass, abrasive blast sand, and hydraulic fracturing sand. Industrial sand and gravel are also important in ceramics, in chemicals and fillers for rubber and plastics, on golf courses, as filter media, and in other uses.

Illinois has produced the greatest amount of silica sand since 1975. Other major producing states include: California, Michigan, New Jersey, Texas, and Wisconsin. The USGS report notes that demand for silica sand is affected mostly by the needs of the foundry and glass industries.

Much of Lake Michigan dune sand is composed primarily of silica. The sand is square, but wind action wears down the corners. The dune sand also has a high fusion temperature, 3,090 degrees Fahrenheit, and can maintain high thermal shock durability — a critical feature for high quality foundry sand. That means that the sand particle is durable when it is exposed to the high temperatures required in foundry processes. The general properties that determine the value of sand for foundry use are: 1) grain shape, 2) bonding ability, 3) refractoriness, 5) durability and 6) chemical composition.[6]

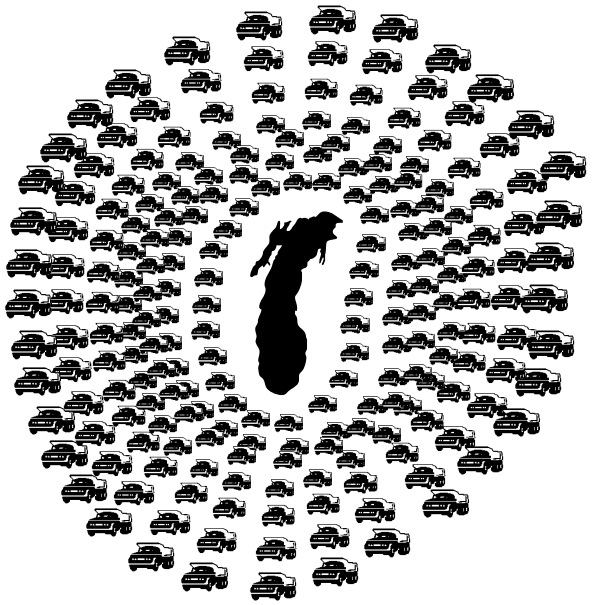
Ninety-five percent of sand mined from Lake Michigan dunes is used in foundries, and the remaining five percent is used for other commercial purposes, including glassmaking, concrete products, sandpaper and other abrasives, drywall, snow and ice control and for use in golf courses.[7]

Not all mining sites supply sand primarily to the foundry industry. According to conversations with DEQ, sand from three active permitted sites is used primarily for fill and mined to clear space for residential development.

Information on sand mined each year from specific dune locations in Michigan is generated on an annual basis, is confidential, and not available to the public. Annual totals for the amount of dune sand mined from the years 1978 through 1997 shows a relatively constant extraction of the sand, ranging from 1.5 million tons per year to over 3 million tons each year with an average of about 2.5 million tons each year. (Please see chart above.) Adding another 2.5 million for 1998, brings the total amount mined during this time period to 46.5 million tons. That is equal to 2,345,000 dump trucks laid end to end for 11,449 miles. That many trucks would ring Lake Michigan seven times.

PART 637 SAND DUNE MINING	
Production Year	**Total Tons Mined**
1978	1,447,217.00
1979	3,339,916.00
1980	2,250,865.00
1981	1,913,690.00
1982	1,561,431.00
1983	1,942,400.00
1984	2,502,660.80
1985	2,677,543.45
1986	2,079,696.25
1987	2,203,171.00
1988	2,326,843.00
1989	1,888,317.45
1990	1,861,794.50
1991	1,689,804.42
1992	1,902,224.85
1993	2,319,239.43
1994	2,520,242.55
1995	2,573,334.85
1996	2,552,437.90
1997	2,480,900.50
1998	2,500,000.00
TOTAL	46,533,729.95 *
*Estimated	

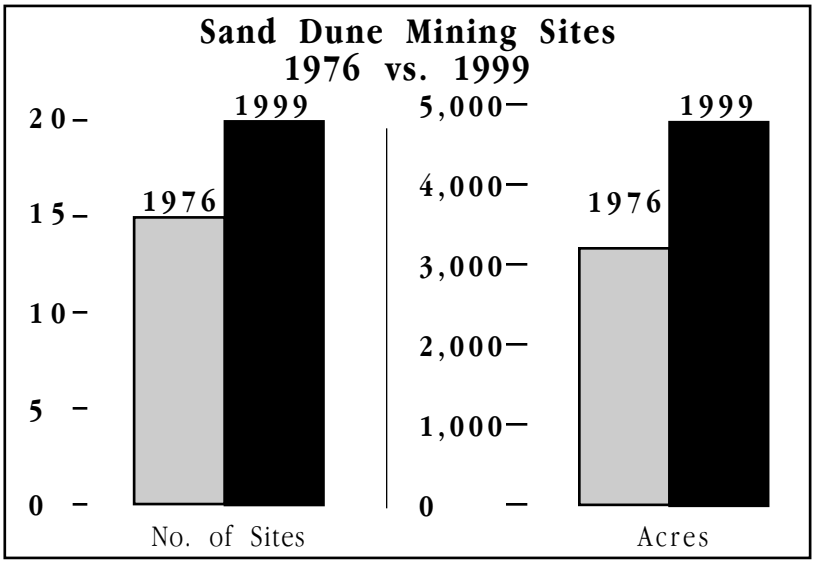
Source: DEQ files



MICHIGAN'S SAND DUNE PROTECTION AND MANAGEMENT ACT FAILS TO PROTECT LAKE MICHIGAN DUNES

This section describes the Act and assesses agency performance in implementing the Act. It concludes that **there are more mining sites now than in 1976 when the Sand Dune Protection and Management Act was passed.**

In 1976, there were 15 active mining sites, totaling 3,228 acres.



This information shows that mining of the lakeshore dunes continues on a large scale and if not discouraged, will continue for several more decades. To understand why the Act is not working, it is important to understand the Act.

In 1999, 20 sites have active permits, covering a total area of 4,848 acres. Depending on what status the closed sites are in, the acreage mined could be higher. For example, the Hart Packing Site is not included in that total though its 152 acres was mined and disturbed.

Permit renewals are a regular occurrence and routinely allow expansion into large areas of dunes. A review of the DEQ's sand dune mining operator data chart shows that the majority of companies have received five or more permit renewals. A number of the permit renewals. A number of the permits expire in 2000 and 2001, but many will likely be renewed becausing the mining companies hold huge parcels of dunes. Closed sites can also be reopened by the same or new mining companies and new mining sites can still be permitted in certain areas of the shoreline dunes. Closed sites in critical dune areas are not able to be reopened.

Figures from the DEQ show a relatively stable trend of about 2.5 million tons each year for most of the years since the 1976 Act. Since 1978 when the DEQ began tracking tonnage, 46.5 million tons of sand have been removed from these once impressive shoreline dunes. In 1978, mining companies identified 256,765,000 tons of recoverable sand reserves in the dunes. This represents about one-fifth of the sand that can be mined. It was thought that dune reserves would be depleted in 20 to 30 years, but there are still massive amounts of sand remaining at the sites to this day.

About the 1976 Act

Mining of sand in Michigan dunes has occurred since the early 1900s. It wasn't until 1976, however, that mining came under state regulation. It was already acknowledged that strict limitations had been placed on the use of coastal dunes in other states and other countries. In Michigan, however, the dunes were mostly under local control which was considered ineffective.[8]

Stimulated by public outcry over the mining of huge barrier dunes on the Lake Michigan shoreline, the State of Michigan passed Act 222, the Sand Dune Protection and Management Act.

Under the Act, sand dune mining came under the specific regulatory oversight of Michigan's Department of Natural Resources (DNR), now the Department of Environmental Quality (DEQ). With the reorganization of the State's environmental acts in 1994, the sand dune mining portions of Act 222 became Part 637 of Act 451. Part 637 is now known as the Sand Dune Mining Act. Although the original title of the Act was the Sand Dune Protection and Management Act, the major emphasis of the legislation was on managing mining, not on protecting the dunes.

The '76 Act required a comprehensive study and inventory of Great Lakes sand dunes in Michigan to include:

- An economic study of the current and projected sand dune mining practices in the state, showing where

the sand is marketed, its uses, and the amount of sand reserves.

- A geologic study of sand areas within the state, other than Great Lakes and dune areas, that would contain sufficient reserves and have properties suitable for use as foundry core and molding sands or for other uses of sand.
- Sand dune areas or portions of sand dune areas that, for environmental or other reasons, should be protected through purchase by the state or other persons or interests, or easements including the acquisition of mineral rights by the state, and a priority list of sand dune areas to be acquired by the department.
- An identification and designation of barrier dunes along the shoreline, showing their effect on aesthetic, environmental, economic, industrial, and agricultural interests in the state.
- Methods for recycling or reusing sand for industrial and commercial purposes, along with alternatives to the use of dune sand and its economic impact.
- Recommendations for the protection and management of sand dunes for uses other than sand mining.

Although the Act required the studies to assist the state in comprehensive dune planning, not all were completed, in particular, that which would detail the sand dune areas to be protected. Those studies that were finished were either ignored, such as several studies on possible sand substitutes for the foundries, or inconclusive, as the study on the economics of coastal dune mining. The DEQ's treatment of the studies points out how mining was to be continued rather than finding better ways to protect the lakeshore dunes.

Controversies over dune mining in the mid-1980s, prompted then Governor Blanchard to propose a ban on all mining of Lake Michigan dunes. As a compromise, the Act was amended in 1989 to restrict mining in certain dune areas (critical dunes), but no ban on sand mining in the dunes was enacted. Additional amendments were made to the Act after its original passage to change the length of permits from three to five years and to adjust the surveillance fee. None of these amendments changed the fact that the Act does nothing to discourage mining.

The sand dune mining program, housed in the Geological Survey Division (GSD), is located in Lansing with staff support from the Grand Rapids field office. The program is allotted three Full Time Employees (FTE), but in practice makes do with less because of budget and hiring limitations using on six-tenths of an FTE for field inspections.[9] The part of the Act that pertains to development, or building in the dunes, is administered by the MDEQ's Land and Water Management Division.

Not all sand mining is regulated in the dunes.

The areas regulated by the Act in relation to mining are termed "Designated Dunes" and are included in a map atlas entitled "Designated and Critical Sand Dune Areas," currently a joint publication of the DEQ and DNR (April 1996). DNR determined the designated dune areas by using topographic maps. These areas are a rough estimate of the shoreline area that may contain Lake Michigan dunes.

Activities regulated in designated dune areas:

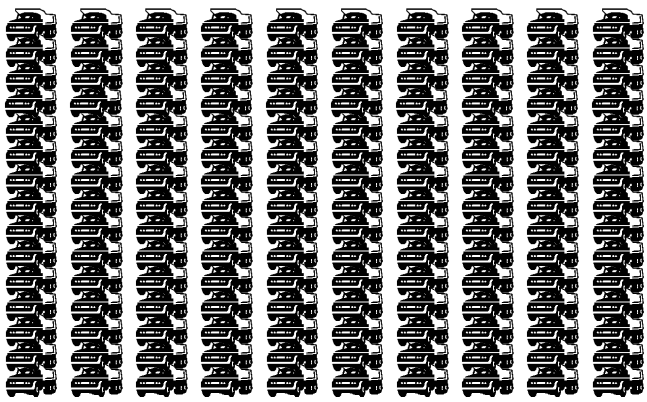
1. Removing dune sand requires permitting and oversight only if it exceeds 3,000 tons.

2. The removal of less than 3,000 tons is not regulated as sand dune mining if it is a onetime occurrence and it is not used for industrial or commercial purposes.

3. The removal of less than 3,000 tons is regulated as sand dune mining if the sand is to be used for industrial or commercial purposes.

4. A removal of greater than 3,000 tons could be authorized without a permit if it is necessary for protection of structures.

Allowing up to 3,000 tons of sand to be mined without a permit is a large loophole in the Act. 3,000 tons is equal to 150 truckloads of dune sand. Since there are no state mining permits required for amounts of sand mined from the dunes up to 3,000 tons, it is not possible to track or measure the damage to dunes.



150 truckloads of dune sand

In addition, areas just outside the designated dune areas are at risk from mining and are not included in the tonnage mined annually. For example, new permits from the local township have just been issued to Technisand, Inc. in Covert Township, Berrien County in an area bordering the designated dunes boundary. Technisand will be able to mine between 475,000 and 660,000 tons of sand at this site, just adjacent to the designated sand dune boundary.

Both situations allow the mining of considerable dune sand, but without any regulation by the state.

Mining of barrier dunes continued after passage of the Act.

Barrier dunes are the highest dunes closest to the lake. They are permanent features and easily defined on aerial photographs. The 1976 Act allowed companies to continue mining in the barrier dunes, but required that an explanation be provided to the Natural Resources Commission, a seven-member body of citizens which has historically served as the oversight body of the DNR.

There have been 13 sites permitted that included acreage in barrier dune formations. The following listing are the sites, total acreage of the site, and a percentage "estimate" of how much of the site contains barrier dunes and if those dune formations are subject to be mined. Please note that all percent estimates are approximate.

Site	Total Acres	% Barrier Dunes	Acres of Barrier Dunes Subject to Mining
Bridgman, South	79	100%	44.6 disturbed
Bridgman, North	230	5%	12 western 200' x 2600'
Gulliver-Peters	86	100%	40.2
Nadeau Site	153	24%	37 western 800'
Nadeau Pit	175	100%	161
Rosy Mound	307	100%	50
Ferrysburg Site	359	45%	160
North Sag Site	508.5	28%	0
Lake Harbor Rd.	36	100%	19
Lincoln Ave.	500	3%	10
Silver Lake	465	88%	152.4
Ludington Site	620	100%	320
Rohn Property	70	20%	0
TOTALS	3588.5		1006.2

Since the Act was passed, DNR granted permits to 13 sites that include acreage in barrier dunes (see chart above). Over 1,000 acres of barrier dunes have been permitted to be mined since 1976.[10]

The DNR memo in the box on the next page provides reasons to the Natural Resources Commission for allowing the mining of barrier dunes at the Sargent Sand mining site in Mason County. Mining of the barrier dunes was recommended by DNR staff mainly because the site was already disturbed and because reclamation or restoration was planned, not a strong case, but the mining was allowed. Unfortunately, as pointed out later in this report, little restoration of the Sargent Sand site is occurring to this day, almost 20 years after the memo was written.

Mining of barrier dunes was an issue at the controversial Bridgman site in Berrien County. In the early 1980s, the DNR recommended denial of a permit to allow the mining of 144 acres of dunes, including the impressive 200-foot high Mt.Edward. In this case, the Commission overruled the DNR recommendation to allow mining of the site. The Commission's decision, however, was overturned by a successful challenge by a number of environmental groups, including the West Michigan Environmental Action Council, and the Attorney General's office. Even so, the settlement allowed the company to mine 45 acres of a corner of the property over a period of ten years.

A new category of dunes is created.

The amendments passed in 1989 began the regulation of development in sand dunes and created a new category of dunes — critical dunes. Critical dunes were identified by conducting a detailed analysis of the local environments. These dunes are often host to exemplary dune plant communities such as interdunal wetlands, coastal plain marshes, dune and swale complexes, open dunes, and certain types of forests. The Act was then amended to incorporate this new category.

All barrier dunes are considered to be critical dunes, but not all critical dunes are barrier dunes — not all critical dunes are the highest nor the closest to the lake. Under the amendments, permits for new sand mining operations could not be issued in critical dunes. Mining companies with permits that owned their property prior to the 89 amendments could, however, expand into critical dunes that they own or lease.

Since the '89 amendments, the DEQ says it has not granted new permits in areas where critical dunes are within the proposed limits of mining. They have not, however, tracked the total area of critical dunes in permitted mining sites in existence before 1989 so the public cannot completely evaluate the devastation caused by this loophole.[11]

Sargent Sand Memo

1. Sand dune mining has been carried forth on this assemblage of acreage since 1937. The majority of the property has been affected by previous mining activities.

2. The only portion of the barrier dune included for removal under the permit has already been disturbed by the sand mining operation.

3. This operation shall not result in the removal of any significant geomorphic features which have been affected by previous sand dune mining activities.

4. A buffer space of vegetation shall be maintained around the perimeter of the property.

5. There is no documented evidence of any threatened, endangered, or rare plant or animal species on the subject property.

6. This operation shall not degrade nor adversely impact ground surface water resources.

7. The dredging phase of the operation shall provide for regraded submerged slopes eliminating the potential for "drop offs" or potentially unsafe water oriented recreational activities.

8. The area subject to permit shall be reclaimed (regraded and revegetated) thereby stabilizing the permitted area affected by sand dune mining activities.

It is our determination that there are no identifiable reasons to justify the denial of the issuance of a sand dune mining permit to the Sargent Sand Company for this permit.

(Taken from a November 17, 1980 memorandum from Authur E. Slaughter of the Geological Survey Division.)

The mining of critical dunes continues.

Since the '89 amendments, a permit into critical dunes was denied to Hart Packing Company in Oceana County, in 1993 only when local citizens and groups protected that the company never had a permit and, therefore, was not legally entitled to expand into critical dunes. The company had, however, already mined one-third of the 152-acre site, all of which was critical dunes.

In 1997, DEQ granted a permit to TechniSand, for its Nadeau Site in Berrien County, to expand into 126 acres, 24 of which are in critical dunes. Mining has not yet begun at the site because of township zoning. That expansion is currently being challenged in court by the Berrien County group, Preserve the Dunes. The group alleges that TechniSand's purchase of the assets from the previous owner, does not entitle TechniSand to expand into critical dunes.

The intention of DEQ in both the Hart Packing and Nadeau Sites was to grant a permit into critical dunes even after the amendments were passed that sought to restrict mining in critical dunes. Critical dunes are in danger. Those already designated critical could be at risk as mining companies continue to expand their operations, using the legal loophole in the Act.

Further, since the state has refused to regulate an additional 12,000 acres termed critical by a Michigan State University study (which included DEQ staff), additional dunes not yet regulated as critical dunes may be at risk if they are within mining sites or adjacent to them. MSU's task was to review USGS maps and aerial photographs to locate areas that met the critical dunes criteria. Many of the new critical dunes may be in private individual ownership, but there are still large properties potentially at risk. In certain areas, mining companies are actively looking for additional dune acreage to purchase.

Almost 5,000 acres of the "new" critical dunes in private ownership are in counties with numerous mining sites. Thus, new mining sites could also be opened in this unregulated critical dunes, in addition to the potential for expansion from existing mining sites (see chart below).

PRIVATELY OWNED CRITICAL DUNE ACREAGE THAT IS CURRENTLY NOT REGULATED, IN AREAS WHERE MINING OCCURS

Lake Twp./Berrien	399.82
Covert Twp./Van Buren	1686.77
South Haven Twp./Van Buren	49.05
Laketown Twp./Allegan	234.50
Park Twp./Ottawa	111.56
Port Sheldon Twp./Ottawa	407.40
Grand Haven/Spring Lake Twp./Ottawa	1167.35
Grand Haven Twp./Ottawa	304.67
Norton Shores/Muskegon	213.24
Brevort/Moran Twp./Mackinac	198.67
TOTAL	4773.03

Now You See It - Now You Don't

by James R. Austin, Save Our Shoreline, Muskegon

Pigeon Hill was one of the largest sand dunes on Lake Michigan. Two hundred to three hundred feet in height, it dwarfed the surrounding landscape. It covered some 40 acres at its base. Its shifting sand created new configurations each year. Before Muskegon's fur trade, lumber, and fishing days, it sheltered and protected the Ottawa Indians living at its base. In the 1800s, millions of the now defunct Passenger Pigeons rested on its peak as they made their yearly north-south pilgrimage. In the 1870s, many citizens of what was then Bluffton, Michigan, made their living by catching pigeons and selling them. Squab or young pigeon meat was in demand in New York. Pigeons were trapped in barrels and shipped east in boxcars. By 1882 the pigeons were gone.

Early in the 1900s, D.D. Erwin, owner of Pigeon Hill, offered to sell the land to the city of Muskegon. At the time, city officials were not interested, and after Erwin's death, Nugent Sand Company and the Pere Marquette Railroad bought the land. In 1936, Sand Products Company began mining the sand. In 1944, the city of Muskegon sold 96 acres of land to Sand Products who added them to their existing 74 acres.

By the middle sixties, only a hole remained. Pigeon Hill is now just a warm memory of pigeons, family day trips and many other fund recollections. In time, the memories also fade — but they might have been replenished over and over, if the hill had not disappeared.

Mining companies have moderate requirements under the Act.

In order to obtain a permit, companies must submit:

- environmental impact studies,
- progressive cell-unit mining and reclamation plans,
- a 15-year mining plan.

Companies also pay a bond and per-ton surveillance fees and file an annual report to the DEQ.

The 15-year mining plan must detail the location and acreage of current sand dune mining areas, future mining plans, and a schedule for current and proposed mining activities. Although a copy of this plan must be provided to the local soil conservation district, reviews of mining site files indicate that the districts rarely comment on the plans. The mining plans do not have to be updated for permit renewals or when sites are sold to other companies. For example, TechniSand is mining its site 20 years after the 15-year mining plan was submitted by the company that owned the site at the time.[12]

Bonds are filed with the DEQ which remain in force until the reclamation is completed

Companies pay a **per-ton surveillance fee** to the DEQ and file an **annual report.** Both the surveillance fee and annual report are confidential and cannot be released to the public without the permission of the permitted company. From 1978 through 1984, the sand dune mining program was supported by a surveillance fee of 1 cent per ton and additional money from the DNR general fund. From 1985 to the present, the program has been funded entirely by surveillance fees. The surveillance fee varies each year based upon costs incurred by the sand dune mining program, but it cannot exceed 10 cents per ton under the Act.[13]

Pursuant to Section 63711, a yearly surveillance fee is paid by the mining companies. This fee is calculated by the Geological Survey Division each year. The yearly revenues collected since 1978, the first year collections were received, are as follows:

Year	Total Fee	Year	Total Fee
1978	$ 14,472.17	1988	$102,590.50
1979	33,399.16	1989	87,353.55
1980	22,508.65	1990	104,632.85
1981	19,136.90	1991	125,822.85
1982	15,613.96	1992	128,286.05
1983	19,423.82	1993	145,740.98
1984	41,693.73	1994	148,157.44
1985	138,696.70	1995	151,080.48
1986	52,449.93	1996	85,710.86
1987	89.360.63	1997	116,825.59[14]

Currently the surveillance fee pays 100% of the costs of implementing the program. During a sand mining controversy regarding the Hart Packing Company in Oceana County, there was considerable public protest of this apparent conflict of interest. State politicians had strong words and vowed to change this part of the Act. "This is clearly a case of the fox guarding the chicken coop," said former State Representative Bill Bobier, R-Hesperia, who said he was seeking changes in the funding arrangement in a February 1993 Muskegon Chronicle article. In that same article, former State Senator Vern Ehlers remarked that the "setup tends to send the wrong signals out, and is an inducement to greater (sand) production." Unfortunately, the public furor did not result in changes in the way the mining program is funded.

The Act does not provide for adequate public notification and opportunities for meaningful participation.

The DEQ has 120 days to approve or deny a permit once a complete application is received. There are no statutory requirements for public notice or hearings. The only requirement of the DEQ is to provide a list of all pending applications if a member of the public requests it.

The DEQ states that its policy is to provide a copy of the application package when a new permit is applied for at a location near the proposed operation. After the permit has been approved or denied, the package is returned to the Lansing office of the DEQ. It is not clear what is done with public comment on a new permit, but it is obvious from the files that public concerns have not significantly altered or halted mining operations.

The DEQ states it is to renew permits if mining companies are in compliance with the Act, but it is apparent that there is much flexibility in that decision. Hart Packing Company in Oceana County failed to complete requirements to receive a permit for 16 years, but the DEQ proposed to grant them a permit regardless. Sand Products Company, which owns the Plateau Site in the Upper Peninsula, has filled wetlands without state and federal permits as part of its mining for over a decade, but continues to receive sand dune mining permit renewals. And Sargent Sand near Ludington trespassed on state lands to mine sand, but received a permit renewal shortly after the trespass issue was made public.

Plans to issue permit renewals are announced in the DEQ monthly calendar, which is also on the

Internet. The DEQ calendar is limited in its distribution and is not well known by the general public. The DEQ does not hold public hearings when renewing mining permits and as noted earlier in this report, makes decisions quickly after the calendar notice. For example, a permit for Nugent Sand Company was issued only seven days after it was noticed inthe DNR/DEQ Calendar. Input from local neighbors of sand dune mining companies who might be aware of violations cannot be obtained without more public notice and review.

The DEQ monthly calendar can be found on www.deq.state.mi.us/cal/

Local watchdog groups say that public participation is discouraged and that the DEQ stonewalls and ignores citizen complaints. These groups say that in past years, permits required public hearings when amendments were to be made to progressive cell unit mining plans, but that is no longer the case and public input is not solicited in these instances. In addition, public oversight over mining in the dunes was lost in the mid-1990s with the reorganization of the Department of Natural Resources into two agencies - DNR and the Department of Environmental Quality. The Natural Resources Commission retained its oversight over the DNR, but there is no such body now for the DEQ and the sand dune mining program. The loss of the Natural Resources Commission has also closed a valuable avenue to the public for input and participation.

DEQ officials have not always been sympathetic to residential neighbors of mining sites. Alerted to concerns about blowing sand and loss of groundwater wells from neighbors of the Nugent Sand Company in Muskegon County, the agency responded that the group should file a civil lawsuit. There was no inclination on the part of the agency to assist in resolving concerns of the neighbors. In other words, it was up to the public to do the job entrusted to the DEQ to protect public health and the environment.

DEQ's implementation of the Act has been inadequate.

Under the Act, the DEQ is able to suspend or revoke permits, but **has never done so.**[15] At the request of the Attorney General, the DEQ may also seek a restraining order or injunction. Failure to comply with the Act or a permit is defined as a misdemeanor and fines are limited to $5,000. Although there have been several court settlements, **no fines have been levied by the DEQ since the Act was passed.**

Out of the thirty applications for permits in the years since the Act was passed, **only one permit was denied**.[16] The denial was to the Hart Packing Company in Oceana County. In 1993, the DEQ was poised to grant a permit expansion into critical dunes to the company that had never had a permit from the state. At the public hearing on the permit, the West Michigan Environmental Action Council, Lake Michigan Federation, and local residents opposed the permit, pointing out that since the company had never obtained a permit, it could not legally expand into critical dunes. **It was only after a ruling by the Attorney General's office that the DEQ was compelled to deny the permit.**

The DEQ appears to maintain a high level of inspections and correspondence with mining companies, but there is evidence of violations left unaddressed for years at a time and little serious attention to compliance with the Act. In the last 19 years, there have been seven enforcement actions in regard to sand dune mining operators according to the DEQ:

- the Bridgman lawsuit;
- a lawsuit related to the Gulliver-Peters site;
- a cease and desist order at Nugent Sand;
- cease and desist order at the Plateau site;
- state trespass issue at the Sargent Sand site;
- a cease and desist order regarding Thunder Mountain at the Nadeau Pit site, and;
- a permit denial and court agreement at the Hart Packing site in Oceana County.

In more than half of these situations, Hart Packing, Nadeau Pit, Nugent Sand, and Sargent Sand, the enforcement actions taken by the DEQ were forced by public pressure. This poor enforcement record makes it clear that the DEQ is reluctant to shut down violators.

Case studies:

Technisand, Nadeau Pit, Berrien County

A local group of citizens called *Preserve the Dunes* formed in 1997 to protect dunes in southwest Michigan. The group has accumulated an excellent record of accomplishments and has uncovered a pattern of violations at mining sites in their neighborhood. Twenty-two violations were documented by the group for the Nadeau Pit and the Busse Property sites. The DEQ initially denied the allegations of violations except a minor item, but subsequently admitted that nine of the violations were corrected. Shortly after acknowledging the violations, the DEQ refused to communicate with the group any longer.

The group found that TechniSand never had a permit to dredge a lake that it had been dredging to mine sand below the ground. A permit had been issued to the previous operator of the mine, but it had expired in 1993. Upon the group's protest, the DEQ's Land and Water Management Division required a full permit application to be made by the company and held a public hearing on the permit in May, 1998. A complete hydrogeological study of underground water flow was also required. The permit is delayed and the company continues to dredge without a permit as of April, 1999.

The group also discovered that TechniSand had been given permission by the DEQ to mine the buffer zone at three places along the Blue Star Highway. One area was adjacent to land owned by the Thunder Mountain Heights Association. Mining in that area would have made the mining area completely visible from the highway. The Association and Preserve the Dunes protested and the permissions were revoked. TechniSand was ordered by the DEQ to regrade and replant the buffer next to the Association's property.

Preserve the Dunes filed suit against TechniSand and the DEQ in July, 1998 under the Michigan Environmental Protection Act over a permit granted TechniSand to mine critical dunes at the Nadeau Site in Hagar Township in Berrien County. The group asserted that since TechniSand did not own the property in 1989, it did not qualify for exceptions provided in the 1989 amendments.

Sargent Sand, Ludington, Mason County

Sargent Sand Company began its mining operation in 1937. The site, composed entirely of barrier dunes and 620 acres, is adjacent to Ludington State Park. In 1994, the Attorney General's office sued Sargent Sand for continuing to mine in state park lands for almost a decade after its 30-year lease with the state expired. State officials claimed the company had taken approximately 250,000 tons of sand illegally, which amounted to $1 million dollars. The DEQ had granted permits to the company during the time it was trespassing and astonishingly, the DEQ renewed the company's permit after the Attorney General's office sued the company, saying that under the act the DEQ must renew sand dune mining permits for companies that operated within its requirements.

Information in Sargent Sand's file suggests a case could have been made that they were not in compliance. A February 1, 1994 memo from James R. Piggish, Assistant Attorney General, provided legal advice to the DEQ on the violation and permit renewal issue. According to Mr. Piggish, a case could have been made that Sargent Sand was in violation of the Act since the company used its sand mining permits from the DEQ to trespass and illegally mine sand. The DEQ ultimately issued the permit renewal to Sargent Sand, however.

And what of the settlement between the state and Sargent Sand? On June 22, 1994, the Attorney General's office signed a settlement agreement that required Sargent Sand to pay only $30,000, allowed the company to continue mining to some degree, and complete a number of reclamation activities. Whether or not the reclamation required in the settlement has been completed is still in question.

Problems with Sargent Sand continue to this day as noted later in this report regarding reclamation at the site. Under the Act, a company can abandon a sand dune mining site littered with junk and debris and then get another permit, without continuing active mining and without completing basic reclamation activities, like removing huge pieces of equipment. Rodger Whitener, supervisor of the sand dune mining program, was quoted in a July 1, 1998 *Muskegon Chronicle* article, as saying "I've probably given the company a little bit of latitude as far as 'what to do' with equipment on the site."

Environmental Impact Statements fail to protect Lake Michigan dunes.

As part of its permit application, the Act requires applicants to prepare an environmental impact statement (EIS). At first glance, the EIS requirements appear to be fairly comprehensive.

An EIS must include an analysis of the following:

- The compatibility of the activity with adjacent existing land uses or land use plans.
- The impact of the proposed sand dune mining activity on flora, fauna, or wildlife habitats.
- The economic impact of the proposed sand dune mining activity on the surrounding area.
- The effects of the proposed sand dune mining activity on groundwater supply, level, quality, and flow on site and within 1,000 feet of the proposed sand dune mining activity.
- The effects of the proposed sand dune mining activity on adjacent surface resources.
- The effect of the proposed sand dune mining activity on air quality within 1,000 feet of the proposed sand dune mining activity.
- Whether the proposed sand dune mining activity is located within any of the following:
    - 1,000 feet of a residence
    - 2,000 feet of a school
    - 500 feet of a commercial development
- Alternatives, if any, to the location of the proposed sand dune mining activity and the reasons for the choice of the location of the proposed sand dune mining activity over those alternatives.
- A description of the environment as it exists prior to commencement of sand dune mining activity of the area of the proposed sand dune mining activity. The environmental impact statement shall provide the greatest detail of the areas and the environmental elements that receive the major impacts from the proposed activity, but also shall include areas that may be impacted as an indirect result of the project.
- An inventory of the physical environmental elements of the proposed site. The inventory shall be conducted at a time or at different times of the year that will provide the most complete information regarding the existing conditions of the area that will be impacted directly or indirectly by the proposed activity.
- The statute goes on to mandate that the DEQ deny a sand dune mining permit if, upon review of the EIS, it determines that the proposed sand dune mining activity is likely to "pollute, impair, or destroy the air, water or other natural resources or the public trust in these resources."

With the obvious destruction that mining does to the dunes, any EIS would have to conclude that the activity would destroy natural resources and the public trust. It would appear that most or all permits should have been denied using this clause in the Act. This protective statutory language does not reflect what happens in practice, however.

First of all, many of the EIS's are over a decade old and do not reflect the current understanding of the value and fragility of the dune ecosystems. Many of the earlier documents are poorly written, technically inadequate and biased toward the proposed mining activity. Later EIS's are more comprehensive, but still present a strong bias toward the continuing of mining practices. In the majority of cases, it was clear that the permit applicants did not use the EIS to honestly evaluate potential harm to the environment, the range of possible alternatives and true mitigation for any adverse impacts. It appears that most of the EIS's were drafted merely to comply with the statutory requirement and that the DEQ consistently allowed applicants to submit biased EIS's.

Example #1: Nadeau Site, Berrien County

"The environmental assessment is, as expected, highly biased in favor of Martin Marietta's proposed action and does not address the effect that the mining operations will have on the ecology of the surrounding land parcels. Floral

Nadeau pic

faunal relationships, though probably almost non-existent because of the disturbed nature of the land, have been largely ignored." [From a November 16, 1978 memo from Irvin V. Kuehner, Regional Geologist, to the DEQ on the Nadeau Site (then owned by Martin Marietta) Environmental Assessment and Reclamation Plan.]

Example #2: Sargent Sand Company, Mason County

"The EIS was physically difficult to read and rather poorly edited. This, along with misspellings and typographical errors, significantly detracted from the content of the report. In addition, this document, purported to be an EIS, contained several subjective decisions which appeared as an attempt to sway the reader to the author's point of view. Normally an EIS objectively presents the facts, describes the positive and negative aspects of each alternative and allows the reader to draw his own conclusions. This was certainly not the case in this report. In addition, the alternatives were not discussed in an environmental context, but rather in the context of the economical advantages by the company by not altering their present mode of operation.

The environmental impact of sand dune mining has its greatest effect by eliminating the ecosystem for any aquatic or terrestrial organism living in the project area. In this case, ongoing mining activities have already had their major impact. However, there are additional wetland and terrestrial habitats which will be eliminated by subsequent mining. The author of the EIS has determined these losses to be insignificant although there is no documentation of a formal survey to determine whether or not any threatened or endangered aquatic organisms, mammals or other terrestrial species are present. Apparently, the author assumes that the animals will simply blend into the surrounding community or be eliminated. I recommend that a survey be completed by a

Farewell to Maggie

Thanks to the Manistee County Historical Museum

Maggie Thorpe was an immense dune system located north of the Manistee River from what is now Harbor Village, north to Residential Drive in Manistee. Maggie was formed over a period of 10,000 years as waves pushed sand against the shoreline. At first glance, she may have looked barren and desolate. In summer, her sand could be very hot and the wind would blow it away. In the winter everything was coated with sheets of ice and snow. Despite the harsh elements, life did thrive on Maggie Thorpe. She was home to many plants and animals that adapted to what she had to offer. Starting at the water's edge was her lower beach, not much in the way of plant cover, but birds would be hopping about — sandpipers, gulls, sanderlings and the now endangered piping plover! In Maggie's foredune area, a sparsely covered area, plants such as sea rocket and the endangered pitchers thistle provided food and shade to snakes, turtles, mice, ant lions, ladybugs and butterflies.

Her marsh area was home to toads, heron, raccoon, and the dwarf lake iris, another endangered species. And, finally, her back dune looked like a mixed deciduous forest, but had sand underneath a thin layer of soil. Aspen, American beech, maple, oak and pine dominated this part of her with blueberries and hazelnut in the shrub layer and wildflowers, such as trillium, in the understory.

She was home to visiting tribes of Native Americans and witnessed the arrival of the white man. Maggie watched her brother dune, Joe, as the first part of his vegetation was uprooted, followed by burning off the rest. Finally, the railroads hauled away all the sand for their tracks. *Creeping Joe* was gone forever.

Maggie's fate soon followed. Operations to mine her sand started in the 1930s and lasted until the 1970s. What took nature thousands of years to create, man was able to destroy in less than 50 years. Her sand was transported by a complex conveyor belt system to the Manistee River where it was loaded onto freighters. After she was completely leveled, the sand was continually mined, resulting in a new lake – "Manmade Lake."

by Liz England-Vos

competent consultant." [From a February 9, 1979 interoffice communication from Dave Kenaga of the Biology Section of the Water Quality Division to the DEQ on the Preliminary Draft EIS for Sargent Sand Company.]

Example #3: Plateau Site, Sand Products Corporation

An August 1982 review of an EIS by Sand Products Corporation for their Plateau site in the Upper Peninsula generated the following comments:

"The environmental impact statement is very poorly done. It is so full of errors and omissions that it is difficult to review within a reasonable time frame." [From an interoffice communication from Sylvia Taylor, Endangered Species Coordinator, DNR Wildlife Division.]

Another reviewer adds: "The EIS inadequately reviews the compatibility of mining operations with adjacent existing land uses or plans. . . . .The effect on adjacent surface resources is not adequately addressed. . . . . The discussion of alternatives is inadequate. Being an already existing operation does not necessarily make it the best alternative." [Interoffice Communication from Kathy Cavanaugh, Environmental Enforcement Division.]

The economic impact discussion requirement is used in EIS's by the mining industry to show that the economic benefits outweigh the environmental degradation. The EIS's, however, never attempt to quantify the cost of destroying an irreplaceable ecosystem.

Example #4: Construction Aggregates Company of Michigan, North Sag Site, 1992

Excerpts from an EIS developed by Construction Aggregates Company (CACM) of Ferrysburg, Michigan, emphasize the economic advantages of continuing mining operations: "The primary advantage of this project is that it permits CACM to remain competitive and in business while still minimizing ecological and other impacts to the site . . . In the Tri-Cities area, and the City of Ferrysburg, in particular, CACM is an important member of the industrial community. Although not one of the communities largest employers, CACM and its 38 employees contribute to the local economy by purchasing goods and services and contributing to the financing of the local units of government . . . "

Case Study

Plateau Site, Sand Products Corporation, Moran Township, Upper Peninsula

The huge 1,350-acre Plateau Site, owned by Sand Products Corporation in the Upper Peninsula, has recently been found to have filled Lake Michigan wetlands as part of its mining practices as far back as 1986. In March,1999, the Army Corps of Engineers issued a joint public notice with the DEQ of the company's application for a permit to fill the wetlands, years after the situation had been discovered by the DEQ. LMF has called for the company to restore the wetlands, but it is disturbing that a violation of the state and federal laws as serious as destroying valuable Lake Michigan wetlands went so long without agency attention. Again, the circumstances at the Plateau Site reinforce the DEQ's failure to ensure that mining activities are conducted in a legal manner.

Later EIS documents appear to be more comprehensive, but still present a strong, unsupported bias for continuing mining in the dunes:

"The foundry industry is highly dependent upon a steady, low cost supply of West Michigan Dune Sand." (EIS Manley Brothers of Indiana, Nadeau Site, February ,1978)

"The stopping of mining in the Busse Site would reduce employment by 2 - 5 persons in the Company, depending on market conditions." (EIS, Busse Site, Manley Brothers of Indiana, November, 1986.)

"The benefits of the proposed project would accrue primarily to the employees and stockholders of Manley Brothers who would profit from the sale of the product." (Busse EIS 1986)

"From a business perspective, the extraction of a portion of the mineral reserves always appeared to be the highest and best use of the land." (Taube Road Expansion of the Nadeau Site, EIS 1996)

The 1986 Busse Site EIS presents a discussion warning that building homes on the site could damage the dunes. "Such use presents the possibility of abuse or negligence of overall environmental quality, should strict attention not be paid to sensitive features. This applies to development either for low density residential sites or

commercial structures on sites. . . . A prime concern would be the potential mishandling of development which could result in significant ecological damage."

These quotes show how powerful the bias is toward mining the dunes and the failure of DEQ to require quantifiable information on the benefits and costs of losing the dune resources.

A report completed in 1978 as a requirement for the Act discusses the various impacts to the dunes from mining and recommends that the review of EISs be extensive and that the public and local units of government be an integral part of the review process. While the original intention of the Act may have been to address EISs in a comprehensive manner, the review of EISs has been limited and does not include the public as it should.

There is also no requirement that EISs be updated when permit renewals are submitted. The DEQ only requires an amended EIS when there are "significant" changes to a permit, such as dredging instead of dry mining.

Although the DEQ has written guidance on what should be contained in an EIS, it does not have any rules on how to evaluate the content of the EIS. That is, there are no objective criteria that spell out how much pollution or destruction is enough to require that the DEQ deny a permit. This lack of rules makes it difficult for the public to hold the DEQ responsible for their decisions.

Reclamation of mining sites is required by the Act, but is not always completed successfully.

Progressive cell-unit mining and reclamation plans require mining companies to describe their mining methods, a schedule for mining the dune areas, (cell-units), plans for stripping plants and vegetation from the site, the final grade for the site after mining is completed, how the site will be regraded and provisions for landscaping, screening, and buffer areas.

When mining is completed at a site, the Act requires that the stripped areas be restored or "reclaimed" - replanted and stabilized, with all mining equipment and construction removed from the site. Inspection visits are conducted to ensure that these activities happen and that revegetation takes place satisfactorily. Reports in mining site files show that reclamation attempts are not always quick nor successful. And information from the DEQ on the number of mined areas that have been reclaimed shows that some sites have little or no areas that have been reclaimed (see chart on next page).

Sargent Sand Company's lack of effort toward reclamation is a distinct example. There has been no mining at the site for several years, but huge pieces of rusty equipment and piles of debris continued to litter a portion of the site in April, 1998. According to the DEQ, since the company had an active permit, it was not required to reclaim the site. The permit was renewed again in January, 1999. Either the Act provides little ability to enforce stricter reclamation or the DEQ is lax is in its oversight.

Another example is the Nadeau Pit site in Berrien County, where the original reclamation mining plan called for stockpiling trees and plant material for replanting, fertilizing before planting and irrigation after planting. This plan was later downgraded to planting red and white pine trees, cherry and poplar trees. The company then eliminated fertilizing and irrigation from the plan. Grasses were planted without the reforestation and hydroseeding, a seed spraying process, was substituted.[17]

Total Acreage Mined vs. Total Acreage Reclaimed

Permit No.	Acres Bonded	Acres Reclaimed
Bonzelaar Laketown	30	20
Constr. Aggregates - Ferrysburg	99.09	29.7
Constr. Aggregates - North Sag	0	0 (no site work started)
New Life Nursery	8.82	0
Hart Packing - permit denied	90	90
Holiday Hills Rycenga	5	0
Jackson-Merkey	28.56	0
Nugent Sand	158.9	120.8
Owens Port Sheldon	4.1	0
Walter Rohn Property	5	0
Sand Products - Plateau	30	0
Sargent Sand - Ludington	79.6	0
Standard Sand - Rosy Mound	30	0
TechniSand - Austin	24.3	24.3
TechniSand - Busse	44.4	44.4
TechniSand - Garlanger	38.48	38.48
TechniSand - Gulliver-Peters	40.2	0
TechniSand - Nadeau Pit	122.84	81
TechniSand - Nadeau Site	34.83	16.5
Verplank - Holiday Hills	10	10
Waters Group	permit pending	
SUBTOTALS	884.12	475.18
Star Excavating - Dokter	1	1
TechniSand-Bridgman No.	165.5	165.5
TechniSand-Bridgman So.	44.6	44.6
TechniSand - Garage	12.1	12.1
TechniSand - Rose Pit	44.5	44.5
Woodland Dev.	21.5	21.5
CWC Castings - Lake Harbor	19	19
Drooger Property	0.5	0.5 (withdrawn)
Tanis Property	13.6	13.6 (withdrawn)
TOTALS	1206.42	797.48

Source: Geological Survey Division

Even when reclamation is successful, it is not restoration and does not bring back the dunes, their unique plants or wildlife. The dunes are home for such rare species as the Pitcher's Thistle, Ram's Head Lady's Slipper. Beautiful and unique wildflowers of the dunes include: White Trillium, Jack-in-the-Pulpit, Green-headed Cone Flower, and orchids such as the Dragon's mouth, Pink Grass, and Yellow and Showy Lady's Slipper. Many of these plants - whether due to rarity, fragility, or inability to withstand changes in microclimate - are poor candidates for reclamation efforts. There are no requirements to replant these species during reclamation and without the dunes for a home, it is unlikely they would survive anyway.

Demand for foundry sand has decreased, but mining of sand continues at a steady rate.

Dune sand mined on an annual basis has declined somewhat since the passage of the Act. The 1976 study on the economics of sand dune mining reported that active mining sites along the lakeshore had generated approximately 3.5 million tons of sand in 1976 compared to the amount mined currently, an average of 2.5 million tons annually.

Passage of the Act may have caused some companies to drop out of the mining business or focus on fewer sites. Some of the mining companies that did not obtain permits or discontinued their mining under the new Act were relatively small sites, such as the Drooger Site in Allegan County with 2.46 acres and the 36-acre CWC Textron Site in Muskegon County which closed in 1976.

The DEQ attributes the decline to passage of the Act, foundry officials cite restrictions on disposal of used foundry sand, but the U.S Geological Service reports that nationwide production of silica sand decreased since 1979 due to less demand for foundry sand and glass. According to foundry officials, as the auto industry produces smaller vehicles, it requires smaller parts and smaller molds, which require the finer sand grains left inland by glaciers, not lakeshore dune sands.

There is less demand for foundry sand and a smaller amount mined annually, but the dunes continue to be destroyed by mining.

The largest use of dune sand – for foundries – is the cheapest

Sand dune mining companies justify mining in their EIS's and routinely state that allowing them to mine

sand from lakeshore dunes allows them to provide foundries with a low cost supply of sand. Prices for sand can vary depending upon its end use, the amount needed, type of packaging, and transportation costs.

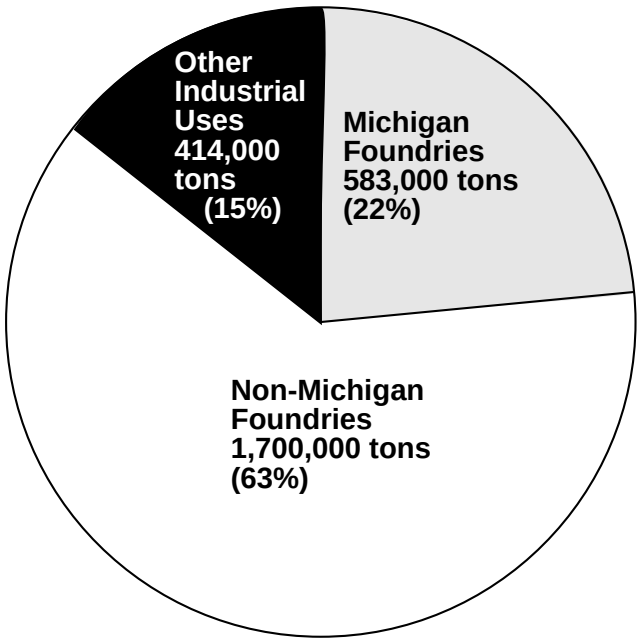
A 1978 study required by the Act[18] documented that dune sand sold for an average of $4.78 a ton in 1976. Available information shows that prices have remained low. University researchers on foundry operations have noted that the average price for foundry sand, dune or other types, in the Midwest is approximately $7 ton. **In some cases, Lake Michigan dune sand can still be sold for as little as $4.50 a ton.[19]**

Compare this to quotes for sand from dunes and inland sources for use in sand blasting that sells for between $50 and $90 per ton. Masonry sand from the dunes sells for $18 to $20 per ton.[20] The higher prices might reflect a narrower set of specifications necessary for this type of sand use. Because the primary use of dune sand is for foundries, Lake Michigan dunes are being destroyed for the cheapest use of its sand.

Michigan foundries do not need dune sand.

There is much anecdotal information from mining companies and foundry officials on how necessary dune sand is to Michigan foundries, but little documented information on specifications for foundries and actual demand for the sand. Some of the information found indicated that there are, in fact, different types of sand used throughout the foundry industry. Researchers conducted a survey of foundries to help determine the use and need for dune sand, but failed to draw convincing conclusions.[21] Overall, no specific current information on the demand for dune sand and specifications for foundries in Michigan is available. Foundry officials strongly assert that Lake Michigan dune sand is crucial to their business and that of the automotive industry, but have not provided facts to support their assertion.

A 1991 report on foundry wastes identified 127 operating foundries in Michigan. Sand suppliers for those foundries responded to a survey for the report and reported that they mined 2.7 million tons of sand annually. (According to the DEQ, the total amount of sand mined in 1991 was about 1.7 million tons, so the additional million tons must have been from other sand sources.)



Sand Mined in Michigan, 1991

Of the 2.7 million tons, 22% or 583,000 tons went to Michigan foundries, 63% or 1,700,000 went to non-Michigan foundries and 15 % or 414, 000 tons to other industrial uses. The information from this study suggests that the majority of sand, including from dunes, is exported and not used by Michigan foundries. Lower transportation costs cannot be used to justify continued mining, nor can support for Michigan foundry jobs.

In interviews for this report, many foundry officials stated that much sand is reused in the casting process. In particular, the officials say that state and federal laws passed in the late 1970s require used foundry sand to be deposited in municipal landfills because of residues from the molding process. This in turn increased disposal costs and encouraged reuse of the sand. Further, the industry attributes the modest decline in sand mined since the 1976 Act to the foundries' practice of sand conservation.

The information in the 1991 report on foundry wastes indicates that may not be accurate. Although there are nationwide efforts to reuse sand that can no longer be used in foundry casting processes, these reuse programs do not appear to be widely used in Michigan. The 1991 report indicates that only ten of the 127 foundries indicated that they reclaimed and reused the sand for further use. The report notes that reclamation will not occur more routinely until the cost of new sand is high enough

Pristine Northern Michigan Dunes Added to Wilderness State Park

Since the early 1970s, the Sturgeon Bay dunes located at the Northern point of Michigan's lower peninsula, have been recognized as a special area. Adjacent to Wilderness State Park, the 706 acres of coastal dune formations are excellent examples of freshwater dunes containing rare plant communities that cannot be found anywhere else in the world. "During the 1970s there were a lot of people in the dunes with recreational vehicles tearing it up," according to Tom Bailey, Executive Director of the Little Traverse Conservancy. "Sand dunes are a very fragile ecosystem," Bailey explained. "Once the thin top layer of vegetation is broken, the results can be devastating."

A group of environmentalists and representatives from the park met with officials from Sand Products Co., the owner of the property, to discuss proper management of the dunes and adding them to the state park. According to the group, Sand Products was also eager to stop the recreation vehicles trespassing and disturbing the dunes.

After 20 years of discussions and grant writing, the Michigan Natural Resources Trust Fund awarded $3,050,000 to the DNR to purchase the property for Wilderness State Park. Rob Comstock, manager of the park, says the area is a strong attraction. "The dunes are a natural playground so we've kept the development of the area to a minimum. People seem to just love it!"

What made this sand dune preservation effort work? Tom Bailey has advice:

1. Maintain good communications with all the parties involved.
2. Be open and honest about plans and goals for the site.
3. View the situation as a partnership and the negotiations as problem-solving.
4. Stick with it. Patience is critical. Remember that the financial picture may change. It took almost 25 years for the Sturgeon Bay acquisition.to take place.

to encourage the reuse of sand. Thus, the foundry industries' sand conservation efforts could not have been the cause of the decline in sand mined since the passage of the Act. Approximately 1 million tons of waste sand and other associated waste materials is sent to landfills each year. 86% of this amount is the sand portion of the waste stream. Much of the dune sand used by Michigan foundries is not reused, but ends up in landfills. Because foundries are not reusing sand to the greatest extent, larger amounts of new sand are needed, including sand from the dunes, which further exacerbates the problem of dune loss in Michigan.

Not all foundries and automotive companies use dune sand.

According to Mr. Robert C. Graham, former vice-president of Ford Motor Company's Automotive Component Group (which included the casting division), Ford Motor Company does not use dune sand in any of its foundry operations and has used inland sand for many years. Mr. Graham worked for Ford during the 1970s and 1980s when sand dune protection was a hotly contested issue. Because of his environmental interests, he viewed sand mining sites in southwest Michigan and discussed with the Department of Natural Resources the foundry industry's position that only dune sand could be used for casting operations, and that prohibition of dune mining would shut down the foundry industry in Michigan. Ford offered to testify in pending litigation taking issue with this position, but was never requested to appear.

A number of years earlier, Ford's casting operations had converted to inland sand. The different sand characteristics required foundry processing changes, but after some experimentation, Ford found that inland sand could be used successfully without significant cost penalty, producing large and small castings of comparable quality to those produced with dune sand. Mr. Graham confirmed for this report that Ford has made no change in its use of inland sand for casting molds and would not consider going back to using dune sand.

Further, the foundry industry in other states do not rely on dune sand. Dr. Karl Rundman, one of the authors of the 1991 report on foundry wastes, stated that foundries in Wisconsin primarily use inland sand.[22] It is clear that industry leaders understand that foundries do not need dune sand and that viable alternatives exist.

Altrenatives to using sand dunes exist.

For decades, officials from mining companies, the DEQ, and foundries have asserted that Lake Michigan dune sand is absolutely the very best size, shape and type for use in foundries. In particular, the foundry industry has alleged that ending mining of Lake Michigan dunes would damage Michigan's economy.

In a February 1993 Muskegon Chronicle article, Jim Lefere, then President of the Foundry Association of Michigan, was quoted as saying, "Do they (sand mining opponents) intend to bring manufacturing capabilities to a screeching halt? Sand is absolutely necessary to what we are doing. We have a resource that we definitely need for the long haul, and we have to try to protect our position."

A review of the study of sand areas within the state that could substitute for dune sand shows that alternatives were both feasible and available at the time the Act was passed.

Completed in 1978 by Michigan Technological University, the study's purpose was to:

1) identify the non-coastal dune sand deposits in Michigan by location, geologic type, quantity and quality;
2) assess the suitability of the deposits for the major industrial uses of sand (foundries and glassmaking);
3) determine if processing could prepare other sands for industrial uses, and;
4) evaluate additional factors such as depth to the water table, transportation, and land use.

The study, conducted in two phases, looked at the following potential sources of sand for use in foundries: inland dune sands and glacial outwash sands. Without clear reasons, the Phase I study eliminated further research of inland sands by concluding that most of the sands were too fine-grained to substitute for coastal dune sands. It then contradicted itself by stating that "many sands (inland dunes) may be able to substitute for coastal dune sands." The Phase I study recommended that inland dune sands should be reconsidered if other types of sand could not substitute.

According to the report, glacial outwash sands appeared to be more promising. These glacial outwash sands were formed during the Ice Age as moving ice picked up soil and rock pieces and ground the material; later, the glaciers melted and the sand was transported by water or wind.

Southwest Michigan Dunes Saved by Property Owners

There has been considerable citizen activity aimed at protecting dunes in southwest Michigan.

One excellent example occured in 1984 when a group of private citizens, led by local resident Cary Neiman, bought about 50 acres of dunes from Technisand, a mining company with several sites in Berrien and Van Buren counties.

Prior to that, the group of citizens had fought successfully for a township dunes protection ordinance. Although they believed the ordinance safeguarded the property they purchased, the group wanted to guarantee total protection from mining. Apparently, the mining company believed the ordinance lessened the value of the dunes, since they sold the land for about $1,000 an acre.

The group is glad to have purchased the dunes since TechniSand has subsequently tried to mine dunes which the group thought were protected under the township ordinance.

Phase I concluded that " . . . a large number of samples collected appear to be suitable for use as foundry sands, based on preliminary data. Many of the samples, particularly from throughout most of the northern half to one third of the lower peninsula, as well as parts of the eastern Upper Peninsula, meet these criteria. This represents an enormous area with apparently good foundry sand potential." The report also stated that " . . . much of the extensive outwash belts contained materials which could be as good (as dune sand)."

Phase II of the study focused upon the glacial outwash sands and provided the drawbacks and benefits of using this type of sand in foundries. On the negative side, the report stated that the sand might require

processing, and had impurities that would make it less refractory than coastal dune sands. In addition, the off-size material (gravel and clay) present in the sands would require washing and screening that would cost more than using coastal dune sands, much of the land was owned by the state and federal goverments and might not be available, and the distance from markets were somewhat greater than for coastal dune sands. Some conclusions appeared uncertain:

1) the sands had lower grain fineness that might appear to be unfavorable, but might only require a minor amount of processing, and;

2) the grain shape was found to be more variable and less well rounded than dune sands, but the report also stated that the apparent advantage of the more rounded grains is not universally recognized by the foundries.

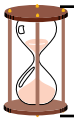
On the positive side:

- The quantity of sand available was considered to be enormous.
- It was highly likely that other areas with large quantities of similar sand occurred throughout much of northern Lower Michigan.
- Costs of reclaiming the areas were favorable.
- Environmental problems weren't considered to be as serious, particularly in comparison with coastal dune areas.

The Phase II report went on to suggest some additional steps, such as testing the suitability of sands under actual foundry conditions, evaluating foundry sand practices to determine critical specifications (it is apparent from the study that the researchers were unable to clearly define those specifications), and conducting economic feasibility studies on using glacial outwash sands as a substitute for coastal dune sands.

Since the study indicates the availability of large sources of glacial outwash and was generally positive, why wasn't the use of these types of sand encouraged? According to the DEQ, no further work was done after the study was completed.

Why was this study ignored? Was it simply because Lake Michigan dune sand was (and still is) available and cheap, and there was no widespread public opposition to mining? It appears so, especially since according to Ezra Kotzin of the American Foundrymen's Society, "We (the foundries) are not stupid enough to spend the money to continue trying alternatives when dune sand is available."



RECOMMENDATIONS TO BETTER PROTECT SAND DUNES

That Lake Michigan sand dunes are tremendously unique natural assets cannot be disputed. The state of Michigan has the largest assemblage and therefore the greatest responsibility to protect the dunes for current and future generations. The sands that make up these dunes are not critical to Michigan's foundry or automotive industries. It is also clear that Lake Michigan dunes are not being protected under Michigan's Sand Dune Management and Protection Act of 1976. For Lake Michigan sand dunes to be better protected, a number of legislative, regulatory and other changes are necessary.

Legislative reforms

1) **Ban new mining.** Enact legislation that prohibits new permits for mining sand dunes. Immediately stop the mining of critical dunes. Add the 12,000 acres of critical dunes to the Critical Dune Atlas and regulate activities in them as required by the Act. Remove the loophole from the Act that allows expansion into critical dunes from existing permitted mining operations.

2) **Phase out existing mining in the dunes.** Enact legislation that stipulates that all existing permits must expire without renewal so that all mining ceases by the 2006, thirty years after passage of the original Act.

3) **Regulate all removals of dune sand.** Close the loophole that allows 3,000 tons of dune sand to be removed without state regulation.

4) **Improve DEQ oversight capability.** Once the above changes have been made to ensure responsible DEQ oversight, allow DEQ to increase fees to fully cover the costs of its regulation until the phase out is complete. Additionally, the legislature should prohibit the DEQ from advising

permittees on how to be in compliance with the Act. Instead, the DEQ's role should be limited to independent assessment of compliance and enforcement.

5) **Ensure that mining operations comply with applicable state and federal laws.** Deny permits and renewals to companies that violate other environmental laws.

Agency reform

The Act's purpose, "to prevent pollution, impairment or destruction of the air, water, or other natural resources" from sand dune mining is clear. The DEQ, however, is not interpreting this statutory mandate in a way that protects the dunes or their surrounding environment. The DEQ has consistently allowed mining companies to submit biased EIS's that focus upon the purported economic "benefits" and downplay the environmental impacts of sand dune mining. To improve the DEQ's implementation of the Act up until the phase out period and ban, it must:

1) **Require current information.** DEQ must require a permit applicant to submit an updated EIS whenever the applicant applies for a permit renewal. Updated mining plans should also be required for permit renewals and changes in ownership.

2) **Develop and utilize an accountable procedure for granting permits.** The DEQ must develop written rules for determining when a proposed mining activity is likely to destroy the dunes. If the permit applicant cannot demonstrate, not just state without evidence, that the proposed mining activity will not destroy the dunes, the DEQ must deny the permit under the Act.

3) **Address compliance problems.** The Attorney General's office must convene a state advisory committee consisting of conservation and environmental groups, DEQ staff, and university experts to review all active mining sites and recommend actions and timetables to address outstanding violations.

Public participation

Public participation must be a key component in the amended permit review process. The following could help to ensure that potential environmental impacts are thoroughly evaluated, alternative locations considered, and the public voice is heard in the process

1) **Improve the process for public participation.** The permit applicant should submit a draft EIS to DEQ who would issue a public notice that the draft EIS is available. Neighboring communities should be notified. The DEQ should hold a hearing 60 days after the draft EIS is available to allow the public to comment on the EIS and permit application. The DEQ should then prepare written comments that utilize the written rules described above and incorporate public comments. Copies of these written comments should be provided to all parties who attended the hearing or submitted written comments. The permit applicant would then submit a final EIS and application and the 120-day clock would begin at this submittal.

2) **Establish concrete information on mining in the dunes.** Amend the Act to establish a Dune Protection Information System on the World Wide Web that requires exact information from mining companies on how much dune sand is removed, where it is going, costs of transportation, removal, etc., and products that use the sand. Annual reports required of the companies will be used to create the information system.

Research

1) **Identify remaining dunes for protection.** Conduct the study not completed as part of the requirements of the Act. Identify all remaining critical or otherwise ecologically significant dunes remaining within mining sites for potential preservation efforts.

2) **Quantify the benefits of Lake Michigan sand dunes.** Conduct a study of the economic benefits of the dunes.

Dune restoration

1) **Improve reclamation of mined areas.** DEQ must review each mining site to

reommend improvements to existing reclamation efforts.

Preservation

1) **Increase funds for dune acquisition.** The legislature should specify a percentage of the surveillance fees to be provided to the Natural Resources Trust Fund for dune preservation efforts.

2) **Increase dunes acquisition.** Conservation groups, community organizations and conservancies should establish local/state public/private partnerships to initiate preservation efforts.

3) **Purchase inactive or closed mines with remaining intact dunes.** Both the Sargent Sand Site, which is active, but not currently being mined, and the Hart Packing Site, which is closed, are 100% barrier dune areas that should be added to existing state parklands.

Local government

1) **Improve protection at the local level**. Local communities host to mining operations should institute improved protections for sand dunes.

Corporate responsibility

1) **Phase out dune sand for industrial purposes.** Automotive companies should review their use of dune sand and agree to a voluntary phase-out of dune sand in their operations. Other lesser uses of dune sand for fill, golf courses, concrete and glass should also be phased out.

2) **Reuse sand in foundry operatins.** Foundries should implement sand recovery and reuse programs to reduce the need for new sand in their processes.

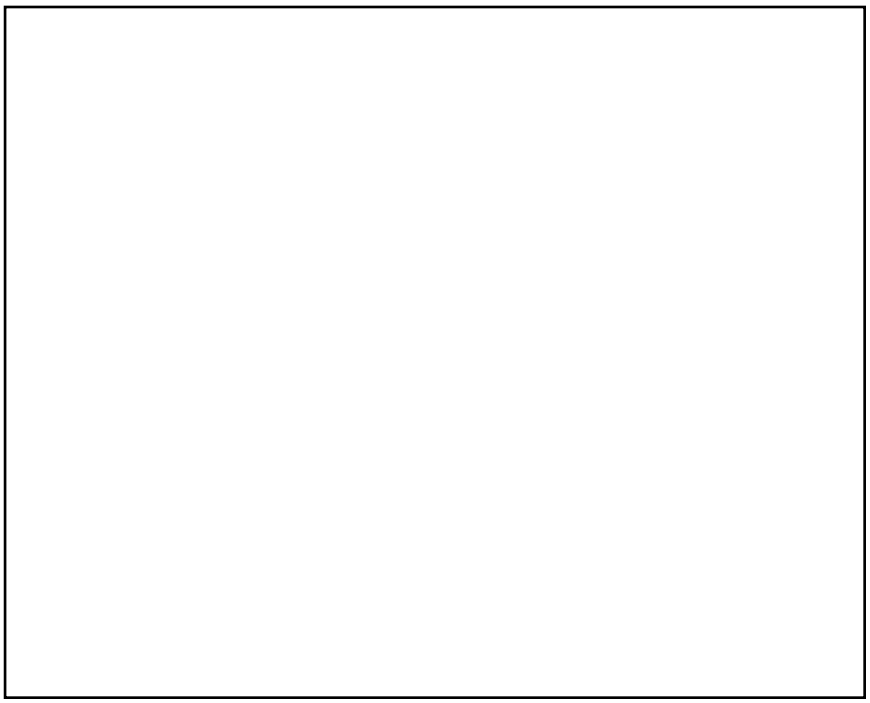
Citizen activism

The public should:

1) **Encourage increased protection for sand dunes at the local and state levels.**

2) **Participate in the permitting of sand dune mining operations.**

3) **Support businesses and industries that do not use dune sand and that strive overall to be good environmental corporate citizens.**



Pigeon Hill, Muskegon County, 1958

Rosy Mound - A Story of Dunes Preservation

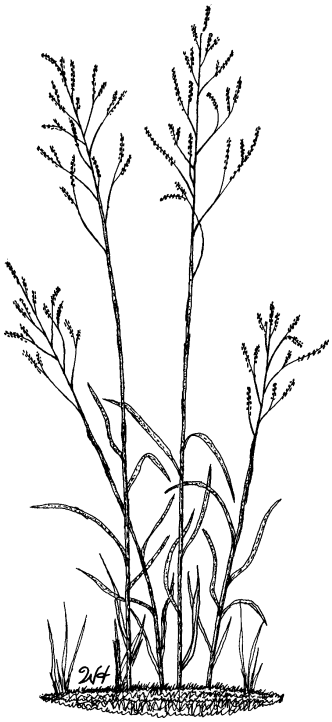
Rosy Mound in Ottawa County, just south of Grand Haven, is a great example of cooperation between local government, citizens and a mining company. In 1987, the Ottawa County Parks and Recreation Commission began searching for additional property to add to their existing park system. By 1989, the Commission had adopted a plan to include the acquisition of Rosy Mound as their number one priority.

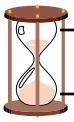
Rosy Mound consists of 300 acres of a beautiful dune system owned and mined by Standard Sand company. The Parks Commission approached Standard Sand to purchase 160 acres of this property, including 3,400 feet of Lake Michigan frontage. In early 1990, Michigan's Natural Resources Trust Fund awarded $3.75 million to purchase the property. The state currently holds title to the property with plans to transfer it to Ottawa County. Future plans for the Rosy Mound Natural Area call for development of an access drive and parking, rest rooms and trails for hiking and beach access. The master plan for the area emphasizes the preservation of the site's unique natural features. Those making the hike to the beach will enjoy a view of a huge dune blowout in the center of the site surrounded by high, forested dunes creating an expansive valley totally buffered from surrounding development.

According to John Scholtz, manager of the Ottawa County Parks and Receation Commission, "The mining company really showed good will towards the public in dealing with county and state officials."

Mr. Scholtz has advice for communities that wish to acquire lakeshore dune properties:

1. Have a plan to identify key lands along Lake Michigan. Protection of key natural resources is a high priority of the Trust Fund.
2. Have a concept plan of what you want to do with the property.
3. Get support from local land owners.
4. Be prepared to go through an application process at the Trust Fund which could take up to a year. For additional information, Mr. Scholtz can be reached at 616-738-4810.





THANK YOU

This report is the culmination of a project to examine the mining of Lake Michigan sand dunes conducted by the Lake Michigan Federation in conjunction with the West Michigan Environmental Council.

Thank you to the Americana Foundation and the Ecology Center of Ann Arbor for funding this project. The L.C. and Margaret Walker Foundation of Muskegon provided LMF with a generous award of funds in 1998, some of which were used in our sand dune research.

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Mary Stephenson in memory of Lillian Ragen
Ruth Todd
Mr. And Mrs. Robert Brown
Wendy Bruno
Joan Newberry

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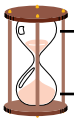
Please see the inside front cover for acknowledgement of others who have assisted with the project.



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[1]Personal communication with staff at P.J. Hoffmaster State Park
[2]Personal communication with staff at Sleeping Bear Dunes National Lakeshore
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[6]*An Economic Study of Coastal Dunes Mining in Michigan,* 1978
[7]Personal communication with Mr. Rodger Whitener, DEQ
[8]*Dune Type Inventory and Barrier Dune Classification of Michigan's Lake Michigan Shore,* DEQ, MDNR, 1996
[9]Report from Westshore Consulting
[10]Correspondence from Mr. Rodger Whitener, DEQ, 7/30/98
[11]Correspondence from Mr. Rodger Whitener, DEQ, 7/30/98
[12]Personal communication with Charles Davis, *Preserve the Dunes*
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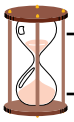


SAND DUNE MINING FILES

Do you have a sand dune mining site in your neighborhood? Check the map on page 31. If so, you may want to find out more about it - plans for expansion, status of reclamation efforts, and compliance with the Act. To help you, we've included some basic information on the sand dune mining program and how it is organized.

The program's main files are maintained in a central file system in Lansing at the Geological Survey Division located at 735 E. Hazel Street, P.O. Box 30526, Lansing, MI 48909-7758. If you wish to review files at the office, it is best to call ahead and get an appointment. Mr. Rodger Whitener, supervisor of the program, can be reached at 517-334-6976.

The files are organized into several general categories::

* Maps and Plans
* Permit Applications and Amendments
* Permit Correspondence and related items
* Inspection Reports
* Photographs
* Litigation (if any)

To one less familiar with the files, the categories can be defined more generally:

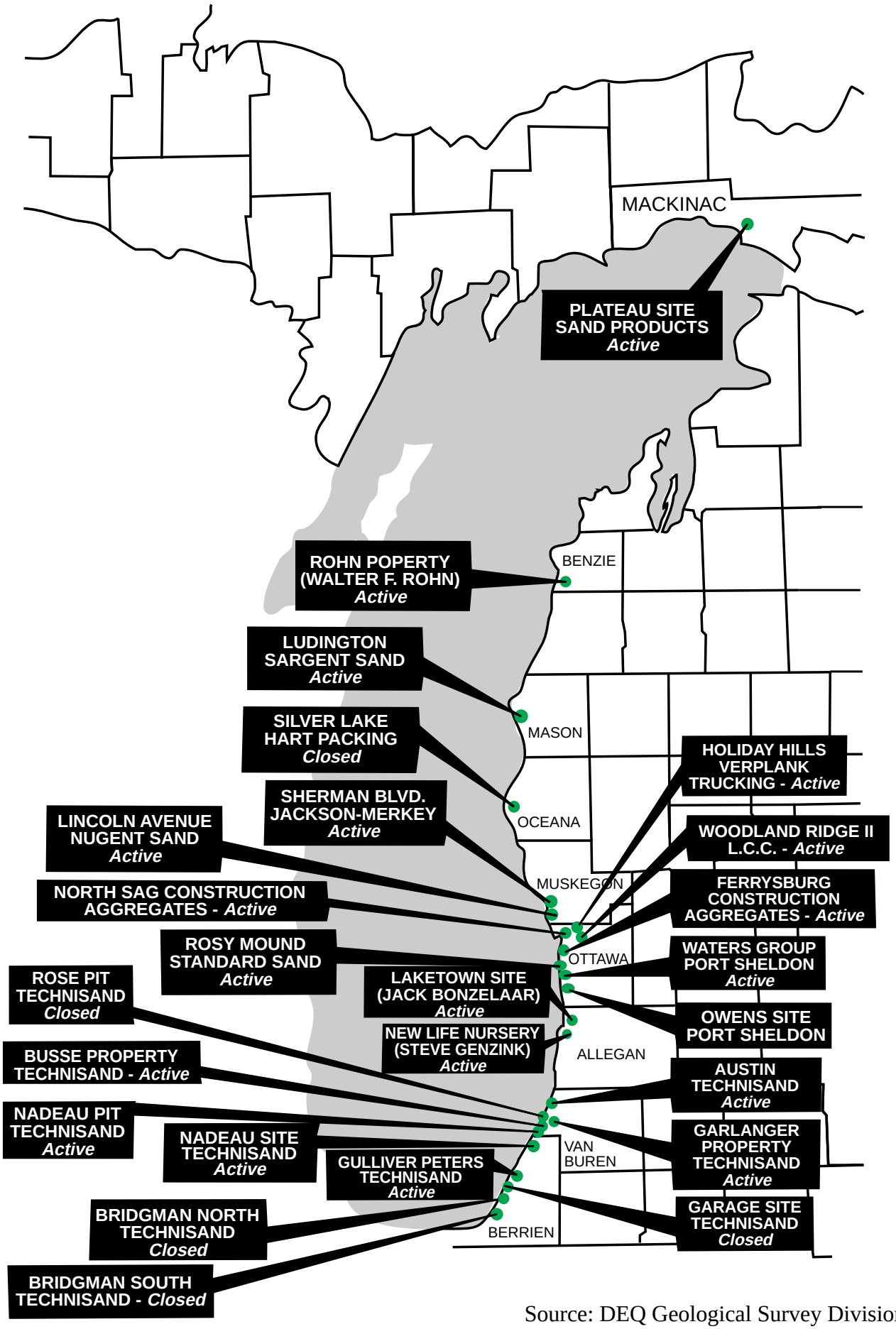
* *Yellow File Folders:* Contain inspection reports ranging from a single file with approximately ten inspection forms to three files of fifty forms each. The inspection forms are one page forms with a series of check-off boxes and room for a narrative description.

* *Pink File Folders:* Contain the permit forms and conformance bond documents. These files tended to be limited to just one file, no more than one to two inches thick. The permits themselves consist of just two or three single pages of forms and various notices and updates. The conformance bond documents can consist of quite a number of correspondence indicating specific negotiations over the application of bond requirements to specific cell units. The conformance bonds appeared to usually consist of letters of credit from banks.

* *Blue File Folders:* Contain permit correspondence regarding the details of permit and associated negotiations. These files can range from single files of just a few pages to several thick files.

* *Plain Manila Folders:* Contain the substantive plans and amendments, and may also include litigation related documents. If litigation or involved negotiations have occurred, the files can be two or more feet thick. The plans consist of the EIS's and Progressive Cell-Unit Mining and Reclamation Plans, which make up the major substantive documents associated with the permits. A number of the major planning documents are quite old (ten to twenty years), which relate to the original permitting dates of the historic/traditional mining sites. These files often have dedicated map documents to the front of a shelf for a given site, and a photograph file to the back.

Lake Michigan Federation would be happy to assist you with your research. We encourage you to find out about your sand dune mining neighbors and help us institute better protections for Lake Michigan's sand dunes.



Source: DEQ Geological Survey Division

MICHIGAN'S SAND DUNE MINING REGULATIONS

Natural Resources and Environmental Protection Act - Act No. 451 of the Public Acts of 1994, as amended

Part 637, Sand Dune Mining and promulgated administrative rules

Michigan Department of Environmental Quality Geological Survey Division - October 1995

Sec. 63701. As used in this part:

(a) "Active cell-unit" means a cell-unit set forth in the approved progressive cell-unit mining and reclamation plan provided for in section 63706(1), in which vegetation and topsoil have been removed in preparation for sand dune mining or sand removal has been initiated after the date of issuance of the sand dune mining permit. Vegetation removal does not preclude the removal of marketable forest products from a cell-unit, if the removal maintains the ground cover and topsoil within the cell-unit in stable condition.

(b) "Administratively complete" means an application for a sand dune mining permit that is determined by the department to satisfy all of the conditions of this part and rules promulgated under this part.

(c) "barrier dune" means the first landward sand dune formation along the shoreline of a Great Lake or a sand dune formation designated by the department.

(d) "Beneficiation" means to process sand for any of the following purposes, but does not include the drying process:

(i) Regulating the grain size of the desired product.

(ii) Removing unwanted constituents.

(iii) Improving the quality and purity of the desired product.

(e) "Cell-unit" means a subunit of the total sand dune mining project as determined in size and location by the operator. A cell-unit shall not exceed 10 acres in size for sand dune mining operations that commence operation after March 31, 1977 or for the expansion of sand dune mining operations that existed before March 31, 1977. A cell-unit shall not exceed 30 acres in size for operations that existed before March 31, 1977.

(f) "Conformance bond" means a surety bond that is executed by a surety company authorized to do business in this state, cash, certificates of deposit, letters of credit, or other securities that are filed by an operator to ensure compliance with this part, rules promulgated under this part, or conditions of a sand dune mining permit.

(g) "Environmental elements" means the biological, physical, and chemical characteristics of the environment, including but not limited to the following:

(i) Watersheds.

(ii) Water bodies.

(iii) Forests.

(iv) Existing areas maintained for public recreation.

(v) Shorelands.

(vi) Habitat areas.

(h) "Great Lakes" means any of the Great Lakes that have a shoreline within this state.

(i) "Interim cell-unit status" means a cell-unit as set forth in an approved progressive cell-unit mining and reclamation plan provided for in section 63706(1), in which all sand dune mining and reclamation within the cell-unit has been completed, but the vegetation has not sustained itself through 1 full growing season. A cell-unit placed in interim cell-unit status is required to retain the conformance bond provided in section 63712 until reclassification by the department as provided in section 63712(5). Each sand dune mining activity shall be limited to no more than 3 cell-units in interim cell-unit status at any 1 time.

(j) "Operator" means an owner or lessee of mineral rights or any other person engaged in or preparing to engage in sand dune mining activities with respect to mineral rights within a sand dune area.

(k) "Sand dune area" means that area designated by the department that includes those geomorphic features composed primarily of sand, whether windblown or of other origin and that lies within 2 miles of the ordinary highwater mark on a Great Lake as defined in section 32502, and includes critical dune areas as defined in part 353.

(l) "Sand dune mining" means the removal of sand from sand dune areas for commercial or industrial purposes, or both. The removal of sand from sand dune areas in volumes of less than 3,000 tons is not sand dune mining if the removal is a 1-time occurrence and the reason the sand is removed is not for the direct use for an industrial or commercial purpose. However, the removal of any volume of sand that is not sand dune mining within a critical dune area as defined in part 353 is subject to the critical dune protection provisions of part 353. The department may authorize in writing the removal of more than 3,000 tons of sand without a sand dune mining permit issued pursuant to section 63704 for a purpose related to protecting an occupied dwelling of other structure from property damage related to the migration of sand or the instability of sand. This removal may be for more than 1 occurrence, but a written authorization from the department is required for each removal.

(m) "Water table" means the surface in an unconfined aquifer at which the pressure is atmospheric. The water table is found at the level at which water stands in wells that penetrate the aquifer.

Sec. 63702. (1) Notwithstanding any other provision of this part, the department shall not issue a sand dune mining permit within a critical dune area as defined in part 353 after July 5, 19489, except under either of the following circumstances:

(a) The operator seeks to renew or amend a sand dune mining permit that was issued prior to July 5, 1989, subject to the criteria and standards applicable to a renewal or amendatory application.

(b) The operator holds a sand dune mining permit issued pursuant to section 63704 and is seeking to amend the mining permit to include land that is adjacent to property the operator is permitted to mine, and prior to July 5, 1989 the operator owned the land or owned rights to mine dune sand in the land for which the operator seeks an amended permit.

(2) As used in this section, "adjacent" means land that is contiguous with the land for which the operator holds a sand dune mining permit, issued pursuant to section 63704, provided no land or space, including a highway or road right-of-way, exists between the property on which sand dune mining is authorized and the adjacent land.

Sec. 63703. The department, by July 1, 1977, shall make or cause to be made a comprehensive study and inventory of Great Lakes sand dune areas in the state. The study and inventory shall include all of the following:

(a) An economic study of the current and projected sand dune mining practices in the state, showing where the sand is marketed, its uses, and the amount of sand reserves.

(b) A geologic study of sand areas within this state, other than Great Lakes sand dune areas, that would contain sufficient reserves and have properties suitable for use as foundry core and molding sands or for other uses of sand.

(c) Sand dune areas or portions of sand dune areas that, for environmental or other reasons, should be protected through purchase by the state or other persons or interests, or easements including the acquisition of mineral rights by the state, and a priority list of sand dunes areas to be acquired by the department.

(d) An identification and designation of barrier dunes along the shoreline, showing their effect on aesthetic, environmental, economic, industrial, and agricultural interests in this state.

(e) Methods for recycling or reusing sand or industrial and commercial purposes, along with alternatives to the use of dune sand and its economic impact.

(f) Recommendations for the protection and management of sand dune areas for uses other than sand mining.

Sec. 63704. (1) After July 1, 1977, a person or operator shall not engage in sand dune mining within Great Lakes sand dune areas without first obtaining a permit for that purpose from the department.

(2) Prior to receiving a permit from the department, a person or operator shall submit all of the following:

(a) A permit application on a form provided by the department.

(b) An environmental impact statement of the proposed mining activity as prescribed by section 63705.

(c) A progressive cell-unit mining and reclamation plan for the proposed mining activity as prescribed by section 63706.

(d) A 15-year mining plan as prescribed by section 63707.

Sec. 63705. The environmental impact statement submitted to the department shall comply with the requirements of the department and shall include, but is not limited to, the following:

(a) The method and direction of mining.

(b) Surface overburden stripping plans.

(c) The depth of grade level over the entire site from which the sand will be removed.

(d) Provisions for grading, revegetation, and stabilization that will minimize shore and soil erosion, sedimentation, and public safety problems.

(e) The location of buildings, equipment, stockpiles, roads, or other features necessary to the mining activity and provisions for their removal and restoration of the area at the project termination.

(f) Provisions for buffer areas, landscaping, and screening.

(g) The interim use or uses of reclaimed cell-units before the cessation of the entire mining operation.

(h) Maps and other supporting documents required by the department.

(2) The department shall not issue a sand dune mining permit for any of the following:

(a) A sand dune mining operation that existed before March 31, 1977, if the progressive cell-unit mining and reclamation plan includes more than 3 30-acre cell-units.

(b) A sand dune mining operation that commenced after March 31, 1977, if the progressive cell-unit mining and reclamation plan includes any cell-unit having an area exceeding 10 acres.

(c) The expansion of an existing sand dune mining if that expansion includes any cell-unit having an area exceeding 10 acres.

(3) The progressive cell-unit mining and reclamation plan for sand dune mining permits issued 30 days or more after June 23, 1994 shall meet the following requirements:

(a) All upland reclamation grades for sand dune mining operations shall have a slope not steeper than 1-foot vertical rise in a 3-foot horizontal plane, except that the department may approve plans that allow steeper reclaimed slopes in order to provide a smoother

transition to undisturbed topographic features or the protection of existing environmental features.

(b) All submerged grades established by the excavation of material below the water table and the creation of a water body shall have underwater slopes as follows:

(i) For water bodies with a surface area less than 5 acres, the submerged grades shall be 1-foot vertical rise in a 3-foot horizontal plans, or flatter, to a depth of 6 feet.

(ii) For water bodies with a surface area 5 acres or greater, the submerged grades shall be 1-foot vertical rise in a 6-foot horizontal plan, or flatter, to a depth of 6 feet.

(iii) For all water bodies where the progressive cell-unit mining and reclamation plan designates a final use after sand dune mining as public access, the area designated for public access shall have submerged grades of 1-foot vertical rise in a 10-foot horizontal plane, or flatter, to a depth of 6 feet.

(c) A 200-foot minimum setback distance from the property line to the cell-unit boundary line shall be provided on all cell-unit mining and reclamation plans, except the department may approve plans with less than 200-foot minimum setback distances if the department determines that the sand dune mining activity is compatible with the adjacent existing land use.

(d) A 500-foot minimum setback distance from the ordinary high-water mark of the Great lakes shall be provided on all cell-unit mining and reclamation plans. As used in this subdivision, ordinary high-water mark means for the lands bordering or adjacent to waters or land affected by levels of the Great Lakes landward of the ordinary high-water mark as defined by section 32502, and those lands between the ordinary high-water mark and the water's edge.

(e) All cell-unit mining and reclamation plans shall include fencing or other techniques to minimize trespass or unauthorized access to the sand dune mining activity.

(f) If the proposed sand dune mining activity proposes to mine below the water table, the department may require a hydrogeological survey of the surrounding area.

(g) If threatened or endangered species are identified within the cell-unit boundaries, the cell-unit mining and reclamation plan shall indicate how the threatened or endangered species shall be protected or, if not protected, what mitigation measure shall be performed.

(h) If the proposed sand dune mining activity includes beneficiation or treatment of the sand, the application documents shall include specific plans depicting the methods, techniques, and manufacturer's material safety data sheets on all chemicals, or other additives that are not natural to the site, that will be utilized in the process. The operator shall also obtain all applicable state and federal permits prior to the beginning the beneficiation process.

Sec. 63707. (1) The 15-year mining plan shall include the following:

(a) The location and acreage of sand dune areas presently being mined and the amount of sand being mined.

(b) The location and acreage of sand dune areas not presently being mined but planned for that purpose and the amount of sand planned to be mined.

(c) A schedule indicating when the mining activity will begin in each sand dune area and the probable termination date of mining activities in each area.

(d) Additional information requested by the department.

(e) All cell-unit mining and reclamation plans shall include fencing or other techniques to minimize trespass or unauthorized access to the sand dune mining activity.

(f) If the proposed sand dune mining activity proposes to mine below the water table, the department may require a hydrogeological survey of the surrounding area.

(g) If threatened or endangered species are identified within the cell-unit boundaries, the cell-unit mining and reclamation plan shall indicate how the threatened or endangered species shall be protected or, if not protected, what mitigation measures shall be performed.

(h) If the proposed sand dune mining activity includes beneficiation or treatment of the sand, the application documents shall include specific plans depicting the methods, techniques, and manufacturer's material safety data sheets on all chemicals, or other additives that are not natural to the site, that will be utilized in the process. The operator shall also obtain all applicable state and federal permits prior to beginning the beneficiation process.

Sec. 63707. (1) The 15-year mining plan shall include the following:

(a) the location and acreage of sand dune areas presently being mined and the amount of sand being mined.

(b) The location and acreage of sand dune areas not presently being mined but planned for that purpose and the amount of sand planned to be mined.

(c) A schedule indicating when the mining activity will begin in each sand dune area and the probable termination date of mining activities in each area.

(d) Additional information requested by the department.

(2) A duplicate copy of the cell-unit mining and reclamation plan shall be submitted to the soil conservation district in the county where the mining activity is proposed to occur. The soil conservation district shall have 30 days after receipt of the plan to review the proposal and submit written comments to the department.

Sec. 63708. (1) A sand dune mining permit issued by the department is valid for not more than 5 years. A sand dune mining permit shall be renewed if the sand dune mining activities have been carried out in compliance with this part, the rules promulgated under this part, and the conditions of the sand dune mining permit issued by the department.

(2) The sand dune mining permit, if the department allows for the removal of all or a portion of the barrier dune pursuant to this part, it shall submit to the commission written reasons for permitting the removal.

(3) In granting a sand dune mining permit, if the department allows for the removal of all or a portion of the barrier dune pursuant to this part, it shall submit to the commission written reasons for permitting the removal.

(4) The department shall approve or deny a sand dune mining permit application in writing within 120 days after the application is received and is determined by the department to be administratively complete. If a sand dune mining permit is denied, the reasons shall be stated in a written report.

(5) The department shall provide a list of all pending sand dune mining applications upon a request from a person. The list shall give the name and address of each applicant, the legal description of the lands included in the project, and a summary statement of the purpose of the application.

Sec. 63709. The department shall deny a sand dune mining permit if, upon review of the environmental impact statement, it determines that the proposed sand dune mining activity is likely to pollute, impair, or destroy the air, water, or other natural resources or the public trust in those resources, as provided by part 17.

Sec. 63710. The state or an instrumentality of the state shall not engage in the extraction of sand or other minerals from a sand dune area, except as required in the interest of public health and safety in an emergency situation resulting from a disaster as defined in Section 2 of the emergency preparedness act, Act No. 390 of the Public Acts of 1976, being section 30.402 of the Michigan Compiled Laws.

Sec. 63711. (1) For purposes of surveillance, monitoring, administration, and enforcement of this part, an operator is assessed a fee of not more than 10 cents per ton of sand mined from a sand dune area for the calendar year reported as described in subjection (2). Funds collected by the assessment of the fee shall not exceed the actual costs to the department of implementing the sections of this part that pertain to sand dune mining. Any fees collected under this subsection that are unexpended at the end of a fiscal year shall be credited to a separate fund of the department, carried over to the succeeding fiscal year, and deducted from the amount appropriated for that year for surveillance, monitoring, administration, and enforcement of this part for purposes of computing the fees to be assessed for that year.

(2) An operator shall file an annual report on or before January 31 of each year. The report shall show the areas mined, and describe the progress of restoration and reclamation activities of the operator for the preceding calendar year. The report shall contain both of the following:

(a) The number of tons of sand mined from a sand dune area.

(b) Location of the sand dune area.

(3) The fee described on subsection (1) shall be due not more than 30 days after the department sends written notice to the operator of the amount due.

(4) The surveillance fee and annual report required by this section is confidential and shall not be available for public inspection without the written consent of the person filing the fee and report, except in accordance with judicial order.

(5) Failure to submit an annual report in compliance with rules promulgated by the department constitutes grounds for revocation of a permit.

(6) A penalty equal to 10% of the amount due, or $1,000.00, whichever is greater, shall be assessed against the operator for a fee that is not paid when due. An unpaid fee and penalty shall constitute a debt and become the basis of a judgment against the operator. Penalties paid pursuant to this section shall be used for the implementation, administration, and enforcement of this part.

(7) Records upon which the annual report is based shall be preserved for 3 years and are subject to audit b the department.

(8) The department shall annually prepare and submit to the house of representatives and senate standing committees with jurisdiction over subject areas related to natural resources and the environment a report on the sand mining surveillance activities undertaken by the department for the immediately preceding year and the cost of those activities.

Sec. 63712. (1) Prior to the initiation of a disturbance of land, the holder of a sand dune mining permit shall file with the department a conformance bond in favor of the state.

(2) The conformance bonds shall be filed for a maximum of 3 active cell-units and 3 cell-units in interim cell-unit status within the sand dune mining permit and shall be for an amount equal to $10,000.00 per cell-unit or $1,000.00 per each acre in the cell-units, whichever is greater, for cell-units bonded prior to June 23, 1994. For all cell-units that are bonded after June 23, 1994, the conformance bond shall be for an amount equal to $20,000.00 per cell-unit or $2,000.00 per each acre in the cell-units, whichever is greater. The bond for a cell-unit bonded prior to June 23, 1994 shall remain in effect until the cell-unit is released from the requirements of the conformance bond as provided in subsection (4) or the cell-unit boundary is revised as approved by the department. If an existing cell-unit boundary is revised, the conformance bond for the cell-unit shall be increased to the amounts provided for cell-units bonded after June 23, 1994.

(3) The conformance bonds shall be transferable to other cell-units contained within the sand dune mining permit upon faithful conformance with the approved reclamation plan as provided in section 63706.

(4) The conformance bond shall be conditioned upon the faithful performance of the requirements set forth in the approved reclamation plan as provided in section 63706. Liability under the conformance bond shall be maintained as long as the reclamation is not completed in compliance with the approved plan. The

conformance bond shall remain in full force until the release of the cell-unit from the conformance bond requirements, including the period of time the cell-unit may have been placed in interim cell-unit status.

(5) The department shall not reclassify a cell-unit from active to interim cell-unit status until the following minimum conditions or requirements have been met:

(a) All permitted sand dune mining activities within the cell-unit have been completed.

(b) All extraction or processing equipment has been removed from the cell-unit, except that a roadway, conveyor, or slurry pipeline corridor may be maintained through a cell-unit and the cell-unit status. This roadway, conveyor, or slurry pipeline corridor shall be considered part of the plant site and shall be removed and revegetated as provided by section 63706(1)(e).

(c) All upland areas within the cell-unit that were disturbed by sand dune mining have been regraded as provided in section 63706(3)(a).

(d) All submerged grades within the cell-unit established by sand dune mining have been regraded as provided in section 63706(3)(b).

(e) All upland areas within the cell-unit that were disturbed by sand dune mining have been revegetated utilizing native or indigenous species or other plant material pursuant to the approved progressive cell-unit mining and reclamation plan as provided in section 63706(1). The vegetation that has been planted shall have germinated or taken root and cover a minimum of 80% of the upland areas disturbed by sand dune mining, and no single area exposed to the elements shall be greater than 25 square feet.

(f) The operator shall provide proper measures to aid in the establishment of growth of the planted vegetation until adequate root systems have developed to provide sustained growth.

(6) The department may reclassify an active cell-unit to interim cell-unit status upon receipt of a written request by the operator. The department shall conduct an on-site inspection of the reclamation activities that have been completed and determine if the completed reclamation activities are adequate to reclassify the active cell-unit to interim cell-unit status. The department shall schedule the on-site inspection within 45 days of the written request. The department shall notify the operator within 30 days following the date of the inspection of the department's decision to grant or deny the request for interim cell-unit status. If the department determines the reclamation activities conducted within the cell-unit do not meet the conditions and requirements for interim cell-unit status, the notification shall include information detailing the reasons for denial.

(7) If the department determines the status of an active cell-unit does not meet the conditions or requirements for reclassification to interim cell-unit status, the operator may not reapply for reclassification of the same active cell-unit until 1 year from the previous request.

(8) Notification shall be given to the operator upon completion or acceptance by the department of the reclamation activity. The notification constitutes the release of the cell-unit from the conformance bond requirements if:

(a) All permitted sand dune mining activities within the cell-unit have been completed.

(b) All extraction or processing equipment has been removed from the cell-unit, except a roadway, conveyor, or slurry pipeline corridor may be maintained through a cell-unit and the cell-unit still released from bond. This roadway, conveyor, or slurry pipeline corridor shall be considered part of the plant site and shall be removed and revegetated as provided by section 63706(1)(e).

(c) All upland areas within the cell-unit that were disturbed by sand dune mining have been regraded as provided in section 63706(3)(a).

(d) All submerged grades within the cell-unit that were disturbed by sand dune mining have bene regraded as provided in section 63706(3)(b).

(e) All upland areas within the cell-unit that were disturbed by sand dune mining have been revegetated utilizing native or indigenous species or other plant material pursuant to the approved reclamation plan as provided in section 63706(1).

(f) There are no areas within the revegetated portions of the cell-unit where a 10-foot by 10-foot test plot can be measured with less than 80% survival of the planted vegetation.

(g) The plant material shall be required to sustain itself through 1 full growing season.

(h) There are no areas within the revegetated portion of the cell-unit with ongoing erosion, except some wind erosion shall be allowed if the wind erosion that is occurring does not threaten the stability of the regraded slopes or the ability of the plant material to accommodate the accretion of sand.

(9) Mining or extraction of sand dune minerals from any other cell-unit contained with the sand dune mining permit is prohibited until compliance or approval is attained from the department.

(10) A violation of this section constitutes grounds for revocation of the sand dune mining permit.

Sec. 63713. The department shall promulgate rules to implement and administer this part.

Sec. 63714. (1) If the department finds that an operator is not in compliance with this part, the rules promulgated under this part, or a permit issued under this part, the department may suspend or revoke the permit.

(2) At the request of the department, the attorney general may institute an action in the circuit court for a restraining order or injunction or other appropriate remedy to prevent or preclude a violation of this part, a permit issued under this part, or the rules promulgated under this part. This shall be in addition to the rights provided in part 17.

(3) A person who violates this part or a permit issued under this part is guilty of a misdemeanor, punishable by a fine of not more than $5,000.00.

A P P E N D I X

Sand Dune Mining Files

Sand Dune Mining Site Map

Sand Dune Mining Act